CHAPTER 1

INTRODUCTION

1. Fourteenth Finance Commission ToR No 3 (viii)

The terms of reference for the 14th Finance Commission state that in making its recommendations the Commission shall have regard among other considerations to 3(viii) 'the need for insulating the pricing of public utility services like drinking water, irrigation, power and public transport from policy fluctuations through statutory provisions'.

The 14th Finance Commission entrusted the study, 'Insulating Public Utility Pricing from Policy Fluctuations for Sustainable Growth: Power and State Road Transport' to Prof U.Sankar, Honorary Professor, Madras School of Economics. The mutually agreed terms of reference for the study are:

(I) A brief review of the existing mechanism of pricing of public utilities and the problems associated with the enforced system.

(II) Reforms undertaken towards improvement in pricing mechanism and cost recovery in recent past.

(iii) Review of international experiences in insulating public utilities via legal, regulatory and administrative reforms and suggest an appropriate policy framework for India.

(iv) Lessons learnt in making public utilities competitive, private and market-oriented;

(v) Design of an information system and cost allocation mechanism for knowledge based (a) tariff design balancing the three pillars – economic, social and environmental – of sustainable development; (b) measurement of subsidies and cross subsidies; and (c) periodical tariff revisions; and

(vi) Consideration of incentive based and flexible pricing options such as long run marginal social cost based prices, price-caps seasonal/time-of-day and other mechanisms to ensure efficiency, financial viability, and meeting national goals including inclusive growth at least social cost.

While doing this exercise, the study will review pricing and subsidy policies, and the relative roles of governments, regulators and utilities in governance.

2. Plan of the Report

The public utility reform in electric utility industry is complex because in more than half of the countries in the world there is a transition from a vertically integrated statutory monopoly status towards an unbundled, privatized (partial or full) and competitive environment and there are learning, transaction and political costs of the transition. The country experiences vary depending on the initial conditions, political will and capacity to manage the transition. In India multiple goals such as efficiency, ensuring universal access to electricity for all and equity, and adverse initial conditions such as persistent power shortages, poor infrastructure and politicization of electricity tariff make the transition slow and difficult. Even though the power sector reform began in the early nineties and there are so many legal, institutional and policy changes, there is consensus that so far the anticipated benefits of reform have not accrued to society. Compared with electricity, globally and in India, there has been very little reform in passenger bus transport service. In this transport segment the major concerns are X-inefficiency resulting from state ownership and the burden of implementing social goals such as connectivity and affordable prices to the target groups at least social cost. Hence, most of the report is devoted to pricing of power.

Chapter 2 reviews the public utility pricing literature. It reviews marginal cost pricing, considers departures from marginal cost pricing in the presence of a binding budget constraint, such as two-part and multi -part tariff, inverse price elasticity rule and consideration of equity in pricing. It reviews the regulatory practice of determination of tariffs based on cost, including fair rate of return regulation, and points out the drawbacks of this regulation. It argues that recent developments in public utility economics and public utility reform in unbundling, privatization and creation of competitive markets favor adoption of new costing methods, incentive-based cost allocation procedures and pricing policies which incentivize regulated firms to minimize costs and help in achieving public interest.

Chapter 3 reviews international experience in power sector reform since the nineties. It begins with the components of standard power sector liberalization programme. It summarizes the reform experiences of selected developed and developing countries, based on secondary sources. It indicates the type of reform adopted and its current status in each selected country. Based on the review, the lessons learnt for developing countries are highlighted.

Chapter 4 reviews legal, institutional and administrative changes in India's power sector in historical perspective. This review is based largely on official sources like legislations, government policy statements, and reports. It shows noteworthy achievements in partial unbundling of the vertically integrated industry, establishment of State Electricity Regulatory Commissions, passage of

comprehensive Electricity Act and periodical corrections in policies. The major challenge is in improving the managerial and operational efficiencies of state power utilities, evolving rational tariffs free from political interference and ensuring financial sustainability of SPU. It considers recent attempts by Ministry of Power on financial restructuring, incentivizing SPUs to undertake reforms, rating of distribution companies, and Model State Electricity Distribution Management Responsibility Bill, 2013 and suggests further reforms. It identifies the needed reforms.

Chapter 5 is on financial profitability of SPUs. It reviews financial provisions in the legislations and government policy statements, observations on finances of SEBs/SPUs by Finance Commissions in the context of their assessment of state finances, and committee reports dealing with SPUs. The empirical analysis is based largely on the Planning Commission Annual Reports on the working of State Power Utilities and Electricity Departments with supplementary data from other sources. A comparative study of selected better performing SPUs with poor performing SPUs is undertaken to understand the factors influencing their differential financial performances.

Chapter 6 attempts development of an information system for design of rational electricity pricing and measurement of subsidies and cross subsidies. First, it considers possible improvements within the existing legal and regulatory frameworks. Second, it articulates and suggests an information system for determination of incentive based electricity retail tariffs and measurement of subsidies and cross subsidies in a liberalized market environment to ensure long term sustainability of the distribution companies. Third, it suggests what needs to be done to implement the new system.

Chapter 7 is devoted to state road transport utilities (SRTUs). It reviews the operational and financial performances of SRTUs in the light of observations by the earlier Finance Commissions. For the review, major information sources are the annual reports on Performances of State Road Transport Undertakings published by Ministry of Road Transport and Highways and Planning Commission 12th Plan Sub group report on State Road Transport Utilities. It recommends measures for improving physical and financial performances of SRTUs and rational pricing of bus fares.

Chapter 8 gives recommendations for consideration by the 14th Finance Commission.

CHAPTER 2

REVIEW OF PUBLIC UTILITY PRICING

1. Introduction

Public utility is an organization which provides an essential service to the public, such as drinking water, irrigation, electricity, and telecommunications. Utility services are essential for both business and consumers, must be available at all times as interruptions in the supply of services will put a halt to economic activities, bring a stop to interactions taking place in society at large and these interruptions may then present risks to life and health.

Until the seventies, public utilities in most countries were conferred statutory monopoly status because it was believed that one firm in an industry could serve any given market at the least social cost. The cost advantage was attributed to economies of scale in production, avoiding duplication costs in distribution networks, economies of vertical integration and economies of scope in joint production and delivery of many services. United Kingdom, Western Europe and many developing countries preferred public ownership whereas United States preferred largely private ownership. But in all countries, public utility regulation was deemed necessary (a) to prevent exploitation of monopoly power in the form of higher prices, (b) to ensure access of the essential good / service at affordable price , especially to the poor, and (c) to achieve other public goals such as rural connectivity and balanced regional development.

The public utility pricing literature has a long history dating back to 1844. Section 2 reviews the marginal cost pricing literature. Section 3 considers departures from marginal cost pricing in the presence of a binding budget constraint. This literature includes two- part and multi -part tariffs based on partial equilibrium approach and the work of Boiteux using general equilibrium approach, and a simpler version of Boiteux by Baumol and Bradford. Section 4 deals with the regulatory practice of determination of tariffs based on cost-based regulation including fair rate of return regulation .It points out the drawbacks of cost-based regulation. Section 5 argues that public utility reform in unbundling, privatization and creation of competitive markets requires new costing methods, incentive-based cost allocation procedures and pricing policies which incentivize regulated firms to minimize costs and help in achieving public interest.

2. Marginal Cost Pricing

Using sum of consumers' and producers' surpluses[1] as a welfare criterion, Dupuit (1844/1969) showed that maximization of the welfare requires marginal cost pricing of public utility services. Hotelling (1938), using ordinal utility, general equilibrium framework and the Pareto criterion derived marginal cost pricing rule for public utilities. Noting that average cost is equal to marginal cost plus a per unit tax rate, he showed that the welfare loss due to average cost pricing is approximately equal to one-half of the tax rate times the decrease in sales. He suggested that the deficit resulting from the application of marginal cost pricing rule in decreasing cost industries should be made up out of the public treasury or lump-sum taxes, taxes on inheritance and the site value of land. His system of pricing allows for commodity rents and different prices for peak and off-peak prices.

Demand for public utility services such as electricity, telecommunications and transportation services exhibit time-of-day as well as seasonal variations, but their capacities cannot vary in the short-run. If a uniform price is charged throughout the day there will be excess demand during peak hours and excess supply during off-peak hours. As these services are non-storable, and capacity cost is a large fraction of total cost, it is desirable to shift demand from peak periods to off-peak periods so that the pressure on capacity is eased. Efficient utilization of available capacity necessitates lower prices during off- periods and higher prices during peak periods. The off-peak price must equal short run marginal cost and the peak price must equal sum of short run marginal cost and marginal capacity cost (including scarcity rent). See Williamson (1966).

The marginal cost pricing rule has been endorsed by many governments as an ideal pricing rule for public enterprises. France adopted many innovative pricing policies including long-run marginal cost pricing and peak load pricing for public utilities, Nelson (1964).The United Kingdom published white papers in 1967 and 1978 for nationalized industries endorsing marginal cost pricing for public firms. In India the Discussion Paper on Administered Pricing, 1986 recommended application of long run marginal cost (LRMC) pricing rule for public/regulated industries. The intuitive rationale for the rule is that the LRMC represents the cost of producing an additional unit of output while the price reflects consumer's valuation of a marginal unit. It is also a condition for Pareto optimality in a general equilibrium model.

[1] In case of a single product consumers' surplus is the area between demand curve and the price line. It is the aggregate of the difference between the maximum price consumers are willing to pay and the actual price, if each unit is charged at the maximum price. It assumes cardinal utility. Producers' surplus is the area between the price line and the supply curve; it is positive in an increasing cost industry, zero in a constant cost industry, and negative in a decreasing cost industry.

There are some conceptual and measurement problems in applying LRMC principle in practice. When there are indivisibilities in plant size, we can expect discontinuities or jumps in marginal costs. In India in the seventies and the eighties, the Bureau of Industrial Costs and Prices considered a "Greenfield plant" as the one corresponding to the best-practice technology and computed the incremental cost i.e., the average cost of production in a marginal plant, for recommending prices for regulated industries such as cement and sugar at that time. The basic idea is that "prices should cover capital and current costs of efficient production in a new plant. The World Bank sponsored a few studies on electric power pricing policy. See, for example, Munnasinghe (1979). It supported many State Electricity Boards in India to undertake estimation of marginal costs of electricity at voltage level. Sankar and Hema (1985) estimated LRMCs for electricity at voltage/ customer category ends for a most efficient power plant in Tamil Nadu. See also Sankar, Mythili and Anuradha

(1998). However, none of the State Electricity Boards (SEBs) in India used the LRMC method for determining the electricity tariff.

3. Pricing Rule with a Budget Constraint

(a) Two- Part and Multi- Part Tariffs

Coase (1946) argued that for the existence of an enterprise both total and marginal conditions must be fulfilled. In case of a decreasing cost industry, application of marginal cost pricing rule involves loss of (LRAC (Q*) – LRMC (Q*)) Q*, where Q* is the output corresponding to price = LRMC, LRAC = long run average cost and LRMC is long run marginal cost. Therefore, he suggested a two part tariff consisting of a lump sum license fee per customer equal to [(LRAC (Q*) – LRMC (Q*))]*(Q*/N) where N is the number of consumers and a per unit charge equal to LRMC.

Under multi-part tariff, monthly consumption is divided into many blocks: e.g., less than 50 kWh, 50-100 kWh, 100-200 kWh, 200-500 kWh, and above 500 kWh in electricity. The tariff consists of a lump sum fee (customer charge independent of the quantity consumed) and rates falling from the first block to the last block. Under ideal conditions, in a decreasing cost industry, the rate for the last block equals LRMC. The rates are decided in such a way that the higher rates in earlier blocks would be sufficient to cover the losses resulting from application of LRMC pricing.

(b) Two –Part / Multi-Part Tariff and Equity

The problem with the two-part tariff is that it is regressive i.e., the average tariff decreases with the quantity consumed. Feldstein (1972) analyzed the trade- off between equity and efficiency by

incorporating distribution of household income, marginal social utility of income, and household demand function depending on income and marginal price. He found that

$$((P - MC)/P) = (1/e)\,((\text{cov}\,(MU, q)/\,(Q\,E\,(MU))$$

where, P= price, MC= marginal cost, e= own price elasticity of demand, MU = social marginal utility of money, cov (MU, q)=covariance across households of the quantity consumed and the social marginal utility of money, Q= aggregate demand ,and E(MU)= expected social marginal utility of income. NG and Weiser (1974) relaxed the assumption that the number of consumers is constant. They found that when the price elasticity of the number of customers is not zero, price exceeds (falls short of) marginal cost if average consumption exceeds (falls short of) the marginal consumption.

The decreasing block tariff is inequitable as the small consumer pays a higher average price than a large consumer. An increasing block electricity tariff provides relief to small consumers and provides incentive to large consumers to curtail energy consumption. However, the increasing block tariff schedule is feasible only in a monopoly. With free entry and exit, large consumers will have an incentive to choose an alternative supplier.

(c) Optimal Departures from Marginal Cost Pricing

Boiteux (1956) formulated a general equilibrium model with private and public firms. His model assumes that each consumer maximizes his utility subject to his budget constraint and each private firm maximizes its profit. The public firms must satisfy budget constraints but their pricing behavior is to be deduced from the model. Using the Pareto criterion and assuming all markets clear, he derived the second best pricing policy for the public firms. Computation of Boiteux prices require information on own and cross-price demand elasticity of demand, the distributional weights, shadow price of the budget constraint and behavioral patterns of private producers. Hence, it is rarely applied.

Baumol and Bradford (1970) considered a simpler version of the Boiteux model and derived the pricing policy of a multiproduct public monopoly operating under a budget constraint. Assuming independent demands they derived the following pricing rule:

$$(P_i - MC_i)/P_i = k\,(-(1/e_i)),\ i = 1,2,\ldots,n$$

where P_i = price of ith product, MC_i = marginal cost of ith product, e_i = own price elasticity of demand of ith product, and k= a constant depending on the Lagrangean multiplier. The above equation is known as the inverse price elasticity rule or the Ramsey pricing rule in the taxation literature. This pricing rule states that the proportional deviation between price and marginal cost for ith product must be inversely related to its own price elasticity of demand. This policy requires a higher mark-up on marginal cost in a market where the demand is less elastic and a lower mark-up on marginal cost where the demand is more elastic.

4. Regulatory Practice

Till the seventies state –owned utilities and regulatory commissions determined the administered prices for public utility services based on historical/accounting costs. The cost based regulation involves the following steps: (a) assumption about expected demand/ forecast output, (b) determination of annual capital cost consisting of depreciation, interest on debt capital, corporation income tax and return on equity capital, and (c) annual operating costs including material costs, labour costs, and interest on working capital. Steps (b) and (c) enable determination of the revenue requirement. In case of a single product firm, the regulated price is arrived at by dividing the revenue requirement by the expected demand/ forecast output. In the rate making process, norms are assumed regarding plant availability, capacity utilization, input-output norms etc. The regulator generally uses the data for the test period but he may disallow certain expenditures. Some regulatory commissions hold public consultations before finalizing the tariff.

In case of a multiproduct firm producing different types of products or selling the same product to different consumer categories/ different time periods, cost allocation is necessary to arrive at prices for the different products. In many public utilities certain costs can be attributed to individual products/ services, but other costs may be “joint costs” or “Common costs”. Regulators applied one of the following fully distributed cost methods for allocation of the joint and common costs: (a) relative output method, (b) relative revenue method and (c) attributable cost method. Sankar (1992) shows that, under the break –even constraint, both the relative revenue method and the attributable cost method yield the same pricing rules. The relative output method yields a constant mark up on attributable cost in standardized unit.

The advantages of the fully distributed cost allocation method are that it requires data for only one year and the computations are simple. The drawbacks are: (a) they use the accounting data which do not reflect the opportunity costs, (b) the test period bundle may not be socially optimal, and (c) the

pricing method may not be consistent with future demand and supply conditions. Assuming independent demands and linear demand functions for two products, Sankar shows that the firm may operate in an upward sloping segment of the profit locus which means that by reducing both prices consumers' satisfaction can be increased without making the firm worse off.

In the United States most public utilities are privately owned. An independent regulatory commission determined the utility prices. The common form of regulation till the nineties was known as the fair rate of return regulation. Under this method the total revenue requirement is equal to sum of all operating costs, depreciation and reasonable return (at least equal to cost of capital) on capital. Averch and Johnson (1962) formulated a profit maximizing model with a production function with capital and labour as inputs bought in competitive markets and a profit constraint of the form that the rate of return is greater than or equal to the cost of capital. They showed that the rate of return regulation favored capital-using bias as the allowed profit is proportional to the rate base i.e. capital times the allowed rate of return[2].

Cost of service regulation including rate of return regulation enables the regulated firm to cover the costs but it encourages the firm to over invest in plant, inflate costs and cross subsidize i.e., charging lower price in competitive market segments and higher prices in monopolistic/ oligopolistic market segments.

In the seventies the theoretical framework based on welfare maximization models came under severe criticisms. The public interest theories of regulation assume that politicians and policy makers are benevolent and design policies which correct market imperfections, market failures, and realization of social objectives. Stigler (1971) suggests a thesis that 'as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefits'. He highlights differences in motivations, capabilities and remunerations of the regulators and the regulated firms. Economists working on asymmetric information note that the private information about technology, costs, and demands are not available to the regulators.

Public choice theory articulates that politicians and bureaucrats have their own objectives which may differ from social welfare. It suggests the possibility of government failure. The principal-agent models consider the implications of firms and regulators having different information, capabilities

[2] It should be noted that the regulator determines the price which remains constant until the next regulatory review. Hence the ex-post rate of return may differ from the fair rate.

and objectives. Agents engage in opportunistic behavior that promote their objectives rather than those of the regulator or the government; regulators also can have their own agenda.

5. Public Utility Pricing Reform

Developments in technology and growth of market size relative to optimum size raised doubts about vertically integrated monopoly status for electricity industry.

There is a growing consensus that competition is feasible in power generation, in wholesale markets and in a few retail markets. Since the seventies many countries initiated reforms towards restructuring the industry via unbundling generation, transmission and distribution, privatization and introducing completion wherever feasible. Dissatisfaction with cost-based regulation because of failure to achieve cost minimization, information problems, and inability of regulatory institutions to achieve social goals and also government failures necessitated search for alternative approaches to public utility regulation, particularly price regulation. The political climate in UK helped restructuring of the electricity in England and Wales via unbundling, privatization and creation of competitive markets in the wholesale and retail markets for electricity.

One advantage of a vertically integrated system is that there is no coordination problem and the costs of generation, transmission and distribution can be pooled and the price determination problem arises only at the retail level. With unbundling, we need accounting separation at the three stages and have to find tariffs for each stage. In the generation market, with many new entrants, the generation tariff must be sufficiently attractive to induce private investments in the sector with long gestation periods and sunk costs. Further with concerns about environmental pollution and climate change and to attract investments in low carbon energy sources, electricity generated from different sources must reflect their social scarcity values i.e., private costs of production and the external costs.

The transmission sector continues to remain a regulated monopoly in most countries. As it is an intermediate link between generation and distribution, its cost and quality affect the overall performance of the electricity supply. With many players including small suppliers from renewable energy sources, co- generators and others, and in an open access system the transmission system must be efficient, congestion free and the prices fair.

In the distribution sector even though state-owned and regulated private monopolies dominate in many countries, the door is gradually being opened for retail competition, franchising, etc. Further,

the pricing problem becomes complex, because of multiple goals like efficiency, equity, and universal access, need for differentiated prices for consumer categories and also by time, and political interference. The link between wholesale price of electricity and retail price of electricity must be recognized. Any pricing reform which fails to address rational retail price of electricity is bound to affect both the generators and the transmitters, as the California electricity crisis of the early 1990s reveals.

Herto (2010) notes that regulatory theory of the 1970s completely ignored informational constraints, transaction costs and incentive problem. He says that the regulators do not have sufficient information with respect to cost demand, quality and other dimensions of firm behavior and also lack enforcement powers to promote public interest. There is a growing awareness of the need for utility pricing reforms which recognize the behavioral reactions of the regulated, provide flexibility to the regulated to use their internal information to achieve economic efficiency, and to adopt incentive –based rather than command and control or prescriptive.

Vogelsang (2002) says, 'incentive regulation delegates certain pricing decisions to the firm and that the firm can reap profit increases from cost reduction. It makes use of the firm's information advantage and profit motive. The regulation thus controls less behavior but rather rewards outcomes', p.6.

Price-cap regulation recommended by Littlechild (1983) and adopted by utilities in U.K and some states in USA is a type of incentive regulation. Under this method, a regulatory agency sets a ceiling on a subset of prices to be charged by a regulated firm. The ceilings are defined for a basket of services which can be expressed as a price index. The price index is adjusted periodically by a factor that is exogenous to the regulated firm. The adjustment factors, baskets and weighing schemes are periodically reviewed and possibly changed. The pricing formulae takes the form RPI-X, where RPI is the retail price index and X a productivity improvement factor. Initially X was 3 % which meant that the rate of increase in the price index should not exceed the retail price increase less 3 %.

The advantages of price- cap are (a) that it requires less information than cost- based regulation, it is forward looking, it does not result in allocative inefficiency, and it provides an incentive to the firm to reduce cost and earn profit. The problems are setting the initial price index, finding an appropriate X, the possibility of cross subsidization among products in the basket as the individual prices are not regulated.

Cost allocation is a problem in many public utilities because of the presence of joint and common costs. The allocated costs must add up to total cost. The allocation must be fair. Game theorists have developed axiomatic approach for cost sharing which is fair and satisfies individual rationality, group rationality and coalition rationality. For an introduction, see Young (1985). Computation of Aumann-Shapley prices requires information on costs for all possible coalitions. However, the cooperative game theory methods based on current normative costs can incentivize the stakeholders to reveal their opportunity costs and to achieve cost minimization. The approach is also helpful in measuring subsidies and cross subsidies. Recently, competitive bidding mechanism in wholesale electricity markets is being used to find the price. Franchise bidding for markets based on service conditions is also common.

Electricity can be produced from fossil fuels, hydro, nuclear and renewable sources. Until recently the environmental costs of using fossil fuels have been ignored in many countries. Concerns about climate change have resulted in internalizing the external costs of electricity from fossil fuels in electricity generation via a carbon tax or other means. This internalization is necessary to arrive at the social costs of electricity from alternative sources.

CHAPTER 3

POWER SECTOR REFORMS: INTERNATIONAL EXPERIENCE

1. Introduction

Until the late 1980s in most developed and developing countries electric utility industry was organized as a vertically integrated monopoly. A few countries such as the United States preferred private monopoly form while countries such as UK and France and many developing countries preferred public monopoly form. In a few countries private monopolies were operating in certain regions. In order to prevent abuse of monopoly power and to achieve policy goals such as ensuring access to power at affordable prices to poor and development of rural/remote areas, the industry was subject to government regulation. In case of pricing, administered prices were common for publicly owned firms and fair rate of return regulation for privately owned electric utilities. The reason for a fair rate of return on capital invested was to provide an incentive for the regulated firm to attract capital for growth, while keeping the electricity prices at reasonable levels.

During the 1960s both the organizational form and the rate of return regulation were criticized by economists. It was alleged that with increases in market sizes many markets could support more than one firm and that a competitive market structure, particularly in generation, would result in reduction in unit cost of electricity supply and foster technological innovation. Regarding the fair rate of return regulation, there were two types of criticisms. Averch and Johnson (1960) argued that the fair rate of return regulation encouraged capital -using bias as the allowed financial returns to the firm is proportional to the invested capital. Stigler (1971) highlighted the asymmetries in power and capabilities between the regulator and regulated firms, and differences in the motivations of regulated private firms and regulated agencies, and argued that regulated firms “captured” regulated agencies. He argued that, contrary to the public perception that regulation was in the public interest, regulation was demanded by the regulated industry to promote its own welfare.

Now more than half of the countries in the world attempted restructuring and reforming their electricity industries. In Chile, UK, Nordic countries and a few states in the United States and Australia, the reforms have progressed well and yielded the anticipated results. But in many other countries electricity sector reforms are incomplete, either moving forward slowly with considerable resistance or moving backward (Joskow, 2008). Electricity reform is a complex process because the transition from a statutory vertically integrated monopoly status to an unbundled competitive industry requires a supportive legal and institutional framework, and also political will, to handle

issues such as sunk costs, high transaction costs, coordination problems, market design and analyzing trade- offs among economic, social and environmental goals. This chapter reviews the experiences of a few selected countries in power sector reforms and draw lessons for India.

Section 2 gives the components of standard power sector liberalization programme. Section 3 summarizes the reforms, based on secondary sources, the reforms experiences of developed and developing countries. Section 4 draws the lessons learnt from country experiences for India.

2. Components of Standard Power Sector Liberalization

Joskow (2008) summarizes the components of standard power sector liberalization as:

a. Privatization of state-owned electricity monopolies to (i) create hard budget constraints and high-powered incentives for performance improvements and to make it difficult for the state to use these enterprises to pursue costly political agendas.
b. Vertical separation of potentially competitive segments (e.g. generation, marketing and retail supply) from segments that will continue to be regulated (distribution, transmission, system operations).
c. Horizontal restructuring of the generation segment to create an adequate number of competing generators to mitigate market power and to ensure that the wholesale markets are reasonably competitive.
d. Horizontal integration of transmission facilities and network operations to encompass the geographic expanse of wholesale markets and the designation of independent system operator to manage the operation of the network, to schedule generation to meet the demand and to maintain the physical parameters of the network (frequency, voltage, stability , and to guide investments in transmission infrastructure to meet reliability and economic standards.
e. The creation of voluntary public wholesale spot energy and operating reserve market institutions to support requirements for real time balancing of supply and demand for electricity, to allocate scarce network transmission capacity, to respond quickly and effectively to unplanned outages of transmission or generating facilities consistent with the need to maintain network voltage, frequency and stability parameters within narrow limits , and to facilitate economic trading opportunities among suppliers and between buyers and sellers.

f. The development of active “demand-side” institutions that allow consumers to react to variations in wholesale market prices and fully integrate demand side responses to energy prices and reliability criteria into wholesale and retail prices.

g. The application of regulatory to promote access to the distribution network by wholesale buyers and sellers.

h. The unbundling of retail tariffs to separate prices for retail power supplies and associated customer services to be supplied competitively from the regulated “delivery” charges for using distribution and transmission networks.

i. Where retail competition will not be available, distribution companies or alternative designated suppliers would have the responsibility to supply these customers.

j. The creation of independent regulatory agencies with good information about the costs, service quality and comparative performance of the firms supplying regulated network services, the authority to enforce regulatory requirements, and an expert staff to use this information and authority to regulate effectively the prices charged by distribution and transmission companies and the terms and conditions of access to these networks by wholesale and retail suppliers of power.

k. Transition mechanisms must be in place to move from the old system to the new system.

3. Electricity Industry Restructure and Liberalization in Selected Countries

Chile

Chile was the first country in the world to initiate power sector reform in the late 1970s. The context of the reform was pro-liberal policy of the military regime in the mid-seventies. The Chilean Constitution provides for strong defense of property rights and commercial information. It ensures that the function of the judiciary is to protect property rights from legislative and administrative abuses. This arrangement and the coalition rule had the effect of making it difficult to reform laws established under the military regime. This has two countervailing effects: first, it severely limits the scope of civil servants and ministers to interpret laws in the light of new developments and, second, it insures the stability of the regulatory regime (Pollitt, 2004).

In the early 1970s Chile’s electricity utilities were in a mess. Inflation, high fuel prices and price controls on final prices had led to large losses and shortage of investment under public ownership. The government wanted to reorganize the sector in order to introduce economic discipline. As Chile

was the first country to start restructuring and liberalizing the electricity industry , it sought help from US economists and by learning from European experience in power sector management. Economists in the government, several of whom had studied at the University of Chicago, were charged with redesigning the regulatory and legal framework within which the companies operated. The officials from Chile did visit the UK, France and Belgium. They came back with the idea of separate generation and distribution companies where power was paid for according to a formula based on the cost (as UK Area Boards then paid the Central Electricity Generating Board), a dispatch system based on marginal cost pricing (as perfected by the French company, EDF) and a system of trading power between generators to meet customer contracts (as existed in Belgium) (Politt, 2004)

Regulated prices for generated electricity were determined on the basis of the expected spot price of energy over the next 4 years and this price was fixed for six months in April and November. This was calculated using a computer program. This node price was then converted into the regulated price of generated electricity at each of the basic substations of the system by an energy penalization factor (to reflect system losses). This gave the node energy prices. To these were added the node peak capacity charges which reflected the annual marginal cost of increasing system capacity assuming a specified reserve margin. This was paid to available generators and reflected the capital and operating costs including a 10% return of the newest technology on the system. This is similarly adjusted by a capacity penalization factor.

The revenue for the distribution companies was set on the basis of the costs of a model company. The distribution charges were regulated by the National Energy Commission. Payment for existing transmission access was to be based on negotiated tariffs coupled with compulsory right of access if capacity was available. New connections and lines were to be paid for by the generators, who were free to negotiate terms with transmission companies or build their own.

The concept of two types of customers – regulated and free – was established in the 1982 law. Free customers were those with maximum demand above 2MW. These customers were free to contract directly with generators for the supply of power. Regulated customers were customers of the local distribution companies who could not contract directly with generators. These customers paid the regulated price of distribution plus a node price of energy which was based on the combination of the forecast short run marginal cost of energy, the capacity charge and the relevant transmission charge.

Payment for existing transmission access was based on negotiated tariffs coupled with compulsory right of access if capacity was available. New connections and lines were to be paid for by the generators, who were free to negotiate terms with transmission companies or build their own.

The National Energy Commission, established in 1978 to advice on long term strategy, has responsibility for advising the Minister of Economy on electricity policy; it is also responsible for the setting of regulated distribution charges. A Superintendent of Prices of Electricity and Fuels has responsibility for data collection for the purposes of enforcement and regulation, handling of customer complaints and the implementation of service quality fines and customer compensations.

The initial restructuring of the electricity industry was extensive. Endesa, a state-owned company created in 1944 with extensive generation, transmission and distribution assets across the country, was split into 14 companies. These included 6 generation companies (including Endesa and Colbun), 6 distribution companies and 2 small isolated companies in the south providing generation and distribution. Chilectra which had been privately owned until 1970 and controlled distribution in Santiago was split into 3 firms: a generation company (Gener) and two distribution companies (including Chilmetro, now part of Chilectra). The privatizations of electricity companies yielded $1200m (in year end 1995 prices). Endesa, Gener and Chilmetro were sold off between 1985 and 1989. Initially this came through sales to workers but eventually through public offers. Since the initial privatizations there has been some change in the ownership structure. By the late 1990s foreign firms had gained majority ownership of the Chilean electricity system.

Politt's performance assessment of the electricity sector from 1982 to 2004 shows that (i) the annual growth in installed capacity was 4.1%; (ii) prices of electricity were at the average level for Latin America but low by international standards (between 1992 and 2002 average electricity prices fell by 30% in real terms); (iii) financial performance of the firms were respectable, (iv) significant improvements in labour productivity: and (v) significant reductions in technical and non technical losses. Joskow observes 'whatever the success that the Chilean reforms achieved, they are not primarily the result of vibrant unregulated competitive wholesale or retail markets for electricity or real vertical and horizontal restructuring. Privatization, incentive regulation, a simulated competitive spot market, contractual obligations placed on distribution companies, and free entry by incumbent suppliers in response largely to administratively determined generation prices have all contributed to the performance improvements' (P 18).

Argentina

The electricity industry was restructured in 1992. About 80% of the generation, all of the transmission and 60% of the transmission were transferred into private ownership; public ownership was limited to nuclear power generation, two hydro electric plants and a few provincially owned companies. The vertically integrated state-owned company was restructured into five generation and 3 distribution companies. A system operator was established with equity participation by major interested participants. The reform was initially successful. But the macro economic crisis of 2002 caused policy changes. The freezing of the retail electricity prices caused losses to the generating and the distribution countries and discouraged new investments, Erdogdu (2013).

As for the status of reform in other Latin American countries, competitive markets exist in Bolivia, Colombia and El Salvador. Mexico and Venezuela have vertically integrated monopolies. In Brazil the reform is cautious and gradual, Erdogdu (2010).

England and Wales

The electricity supply industry in England and Wales was under public ownership from 1948 to 1990. The industry was a vertically integrated statutory monopoly operated by Central Electricity Board (CEGB). 12 area boards acted as regional distribution monopolies. The cost of service regulation was practiced.

Margaret Thatcher, Prime Minister at that time, emphasized deregulation , flexible labour markets, and privatization of state-owned companies. The Electricity Act 1989 provided for privatization, introduction of competitive market and a system of independent regulation. In1990 the CEGB was restructured and privatized. It was divided into 3 generating companies and 12 regional electricity companies. These companies were sold to the general public. The Electricity Pool of England and Wales was established to facilitate competitive bidding process where generators named bid prices for electricity for each half hour of the day. The bids were ranked by price and the last unit required to meet the demand set the clearing price for the system. The National Electric Grid Co operated the Pool and administered the Pool's settlement system on behalf of the Pool members. Lack of competition and gaming strategies by generating companies necessitated regulatory intervention to prevent monopolistic behavior.

Competition was introduced in retail electricity market in three phases. In 1990 customers with peak demand of more than 1MW were allowed to choose their suppliers from local monopoly distribution companies or other companies. In1994 the open market was extended to users with 100 kW or more actual demand. By September 2001, 38% of domestic electricity customers had switched

suppliers once or more. The Utilities Act of 2000 granted Great Britain- wide licenses allowing all suppliers to supply customers nationwide.

The Review of Electricity Trading Agreements Act 1998 created a new market mechanism to replace the Pool. The New Electricity Trading Agreements addressed the weakness of the Pool mechanism. Bilateral trading between generators, between generating suppliers, traders and customers through forward and future markets and short-term power exchanges were allowed. In 2005 the name of the trading agreement was changed to British Electricity Trading Agreement to become a single electricity market of England, Wales and Scotland.

Consumer interests were safeguarded by way of universal social obligation wherein last resort supply direction was given to incumbent distribution licensee under certain conditions. Distribution network operator has the duty to connect incumbent distribution licensee as well as competitive retailers both have the duty to supply.

Newberry attributes the success of electricity restructuring in England and Wales to a number of favorable factors at the time of liberalization: substantial excess capacity in generation, dense network of transmission capacity, complete electrification, and availability of cheap new fuel source. He stresses that increased competitive pressure on generation is needed to reduce costs and that requires separating generation from transmission and distribution. Whether these benefits will be passed on to consumers depends upon the intensity of competition - particularly the number of competitors and the existence of an open access wholesale market. He says that efficiency improvements in transmission and distribution require tough regulatory price controls. The evidence suggests that regulators have to work hard to transfer efficiency gains into lower consumer prices. They also need to take positive steps to counteract market power in the potentially competitive sectors, possibly including further divestment of capacity, if consumers are to gain from restructuring.

EU

The EU has issued several directives to member states on electricity reform. The 1996 Directive required member countries to open their markets at least partially by 2000. By 2000, all European countries, except Greece, had opened their retail markets. Other requirements were account separation between potentially competitive and monopolistic segments, freedom of choice for large customers, and increasing autonomy of networks. The 2003 Electricity Directive required all

member countries legal unbundling of transmission and distribution from generation, free entry into generation markets, establishing an independent sector regulator, and to open their markets to all customers excluding residential customers by 1 July 2004 and to achieve complete liberalization by 1 July 2007. The Third Directive 2011 urged consumer choice, fairer prices, cleaner energy and security of energy supply. It also urged cross-border trade in energy, efficiency of national regulation, cross-border collaboration and solidarity among EU countries.

In Europe a number of electricity models exist and they are different form one another in terms of type of ownership, degree of openness, market concentration and degree of vertical integration (Erdogdu, 2013) . U.K has become a model for full restructuring. Norway follows the British model but without privatization. France has wholesale electricity market, third party access, and sector regulator but there is vertically integrated monopoly with only accounting separation. It allows export and import of power. In Germany, vertically integrated monopolies account for 80% of production, 40% of distribution and 100 % of transmission. It has opened the market and created power exchange and a regulatory body. Italy has started unbundling and created a state-owned transmission system operator but state-owned companies dominate in generation, transmission and distribution.

Russia

In 1992 RAO UES owned nation-wide high voltage transmission grid, all large thermal power plants, all the hydro plants and the central dispatch unit. Nuclear plants were state-owned. Small thermal plants were controlled by regional power companies. Under restructuring plan, the national transmission system was to be handed over to the Federal Grid Company; the State would own nuclear plants and most hydro plants; the thermal power plants owned by RAO UES would be sold off to 6 new private companies of roughly the same size; and there would be 14 smaller territorial generating companies.

According to Cooke (2013) the reform measures are:

i. Unbundling and USD 30 billion privatization of generation infrastructure;
ii. Implementation of a wholesale energy spot market and capacity mechanism covering much of European Russia, the Urals and Siberia;
iii. Introduction of incentive-based economic regulation and open access arrangements for transmission and distribution networks;

iv. Progress toward retail market reform and more cost-reflective pricing; and

v. Establishment and strengthening of key market and regulatory institutions.

At present, the wholesale market is relatively diversified with modest concentration structure on national basis. As for the retail markets, they are dominated by regulated Guarantee Suppliers which operate localized franchisees primarily to supply regulated residential customers and to fulfill universal service obligations, Cooke (2013). The May 2012 Resolution addresses the market rules and regulatory gaps which limit the development of competitive retail markets and more effective consumer choice.

USA

In USA until 1990 the electricity industry structure was vertically integrated monopoly. Most states had investor –owned monopolies and a few states had publicly owned monopolies. The Federal Electricity Regulatory Commission regulated wholesale electricity prices and State Public Utility Commissions regulated retail electricity prices. The Public Utility Regulatory Policy Act (PURPA), 1978 aimed at weaning America off foreign oil, created a new category of plants known as qualifying facilities and allowed utilities to buy power from the qualifying facilities on the basis of long term contracts.

The restructuring programme in 1990s aimed at creating competitive wholesale and retail markets for electricity. The Energy Policy Act of 1992 extended FERC's authority to order utilities to allow independent power producers equal access to the utilities transmission grids. FERC order 888 opened the door to independent power generators. In 1999 regional transmission grids were created. Deregulated markets were structured using locational marginal prices, in which the price set by the generator supplying the last megawatt of power to meet demand set the price for all generators in the market. The clearing price was often set by natural gas peak power plants.

California

California was the first state to reform the electricity industry. California Public Utilities Commission (CPUC), an independent state agency regulated 3 investor-owned electricity monopolies and their retail prices. These plants owned power plants and purchased power from wholesale markets, from utilities in other western states, Canada and Mexico. The restructuring programme of 1990s aimed at creating competitive wholesale and retail markets for electricity. In1994, the CPUC embarked

upon a radical reform program in which the production of electricity from existing as well as new generating plants would be deregulated and the power sold in a new competitive wholesale market. Retail consumers were given the option to obtain "direct access" to these competitive wholesale markets by using only the wires system of their local utility, or continue to receive power from their local utility at regulated default service rates. The default service pricing formula effectively capped the retail prices for up to four years. From 1998 onwards, all retail customers were given the option to choose a competitive electricity service provider (ESP) to provide them with generation services. If they did not choose an ESP they could continue to receive "default service" from their local utility distribution company at the fixed default service rates. Contrary to earlier predictions, less than 12% of retail demand migrated to ESPs. All three IOUs eventually divested all of their fossil-fuelled generation in California, retaining only their nuclear plants, hydro-electric plants, and their existing long-term contracts for procuring power from other sources. However, they were still mandated to meet their default service obligations towards their remaining consumers by purchasing power from wholesale markets.

Between 1999 and 2000 wholesale electricity prices rose by about 500% due to increase in natural gas price, sharp increase in electricity demand , no growth in generating capacity , increases in the prices of air emission permits, and electricity suppliers withholding generating capacity. In 2001 two largest utilities became bankrupt and stopped paying their bills. In January –May 2001, the State bought power first in the spot market and later through long term contracts by spending $50 billion. By June 2001 wholesale prices of electricity dropped due to lower natural gas prices and lower demand.

Joskow (2013) observes that (i) the State seriously underestimated the challenges associated with creating well functioning competitive electricity markets; (ii) both federal and state regulators failed to respond quickly or effectively to market problems when they emerged; and (iii) competitive electricity markets cannot work properly if consumers are completely insulated through regulation from variations in wholesale market prices. The failure of retail prices to respond to changes in wholesale prices caused credit problems, insolvencies and destroyed incentives for energy conservation by consumers.

Texas

Zarnikau (2013) says the Electric Reliability Council of Texas (ERCOT) market is generally considered to be the most successful of the restructured retail electricity markets in North America. The Senate

Bill 373 of 1995 required the Public Utility Commission of Texas (PUCT) to establish rules to foster wholesale competition and create an Independent System Operator to ensure non-discriminatory transmission access, an equitable interconnection process for new generation capacity, and consumer protection. PUCT established generator-friendly inter connection rules and allowed postage stamp transmission pricing (pricing invariant to distance) in the wholesale market. The Senate Bill 1999 allowed customers of state's investor –owned utilities to choose among retail electricity providers for a retail supply of electricity from 1 January , 2002. Vertically-integrated utilities were required to separate or unbundle their functions into separate regulated and unregulated entities prior to the start of customer choice on January 1, 2002. Regulatory oversight over the transmission and distribution of power was retained.

Two of the three largest incumbent utilities chose to fully divest their competitive operations from their regulated transmission and distribution services and are operating in Texas as transmission and distribution services providers. TXU, the largest incumbent IOU, continues to operate as a vertically-integrated, but functionally-unbundled, utility, although its functions have become increasingly separated in recent months.

The wholesale market relies upon bilateral contracts. Where there presently is no centralized market for power, ERCOT operates a market for balancing energy with some similar attributes. It also administers day-ahead ancillary services markets and acts as the default provider for ancillary services for load-serving entities who decide not to self-arrange their services requirements. It also serves as the central registration agent and maintains a customer database for all consumers in the competitive market. Initially, price (offer) caps were used to prevent market domination.

Texas adopted an approach to retail competition that is similar to that adopted in the UK, except retail competition was opened to all classes of customers from the beginning. At least in terms of switching behavior, Texas has the most successful retail competition program in the U.S., especially for smaller customers; more than half of the customers switched. There are some challenges ahead-coordination to match supply and demand in real time, managing transmission congestion, and mitigation of market power. However, electricity industry restructuring is viewed as successful because the industry is free from federal oversight within the state, adequate investments in electricity supply, growth of more efficient electricity technologies and business models, and the integrated operation of the wholesale and retail electricity markets.

Despite the success in Texas, the failure of electricity reform in California affected the speed of electricity reform in the states. According to the US Energy Information Administration, the status of

electricity restructuring as on September 2010 is as follows: 17 active, 26 not active and 7 suspended. The US experience has also generated debate about the degree to which market relationships should replace transactions that formally took place within regulated vertically integrated utilities. See Michaels (2006).

Japan

Japan's electricity system since 1951was dominated by 10 vertically integrated monopoly utilities in their respective regions. The reform since 1990 was gradual. First, new IPPS were allowed to generate power and deliver electricity to the utilities. The utilities were allowed to procure electricity from other utilities and IPPs, thereby expanding the wholesale electricity market. Competition was introduced in the retail market in 1999 by allowing Power Producers and Suppliers (PPS) to deliver electricity directly to eligible consumers using the transmission network of the general electric utilities. The threshold for retail choice was gradually lowered. By 2005, 63% of customers (those consuming 50 kW or more) were allowed to choose a supplier. However, the PPS's retail market share was still small at 2.8% in 2009.

The institutional infrastructure has evolved in line with market liberalization. To promote transactions in the wholesale market, the Japan Electric Power Exchange, a private non-profit organization composed of 21 investors, was established in 2003. Participation in the wholesale market was voluntary. In 2004, the Electric Power System Council of Japan was designated as a "neutral transmission system organization". It is a self-governing agency operated by private entities, such as the general electric utilities and IPPs. It plays a key role in setting rules, providing market oversight and settling disputes to ensure fairness and transparency in transmission and distribution. The Ministry of Economy, Trade and Industry oversees the electricity sector, with overall responsibility for regulation and supervision. Japan opted for accounting unbundling in 2003, which does not separate ownership but requires separate accounting for the different services. In addition, the government introduced rules of conduct, such as prohibiting discriminatory treatment.

The price of using the transmission system ("wheeling tariffs") must be set in accordance with regulations established by METI and reported to it. However, the price of electricity is high by international standards, particularly in the industrial sector, where it is second highest in the OPEC.

The Great East Japan Earthquake caused a loss of confidence in the safety of Japan's 50 nuclear power plants, prompting the government to change its energy strategy. The Innovative Strategy for Energy and the Environment (September 2012) envisages:

(i) Reform of demand side: full liberalization of retail market by abolishing the general electricity utilities' regional monopolies and abolishing rate of return regulation.

(ii) Reform of power generation: full liberalization of power generation by removing regulations on the wholesale market and revitalization of the market by measures to activate transactions.

(iii) Reform of the power transmission/distribution sector: establish a nationwide system by reforming the current systems that control the supply-demand balance in each area. Ensure the neutrality of the power transmission/distribution sector in each area by functional or legal separation, while enhancing interconnection capacity between regions. Establish the Nuclear Regulation Authority.

China

Until 1985 China had a vertically integrated public monopoly structure. The 1995 reform allowed new investments in power generation by regional and local governments as well as by domestic and foreign independent power producers. In 1987 a two-tier pricing scheme was introduced. The old plants' price included all operating costs but no capital costs. For new plants the tariff guarantees rate of return between 10- 15% and allowed full pass through of fuel costs. In 1996 the two tired pricing system was dismantled.

During 1996-97, China bifurcated the Ministry of Power into a financially independent State Power Corporation and an administrative and regulatory agency. In 2002, the State Power Corporation was divided into five independent power generation corporations. There was separation of power generation from transmission and distribution. In 2003 State Electricity Regulatory Commission, a quasi-independent responsible for granting operating license, ensuring competitive market forces, and recommending tariffs and policy reforms was set up. In 2006, Provisional Regulations on On-grid Power Price, T&D Price, and Retail Price, made the regional on-grid "benchmark" price applicable to all power plants. The term benchmark price reflected the regional differences in power production and fuel cost in order to create competition and efficiencies for power producers to sell to the grid companies and still tries to make a profit. Presently, the central government publishes annual electric price indices that include the provincial on-grid supply price, transmission and distribution charges, taxes, and some surcharges. In addition to the nationally published prices, provincial and local authorities apply other taxes, surcharges. Power producers enter into power-purchasing agreements with the grid operators that pass along the supply costs and other charges to end-users via a central and local government controlled retail price. The end-use costs are often separated into

rate classes determined by voltage requirements. China gives positive focus on correcting the environmental externalities and promotion of clean energy (Edwards, 2012).

Kazakhstan

Kazakhstan divested itself of power generation facilities in 1997. It created independent generating companies and then reorganized transmission and distribution facilities. It launched wholesale power exchange in 2001 to undertake day in advance power trading in 2002 it began organizing hour-in advance trading.

Indonesia

Electricity Act 1985 provided the legal framework permitting entry of private and co-operative units in power generation. In 1996 Directorate of Private Power was entrusted with the responsibility of issuing electricity licenses, and regulation of prices charged by IPPs and end-user prices. In 2002 competitive electricity market in generation and transmission and distribution was planned.

Pakistan

Private entry in power generation was permitted in 1994. National Electric Power Regulatory Authority was created in 1997. Unbundling was done in 1998. Competitive generation with independent system operator and bulk power market were set up.

Africa

According to Erdogdu electricity reforms in Africa were very limited in terms of scope and scale and almost in all reform cases the main motive was to encourage foreign private direct investment in power markets. He narrates the experiences in South Africa, Ghana, Cameroon and Nigeria.

In South Africa the new democratic government came into power in 1994. In 1995 the government established the National Electricity Regulator. Eskom, the state-owned electricity utility, owns, operates and maintains the national transmission grid and is a de facto monopolist on both the generation and transmission level. In 2002, Eskom was converted into a public company pursuant to the Eskom Conversion Act of 2001. It is regulated by the National Energy Regulator of South Africa in accordance with the Electricity Regulation Act of 2006. Privatization process was abandoned; a regulator was created but the prices are still based on historic costs and the demand has outstripped the capacity.

Prior to reform, Ghana's small electricity sector consisted primarily of two state enterprises, one operated all generation and transmission (VRA), and the other was distribution utility (ECG). VRA performed well technically and financially, but ECG had high system losses and poor service quality. Even after a series of increases, tariffs recovered only one third of long run marginal costs and only 24% of the population had access to electricity in 1993. Electricity reform was triggered in 1993 by a supply crisis due to rapidly rising demand and drought. When the government approached the World Bank to finance new thermal generation, it was required to increase tariffs, remove barriers to private participation, and plan a comprehensive reform. An independent regulator was created. Today, electricity sector in Ghana continues to be a strain on the national budget. After a decade of reform, the basic structure of Ghana's power sector has remained the same.

The Cameroon government decided in 1996 to privatize the vertically integrated electricity utility (SONEL). An American group (AES) acquired 51% of SONEL shares and signed a contract for a 20-year concession. The new entity has a monopoly on generation, transmission, and distribution of electricity. So, the reform process in Cameroon only resulted in a transfer of public monopoly into private one.

In Nigeria, state owned power utility (NEPA) was commercialized in 1988and wholesale competition model was put into practice. NEPA was divided into 18 companies, including 6 generators, 11distributors and one transmission company. Currently, the government holds the shares in the successor companies but it is planned that these companies would gradually be privatized.

Chaynowski (2004), after reviewing restructuring and reform of electric power industries in 34 developing member countries in 2004 reports that (i) in 23 out of 34 the industry was organized as vertically integrated monopoly and all except one were public sector enterprises;(ii) in generation monopsony market structure prevailed; (iii) in distribution except one all are public;(iv) in distribution only three are private; (v) there is one wholesale market ;and (vi) none has full consumer choice in retail market.

4. Lessons Learnt

Even though electricity restructuring, creation of competitive wholesale and retail markets, and privatization reforms have been attempted in half of the countries in the world the reform process has been completed only in a few countries. In most countries, the reforms are in different stages of implementation. Many countries find it difficult to create competitive retail markets for power. Regarding unbundling, even developed countries such as France and Germany have still vertically

integrated systems and their physical and financial performances have been satisfactory. Unbundling does not appear to be a necessary condition for sustainable development of electric utility.

Regarding the impact of reforms on consumer prices, regular availability of power, quality of service, and overall financial performance the results are good only in a few countries like UK, Chile and Nordic countries. In case of U.K, favorable initial conditions such as no power shortage, good transmission system, and availability of cheap power; strong political support for unbundling and privatization and capacity to implement the reform yielded expected results. In the US the results vary from state to state. The California power crisis has two valuable lessons : (1) a wholesale electricity market where price is determined by competitive forces with no regulation and a retail electricity market where retail prices are frozen for a few years cannot coexist; it will result in bankruptcy of distribution agencies, or /and impose heavy financial burdens on the state. This problem arises because in unregulated competitive wholesale markets marginal costs determine the prices, whereas in regulated retail markets the embedded average costs determine the retail price with time lags. (2) When exogenous factors such as sudden jump in fuel prices or other input prices and strategic behavior in oligopolistic market permits price manipulation and if the regulators do not anticipate these events or do not respond even when the events happen power crisis becomes inevitable. The lesson is that with unbundling and privatization, tackling the coordination problem necessitates knowledge –based regulation and prompt responses from government/ regulating agencies are necessary for crisis management.

Some Latin American, Asian and African countries failed to set up knowledge based regulatory agencies to solve the coordination problem and deal with exogenous shocks. In most developing countries, multiple goals such as efficiency, equity, universal access ,and adverse initial conditions such as persistent power shortage, poor transmission capacity, and poor quality of accounting information, require careful evaluation of the trade-offs among the goals and preparation of short-term and long term strategies .Hence, capacity building in the utilities, regulatory commissions and government, and political will to implement the reforms are necessary for ensuring success of the reforms.

CHAPTER 4

REVIEW OF POWER SECTOR REFORMS IN INDIA

1. Introduction

Legal and institutional changes in India's power sector are reviewed in historical perspective. The focus is on structural changes, tariff policy and financial sustainability of electricity distribution companies. Section 2 covers the period from 1887 to1991. Section 3 deals with reforms initiated from 1991 till 2003. Section 4 covers the period since 2003. Section 5 contains concluding remarks.

2. Pre-Independence Period

Indian Electricity Act of 1887 repealed in 1903 dealt with broad and general lines applicable to the country as a whole. In 1910 power of licensing was given to local governments. Bulk supply license was permitted. The Electricity (Supply) Act of 1948 was passed for the rationalization of production and supply of electricity and for taking measures conducive to the development of the industry. It paved the way for creation of Central Electricity Authority (CEA) and State Electricity Boards (SEBs).

The duties of SEBs are:

(a) To arrange in coordination of the generating company or companies operating in the State for the supply of electricity within the State and for transmission and distribution of the same;
(b) To supply electricity to a licensee or other parties requiring supply;
(c) To collect data on the demand for and use of electricity and to formulate perspective balance in coordination with generating companies.

As in many countries, the SEBs functioned as vertically integrated public monopolies. Section 12 A and Chapter VI deal with the Board's finance, accounts and audit. The Board gets financial support from the State Government in the form of subventions, grants and loans. Section 59 stipulates that that the Board should not, as far as practicable, carry on its operations at a loss and should adjust its charges (tariffs) accordingly from time to time.

In 1951, the Constitution of India Article 246 puts electricity sector in concurrent list. Federal Government is responsible for policies and statutory and organizational field work. State's duty is to provide for power generation and supply to consumers .The Industrial Policy Resolution of 1956

reserved generation and distribution of electricity exclusively for the public sector while allowing existing private utilities to continue. In 1964 Regional Electricity Boards were created for integrated operation and exchange of power among the States. In 1969 Rural Electrification Corporation was established to facilitate supply of electricity for accelerated growth and enrichment of rural and semi-urban areas. In 1975 National Hydroelectric Power Corporation and National Thermal Power Corporation were set up. In 1986 Power Finance Corporation was set up and in 1989 Power Grid Corporation of India was established.

3. Power Sector Reforms 1991- 2003

The macro economic reforms from 1991 were aimed at liberalizing and opening up the Indian economy to competition and foreign direct investment. The Electricity Laws (Amendment) Act of 1991 encouraged entry of privately owned generators. In 1998 the transmission sector was opened for private investment subject to the approval the Central Transmission Utility. In 1995, the World Bank reform of unbundling and privatizing SEBs began in Orissa in 1995. In Orissa, in 1993-94 the generating plants were running at 36 percent plant load factor, transmission and distribution losses were at 43 percent, and the proportion of bills collected was only 17 percent. Orissa was ideally suited for reforms because its agricultural share in sales was only 6 per cent (compared to 40 percent in some other states) and as it was expected that as there was no lobby which could derail the reform process, Government of India (Planning Commission, 2012). The “Orissa Model” involved restructuring of the monolithic SEBs into separate generation, transmission and distribution sub-sectors. The distribution segment of the Orissa State Electricity Board was divided into four regional utilities and later on privatized. The transmission assets remained under public ownership with the Grid Corporation of Orissa .The existing hydro generation assets were vested with the Orissa Hydro Power Corporation and the thermal capacity of the OSEB had to be transferred to the NTPC to settle the dues of the OSEB with the NTPC. This restructuring was made possible through the Orissa Electricity Reforms Act 1995.

The Common Minimum National Action Plan for Power, an outcome of two Conferences of Chief Ministers on the whole gamut of issues in the power sector recognized that the gap between demand and supply of power was widening and acknowledged that the financial position of SEBs was fast deteriorating and the future development in the power sector could not be sustained without viable SEBs and improvement of their operational performance.

The Electricity Regulatory Commissions Act, 1998 paved the way for creation of Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs). The Act also deals with rationalization of electricity tariff, transparent policies regarding subsidies, promotion of efficient and environmentally benign policies and matters connected therewith or incidental thereto.

The main functions of CERC are:

(a) To regulate the tariff of generating companies owned or controlled by the Central Government;
(b) To regulate the tariff of generating companies, other than those owned or controlled by the Central Government specified in , if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one state,
(c) To regulate the inter-state transmission of energy including tariff of the transmission utilities;
(d) To promote competition, efficiency and economy in the activities of the electricity industry;
(e) To aid and advise the Central Government in the formulation of tariff policy which shall be,
    (i) fair to the consumers; and
    (ii) facilitate mobilization of adequate resources for the power sector;
(f) To associate with the environmental regulatory agencies to develop appropriate policies and procedures for environmental regulation of the power sector;
(g) To frame guidelines in matters relating to electricity tariff,
(h) To arbitrate or adjudicate upon disputes involving generating companies or transmission utilities in regard to matters connected with Cls. (a) to (c) above;
(i) To aid and advise the Central Government on any other matter referred to the CERCC by that Government.

The tariff guidelines for CERC are:

(a) The generating companies and transmission entities shall adopt such principles in order that they may earn an adequate return and at the same time that they do not exploit their dominant position in generation, sale of electricity or in the inter-State transmission of electricity ;
(b) The factors which would encourage efficiency, economical use of the resources, good performance, optimum investments and other matters which the CERC considers appropriate;
(c) National power plans formulated by the Central Government; and
(d) Such financial principles and their applications contained in Sch.VI to the Electricity (Supply) Act, 1948 (54 of 1948) as the Commission considers appropriate.

The functions of SERCs are:

(a) To determine the tariff for electricity, wholesale, bulk, grid or retail, as the case may be, in the manner provided in Sec.29.
(b) To determine the tariff payable for use of transmission facilities.
(c) To regulate power purchase and procurement process of the transmission utilities and distribution utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in the State.
(d) To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of this Act.

(2) The State Government, may by notification in the Official Gazette, confer any of the following functions upon the State Commission, namely:

(a) To regulate the investment approval for generation, transmission, distribution and supply of electricity to the entities operating within the State;
(b) To aid and advise the State Government, in matters concerning electricity generation, transmission, distribution and supply in the State;
(c) To regulate the operation of the power system within the State;
(d) To issue licenses for transmission, bulk supply, distribution or supply of electricity and determine the conditions to be included in the licenses;
(e) To regulate the working of the licensees and other persons authorized or permitted to engage in the electricity industry in the State and to promote their working in an efficient, economical and equitable manner;
(f) To require licensees to formulate perspective plans and schemes in co-ordination with others for the promotion of generation, transmission, distribution, supply and utilization of electricity, quality of service and to devise proper power purchase and procurement process;
(g) To set standards for the electricity industry in the State including standards relating to quality, continuity and reliability of service;
(h) To promote competitiveness and make avenues for participation of private sector in the electricity industry in the State, and also to ensure a fair deal to the customers;
(i) To lay down and enforce safety standards;
(j) To aid and advise the State Government in the formulation of the State power policy;

(k) To collect and record information concerning the generation, transmission, distribution and utilization of electricity; to collect and publish data and forecasts on the demand for, and use of, electricity in the State and to require the licensees to collect and publish such data;

(l) To regulate the assets, properties and interest in properties concerning or related to the electricity industry in the State including the conditions governing entry into, and exit from, the electricity industry in such manner as to safeguard the public interest;

(m) To adjudicate upon the disputes and differences between the licensees and utilities and to refer the matter for arbitration;

(n) To co-ordinate with environmental regulatory agencies and to evolve policies and procedures for appropriate environmental regulations of the electricity sector and utilities in the State; and

(o) To aid and advise the State Government on any other matter referred to the State Commission by such Government.

(3) The State Commission shall exercise its functions in conformity with the national power plan.

The tariff guidelines for SERCs are:

(1) The tariff for intra State transmission of electricity and the tariff for supply of electricity, grid, wholesale, bulk or retail, as the case may be, in a State, shall be subject to the provisions of this Act and the tariff shall be determined by the State Commission of that State in accordance with the provisions of this Act.

(2) The State Commission shall determine by regulations the terms and conditions for the fixation of tariff, and in doing so, shall be guided by the following, namely: -

(a) The principles and their applications provided in Sees. 46, 57 and 57-A of the Electricity (Supply) Act, 1948 (54 of 1948) and the Sixth Schedule thereto,

(b) In the case of the Board or its successor entities, the principles under Sec. 59 of The Electricity (Supply) Act, 1948;

(c) That the tariff progressively reflects the cost of supply of electricity at an adequate and improving level of efficiency;

(d) The factors which would encourage efficiency, economical use of the resources, good performance, optimum investments, and other matters which the State Commission considers appropriate for the purposes of this Act;

(e) The interests of the consumers are safeguarded and at the same time, the consumers pay for the use of electricity in a reasonable manner based on the average cost of supply of energy;

(f) The electricity generation, transmission, distribution and supply are conducted on commercial principles;

(g) National power plans formulated by the Central Government.

(3) The State Commission, while determining the tariff under this Act, shall not show undue preference to any consumer of electricity, but may differentiate according to the consumer's load factor, power factor, total consumption of energy during any specified period or the time at which the supply is required or the geographical position of any area, the nature of supply and the purpose for which the supply is required.

(4) The holder of each license and other persons including the Board or its successor body authorized to transmit, sell, distribute or supply electricity wholesale, bulk or retail, in the State shall observe the methodologies and procedures specified by the State Commission from time to time in calculating the expected revenue from charges which he is permitted to recover and in determining tariffs to collect those revenues.

(5) If the State Government requires the grant of any subsidy to any consumer or class of consumers in the tariff determined by the State Commission under this section, the State Government shall pay the amount to compensate the person affected by the grant of subsidy in the manner the State Commission may direct, as a condition for the licensee or any other person concerned to implement the subsidy provided for by the State Government.

(6) Notwithstanding anything contained in Sees. 57-A and 57-B of the Electricity (Supply) Act, 1948 (54 of 1948) no rating committee shall be constituted after the date of commencement of this Act and the Commission shall secure that the licensees comply with the provisions of their license regarding the charges for the sale of electricity both wholesale and retail and for connections and use of their assets or systems in accordance with the provisions of this Act. The CERC was established in 1998. All states have established SERCs. Goa and Union Territories have

a joint regulatory commission.

Accelerated Power Development Program (APDP) 2000-01

The programme gave a composite loan/grant for improving the infrastructure of the electricity utilities. In 2002-03, the scheme was changed to the Accelerated Power Development and Reforms Program (APDRP) with liberal funding. An Expert Committee for making recommendations for one-time settlement of outstanding dues of all SEBs towards central public sector undertakings and for suggesting a strategy for capital restructuring of the SEBs recommended that 50 percent of the surcharge/interest on delayed payments be waived; the rest of the dues along with full principal amount aggregating to about Rs. 33,600 crore be securitized through bonds issued by the respective state Governments. The bonds were to be issued through the RBI at a tax-free interest rate of 8.5 percent per annum.

4. Reforms since 2003

The Electricity Act, 2003

This Act 'consolidates the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies ,constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal'.

Regarding tariff it says, the Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:

(a) The principles and methodologies specified by the CERC for determination of the tariff applicable to generating companies and transmission licensees;
(b) The generation, transmission, distribution and supply of electricity are conducted on commercial principles;
(c) The factors which would encourage competition, efficiency, economical use of the resources, good performance and optimum investments;

(d) Safeguarding of consumers' interest and at the same time, recovery of the cost of electricity in a reasonable manner;
(e) The principles rewarding efficiency in performance;
(f) Multi- year tariff principles;
(g) That the tariff progressively reflects the cost of supply of electricity and also, reduces and eliminates cross-subsidies within the period to be specified by the Appropriate Commission;
(h) The promotion of co-generation and generation of electricity from renewable sources of energy;
(i) The National Electricity Policy and Tariff Policy

Provided that the terms and conditions for determination of tariff under the Electricity (Supply) Act, 1948, the Electricity Regulatory Commission Act, 1998 and the enactments specified in the Schedule as they stood immediately before the appointed date, shall continue to apply for a period of one year or until the terms and conditions for tariff are specified under this section, whichever is earlier.

The Appropriate Commission shall determine the tariff in accordance with provisions of this Act for -

(a) Supply of electricity by a generating company to a distribution licensee: provided that the Appropriate Commission may, in case of shortage of supply of electricity, fix the minimum and maximum ceiling of tariff for sale or purchase of electricity in pursuance of an agreement, entered into between a generating company and a licensee or between licensees, for a period not exceeding one year to ensure reasonable prices of electricity;
(b) Transmission of electricity ;
(c) Wheeling of electricity;
(d) Retail sale of electricity.

Provided that in case of distribution of electricity in the same area by two or more distribution licensees, the Appropriate Commission may, for promoting competition among distribution licensees, fix only maximum ceiling of tariff for retail sale of electricity.

(1) The Appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in respect of generation, transmission and distribution for determination of tariff.

(2) The Appropriate Commission shall not, while determining the tariff under this Act, show undue preference to any consumer of electricity but may differentiate according to the consumer's load

factor, power factor, voltage, total consumption of electricity during any specified period or the time at which the supply is required or the geographical position of any area, the nature of supply and the purpose for which the supply is required.

(3) No tariff or part of any tariff may ordinarily be amended more frequently than once in any financial year, except in respect of any changes expressly permitted under the terms of any fuel surcharge formula as may be specified.

(4) The Commission may require a licensee or a generating company to comply with such procedures as may be specified for calculating the expected revenues from the tariff and charges which he or it is permitted to recover.

(5) If any licensee or a generating company recovers a price or charge exceeding the tariff determined under this section, the excess amount shall be recoverable by the person who has paid such price or charge along with interest equivalent to the bank rate without prejudice to any other liability incurred by the licensee. The Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government.

(6) The Act aims at improving the financial health of the SEBS which were losing heavily on account of irrational tariffs and lack of budgetary support from the State Governments as a result of which, the SEBs became incapable of even proper maintenance, leave alone purposive investment. Further, the lack of creditworthiness of SEBs was a deterrent in attracting investment from both the public and private sectors.

Hence, it is made mandatory for SERCs to fix tariff in a manner that none of class of consumers shall be charged less than fifty per cent of the average cost of supply. It enables the State Governments to provide subsidies to weaker sections on the condition that the State Governments through a subsidy compensate the SEBs. Regarding agriculture, it allows the agricultural consumers to be charged less than 50% for a maximum period of three years. It enables the State Governments to fix any tariff for agriculture and other sectors provided it gives subsidy to SEBs to meet the loss.

The Act introduces open access subject to certain conditions including the cross subsidies. Section 108 says that;

(1) In the discharge of its functions, the State Commission shall be guided by such directions in matters of policy involving public interest as the State Government may give to it in writing; and
(2) If any question arises as to whether any such direction relates to a matter of policy involving public interest, the decision of the State Government thereon shall be final.

National Electricity Policy (2005)

It aims at achieving the following objectives;

(a) Access to electricity available for all the households in next five years.
(b) Availability of power demand to be fully met by 2012. Energy and peaking shortage to be overcome and spinning reserve to be available.
(c) Supply of reliable and quality specified standard in an efficient manner at reasonable rate.
(d) Per capita availability of electricity to increase over 1000 units by 2012.
(e) Minimum lifeline consumption of one unit/household/day as a merit good by year 2012.
(f) Financial turn around and commercial viability of electricity sector.
(g) Protection of consumer interests.

Tariff Policy 2006 specifies the general approach to tariff, periodical announcement of rate of return on equity by CERC, debt equity ratio of 70:30, depreciation method and operating norms. It recommends adoption of multi-year tariff framework. It suggests that the facility of regulatory asset to limit the tariff impact in a particular year should be an exception. It recommends two-part tariff and time-of-day pricing on priority for large customers. Regarding the cross subsidy charge it suggests the following formula:

$$S = T – [C (1 + L/100) + D],$$

where, S is the surcharge, T is the tariff payable by the relevant category of consumers , C is the weighted average cost of power purchase of top 5% at the margin excluding liquid fuel based gas and renewable power, D is the wheeling charge, and L is the system loss for applicable voltage level expressed as a percentage.

The Energy Conservation Act, 2001 aims at providing efficient use of energy and its conversion. It established Bureau of Energy Efficiency to recommend norms for processes and energy conservation, label on equipments and appliances, notify class of designated consumers, develop energy conservation code for buildings etc. The Act was amended in 2010.

A Memorandum of Understanding with the State governments with the intention of accelerating the process of reforms was signed. The state governments were encouraged to set up their own electricity regulatory commissions, undertake 100 percent metering, conduct energy audits at 11 KV level, impose minimum agricultural tariff as decided in the Chief Ministers' Conference, pay subsidies on time etc. In return, the Central government promised to increase the share of the State concerned from central generating stations, upgrade the inter-state transmission lines through APDRP funding, extend help for the State's rural electrification program and provide other financial benefits. By 2005, the Central Government had signed MOUs with all of India's 28 states, Government of India (Planning Commission, 2012).

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)

The Rural Electricity Infrastructure and Household Electrification Scheme for providing access of electricity to all rural households were launched in 2005. It provides capital subsidy of 90% of the total project cost under the scheme and balance 10% of the project cost are being provided by REC as loan. The emphasis is on sustainable rural power supply through deployment of rural franchisees and provision for revenue subsidies from the State Government. The projects are financed with capital subsidy for provision of -

(a) Rural Electricity Distribution Backbone (REDB) - Provision of 33/11 KV (or 66/11 KV) substations of adequate capacity and lines in blocks where these do not exist.
(b) Creation of Village Electrification Infrastructure (VEI) - Provision of distribution transformers of appropriate capacity in electrified villages / habitation(s).
(c) Decentralized Distributed Generation (DDG) and Supply - Decentralized generation-cum distribution from conventional or renewable or non-conventional sources.
(d) Electrification of Below Poverty Line Households - Free electricity connection to un-electrified BPL households as per norms of Kutir Jyoti Program in all rural habitations.

The management of rural distribution would be through franchisees who could be Non-Governmental Organizations (NGOs), Users Association, Panchayat Institutions, Cooperatives or individual entrepreneurs. The franchisee should preferably be input based to reduce AT&C losses so as to make the system revenue sustainable.

Restructured- Accelerated Power Development & Reforms Programme (R-APDRP)

R-APDRP was approved as a Central Sector Scheme on 31.07.2008 with total outlay of Rs.51, 577 Cr. This programme was launched in 2008-09 with the following objectives:

(1) To reduce AT&C loss through establishment of base line data and integrated IT applications for energy audit / accounting and investing in improvement of distribution infrastructure.
(2) Central Sector Scheme and fund release directly to distribution utilities.
(3) Projects under the scheme to be taken up in two parts.

Part-A: Projects for establishment of baseline data and IT applications for energy accounting /auditing & IT based consumer service centers. (100% GOI loan convertible in grant).

Part-B: Regular distribution strengthening projects. (Up to 50% conversion of loan into grant on achieving targets).

Report of High Level Panel on Financial Position of Distribution Utilities, 2011

The report says separation of three interlinked activities is only in the form and not in substance. The ownership, the maintenance, the financial well being and the cash flow in particular are so interlinked that it cannot be said that there is separation in any real sense of the word (p 2). The inefficiencies of generation and transmission are passed on a cost plus basis to the distribution companies which have no choice but to procure power from state generating units through state transmission lines for the purpose of distribution.

It says that inadequacies and distortions in tariffs have been caused by actions and inactions of regulator, utilities and indeed the states (p 64). Irregular determination of tariffs, leaving uncovered gaps, camouflaging the same through measures like creation of regulatory assets and laying down unrealistic efficiency improvement targets instead of revising tariffs are nothing but examples of regulatory failure to discharge statutory responsibilities - individuals willing to follow government's

wishes. Regarding data, it notes that utilities' accounts are rarely up to date. Distribution utilities do not file ARR (average revenue requirement)or tariff proposals in time.

Appellate Tribunal for Electricity order dated 11 November 2011

(a) Every SERC must ensure that ARR and tariff determination take place annually.
(b) Tariff should be decided well before 1, April and shall be applicable for the whole year.
(c) In the event of delay in filing such application beyond one month, the SERC must initiate suo-moto proceedings.
(d) Truing –up should be annual exercise.
(e) Fuel and power purchase costs should be allowed as monthly adjustments
(f) Instead of basing regulatory decisions on targets for AT& C losses, set base tariffs on the targeted losses and add a loss surcharge.
(g) Do not create regulatory assets to avoid tariff increase.

Selection Committees for state regulators be broad based to make selection process fair, objective and independent. It suggested:

(a) Chairman a sitting judge of the High Court of the state nominated by the Chief Justice
(b) Chairperson of the CERC
(c) Chairman of the Public Service Commission of another state
(d) Chief Secretary of the concerned state

Time of Day and Seasonal Tariffs

The Electricity Act 2003 and the National Electricity Policy urged introduction of Time of Day (ToD) tariff. It is an important demand side management (DSM) incentive for the customers to shift their loads from peak time to off-peak time and thereby improve the system load factor. A study for Forum of Regulators (2012) by PricewaterhouseCoopers states, as on March 31, 2012, 17 states have introduced ToD tariffs for certain HT categories. The electricity rate per kWh during peak hours is 20% to 40% higher than the normal rate and the off –peak rate 10%- 20% lower than the normal rate. A few states have introduced seasonal rates (summer and winter). The cost of HT meter is in the range Rs5200 and Rs 5500 and the expected life of the meter is about 10 years. It is desirable to introduce ToD tariff for LT industry and commercial consumers whose demand exceed 50 KW. Ideally, the peak tariff should reflect the long run marginal capacity and energy cost and the off-peak

price should be at least equal to the short run marginal cost. The impact of ToD pricing on decrease in peak demand and increase in off-peak demand will depend on the relevant price elasticites of demands. The study recommends cost benefit analysis of ToD tariff.

Scheme for Financial Restructuring of State Distribution Companies (No 20/11/2012-APDRP GoP Ministry of Power 5 10 12)

The Scheme notes that the expectations that post unbundling newly formed functional utilities would operate on sound commercial principles and SERCs depoliticize tariffs have not materialized. The accumulated losses of state power distribution companies are about Rs 1.9 lakh crore. It says that the gap between average cost of supply and average revenue increased from 76 paise/kWh in 1998-99 to 145 paise/kWh in 2009-10.

Under the scheme 50% of the outstanding short term liabilities (STLs) up to March 31, 2012 would be taken over by the State Government. The discoms would issue bonds to the participating lenders, backed by State Government guarantees. During the next 2 to 5 years, the State Government would take over the liability through issue of special securities in favour of participating lenders in a phased manner as per the space available in the State Fiscal Responsibility Budget Management limit. The balance 50% of the STLs shall be rescheduled and serviced by the Discoms with a moratorium of 3 years on principal and will be backed by State Government guarantees.

The central government support is in the following forms:

(a) (i) For providing incentive by way of grant equal to the value of additional energy saved by way of accelerating AT&C loss reduction beyond the loss trajectories scheduled under RAPDRP.

(iii) The eligibility of grant would arise only if the ARR –ACS for the year has been reduced by at least 25% during the year judged against the benchmark year of 2010-11.

(iii) The same would be available for 3 years beginning 2012-13.

(b) Reimbursement support of 25% of principal and interest of bonds/special securities issued by discoms and taken over by State Governments.

The following are the mandatory conditions aimed at improving efficiency, shore up revenues and ensure viability of discoms:

(1) Preparation of financial restructuring plan for state Discoms and approval from the lenders.
(2) State Governments shall convert all loans to equity defer the recovery of loans along with interest till the loans rescheduled by banks /FIs are fully repaid.
(3) The restructuring of STLs will be done after netting the subsidy and energy bills due from State Governments to the Discoms.
(4) The State Governments shall pay all its outstanding bills as of 31.3.12.
(5) State Governments would ensure that Discoms eliminate the gap between ACS and ARR within the period of moratorium.
(6) State Governments and Discoms not to resort to resort to short term loans from banks/FIs to fund operational losses.
(7) Road map for involvement of private sector in state distribution sector through franchisees or other mode of private participation within a year.

Regarding tariff setting, the conditions are:

The tariff order for 2012-13 should have been notified before FRP is approved and for subsequent years should be notified by 30 April of each financial year; Compliance with APTEL judgment dated November 11, 2011,Fuel cost adjustment be allowed as directed by APTEL; Time bound plan for liquidation of regulatory assets along with its carrying costs and the same should be incorporated in their ARR; State Government shall make a firm commitment to underwrite the shortfall as equity or interest free loan on annual basis. FRP should include by 31.3.13 targets for procurement reduction in short term power purchase by State discoms. Release of agricultural subsidy should be based on feeder/distribution transformer data. Pre-paid meters should be installed for all government consumers and large customers (>1 MW) where defaults have occurred. A time bound plan for metering all categories of consumers is put in place.

Integrated Rating of Discoms

Ministry of Power's First Annual Report on Integrated Ranking of state distribution utilities in operational, financial and managerial performances, March 2013 devise a mechanism for incentivizing / disincentivising, risks associated with lending exposure and enable funding with appropriate loan covenants for bringing improvement. It contains ranking of 20 discoms by ICRA and 19 discoms by CARE. This ranking assigns 63% weight for financial performance, 15,-15% weight for regulatory environment and 5, -12% weight for accounting information.

Model State Electricity Distribution Management Responsibility Bill

The Ministry of Power has circulated a model state electricity distribution management responsibility bill in September 2003, Government of India (Ministry of Power) (2013) to provide for responsibilities of the State Governments to ensure financial and operational turn around and long term sustainability of state-owned distribution licensees. The bill specifies Key Performance Indicators (KPI) under long term planning and sustainability, financial restructuring plan, accounting measures and regulatory compliance and tariff filings. The State Governments have to lay before state legislatures a state electricity distribution management statement on the measures to be taken and also report to the legislatures on achievements under KPIs.

The KPIs under long term policy include a time bound road map for AT&C loss reduction; energy accounting and auditing of all 33 KV feeders, 11 KV feeders and distribution transformers along with consumer indexing and time bound metering of each category of consumers; declaration of quantum of subsidy in advance and timely disbursement of subsidy; and special courts to tackle power theft. The KPIs under FRP include improvement in collection efficiency, recovery of past receivables, liquidation of liabilities, liquidation of regulatory assets within three years, and reducing the gap between average revenue receipts and average cost of supply within three years. The other KPIs are on accounting measures, corporate governance and regulatory compliance and tariff policy. Some KPIs under regulatory compliance and tariff policy are evaluation twice a year on the status of compliance by state distribution licensees with the legislations and rules, timely filing of tariff petitions, and adjustments on account of cost of fuel and cost of power purchase. It also suggests a monitoring mechanism.

The above model responsibility bill is framed in the context of R-APDRP funding. It may ensure regulatory compliance but it may not ensure financial sustainability of the discoms. It does not address some fundamental issues such as;

(a) Average cost of pricing based on embedded (historical) costs in an inflation – prone economy (with WPI rising at an annual rate of 6 % or more) will increase the gap between current (economic) cost of electricity and the regulated price over time;
(b) The unsustainability of allowing wholesale electricity prices determined largely by market forces (based on current marginal costs) and retail electricity prices on the basis of embedded average costs;

(c) Computation of per unit subsidy for a category as the difference between the average system-wise cost of supply (rather than the appropriate cost for the consumer category depending on voltage and other consumer characteristics) and the average revenue realization for that category;

(d) Fixing the subsidized prices in nominal terms rather as percentages of the appropriate costs for consumer categories, and

(e) Current prescriptive regulatory practice of laying down norms and standards which are of command and control type and which weaken the incentives for the regulated units to search for adopt cost – minimization in production and delivery of utility services. Long term sustainability of discoms and the electricity sector require regulation which recognizes asymmetric information between the regulator and the regulated, and differences in the motivations and capabilities of the regulators and regulated units.

5. Concluding Remarks

The reforms initiated since the early nineties are similar in many respects to the reforms initiated in other countries. Regarding unbundling some states have unbundled SEBs into generation, transmission and distribution segments while others into two segments-transmissions and combined generation and distribution companies. In a few states there are regional distribution companies and about 5 states are experimenting with distribution franchises. Only in two states there is privatization; otherwise government ownership continues. See Table 1. In most states even the accounting separation is only in form.

Even official reports have recorded several drawbacks in the functioning of SERCs namely, poor quality of members, lack of competence in managing the transition from a vertically integrated monopoly stage to an unbundled stage, delays in finalizing tariff orders, and creation of regulatory assets. Also, the regulated tariffs do not provide the correct market signals to suppliers and consumers of electricity. Even the four SPUs which reported surpluses without subsidy in 2011 -12 have not yet applied economic principles in costing and tariff determination. There is no clear evidence that structural unbundling has resulted in significant improvements in physical and financial performances. The Planning Commission and Power Finance Commission Annual Reports and the High Power Commission, and the Report of High Level Panel on Financial Position of Distribution Utilities, 2011 assessments reveal the benefits of reforms have not accrued to society.

National Electricity Policy's targets of access to electricity for all and per capita consumption of 1000 kWh per annum are yet to be achieved in many states. Even the All-India annual per capita consumption by March 2012 was only 819 kWh. Peak and energy shortages in 2011-12 were 10.3% and 8.5 % respectively. Accumulated deficits of SPU, reached Rs 1.9 lakh crore in 2012. The Electricity Act, 2003 provisions such as tariff for no consumer category be below 50 % of the average cost of supply, that the average tariff for agriculture could be less than 50% of the average cost of supply only for a period of three years, and that cross subsidies be eliminated in a phased manner have not yet been implemented in many states. The average agricultural tariff in 9 out of 30 SPUs was less than 50 paise, the figure recommended in the Common Minimum Plan of Chief Ministers Conference in 1995.

The Appellate Tribunal Order 2011, the financial restructuring plan of 2012 and the Ministry of Power attempt to rank utilities in terms of their physical, managerial and financial performance seem to influence behavior of some SERCs and SPUs. This is evident from a substantial increase in the issue of tariff orders in2012-13, some SERCs following truing up procedures for tariff orders, and declining trends in financial losses of a few SPUS.

As long as the discoms are state–owned and run by government officials, the behavior of the discoms will be influenced by political authorities rather than by SERCs or by public interest. Political myopia , as seen in reluctance to increase agricultural and domestic tariffs (and also conceding to demand for concessional tariffs by other organized consumer groups), failure to achieve compulsory meeting and taking stringent actions on power theft, infrequent tariff revisions, inactions regarding pass-through for input costs, can be prevented to some extent via creation of hard budget constraints on SPUs, market pressures such as ranking of SPUs, incentivizing states and SPUs for achieving superior performance and also educating the public about the long-run consequences of political myopia.

With reluctance for privatization of SPUs by most state governments, creation of "hard budget constraint" becomes absolutely necessary. But a permanent solution lies in creating SPUs and SERCs autonomous and knowledge-based organization with capacities for making the transition to a liberalized and sustainable regime.

Table 4.1: Status of Electricity Reforms in India as on 30 September 2013.

Status of Reforms & Restructuring in States																														
S.No.	Milestones	Arunachal Pradesh	Andhra Pradesh	Assam	Bihar	Chattisgarh	Delhi	Gujrat	Goa	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka	Kerala	Meghalaya	Manipur	Mizoram	Maharashtra	Madhya Pradesh	Nagaland	Orissa	Punjab	Rajasthan	Sikkim	Tamil Nadu	Tripura	Uttar Pradesh	Uttrakhand	West Bengal	Total
1	**SERC**																													
a	Constituted																													29
b	Operationalisation																													29
c	Issuing Tariff orders																													28
2	**Unbundling / Corporatisation**																													
a	Implementation																										*			20
b	Privatisation of Distribution																													2
3	**Distribution Reform**																													
a	MYT / ARR Order issued																													11
b	Open Access Regulations																													28
c	Franchisee exist																													6
			Yes																											
			No																											
			Steps have been initiated towards corporatisation/unbundling.																											
		*	Tripura Power Dept. is corporatised as Tripura State Electricity Corporation Ltd.																											

CHAPTER 5

FINANCIAL PROFITABILITY OF STATE POWER UTILITIES

1. Introduction

Financial profitability is an accounting measure derived from balance sheet and Income- expenditure statements of companies. The capital stock in book values is embedded (historical) costs and it does not reflect the opportunity cost of capital. The net capital stock estimate is based on the depreciation method (usually straight line) followed by companies. In periods of inflation the opportunity cost in any year may be higher than the estimated capital value. In case of state –owned or private regulated firm, the estimated capital value may differ from the optimal capital value due to X-inefficiency[3].

The financial performances of SPUs have been assessed by Finance Commissions in their assessments of State finances, and several committees appointed by government from time to time. Most of the assessments are based on the time series data on physical and financial performances of state power utilities available in Planning Commission Annual Reports on the Working of State Power Utilities and Electricity Departments. Recently the Power Finance Corporation (PFC) has been publishing reports on the performances of state power utilities, the latest being for the period 2008-09 to 2010-11. Many tables in the PFC reports give the data at the distribution company level. Since the Planning Commission data is available at the state level and it is for a longer period, we use mainly this data from 1992-93 to 2001-02 and 2007-08 to 2011-12 for analyzing the financial performance of SPUs overtime[4].

A commonly used measure for assessing profitability of a firm is the return on networth (net profit after-tax / net worth) of a firm as it is the residual return i.e., available to the owners of a firm after deducting all operating expenses, depreciation, interest on loans, and corporation income tax. In case of most SPUs the operating surplus (revenue – operating cost) is inadequate even to meet depreciation and interest on debt. The Annual Reports give profit/loss without subsidy and profit/loss with subsidy for each SPU. Despite its limitations it is used by government agencies, SERCs and others to analyze financial profitability of SPUs. Loss with subsidy not only affects financial viability of SPU but would result in delayed payments to input suppliers, suppliers of electricity and

[3] The word X-inefficiency is due to Leibenstein (1966). He distinguishes between movement along the production surface and movement upward from the production surface. The causes of X-inefficiency are monopoly, state ownership with no incentive to reduce cost, and cost based regulation.

[4] The reports are not published for years 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07.

financing agencies. Continuous net loss with subsidy would affect the ability of SPU in raising resources for covering the deficits or undertaking new investments and ultimately the burden is passed on to the State government. Loss without subsidy measures net financial liability of SPU to state as well as society.

Section 2 reviews observations on the expectations of financial performances in Electricity Acts, some important Committees and Finance Commissions. Section 3 contains time series analysis of financial performances of SPUs. Section 4 gives comparative performances of better performing and poor performing SPUs. The Planning Commission data is supplemented with data from tariff orders by State Electricity Regulatory Commissions, wherever available. Section 5 gives concluding remarks.

2. Acts, Commissions and Committees of financial profitability of SPUs

The Electricity Supply Act 1948 envisaged a three percent return on net capital at the beginning of each year as the overall guiding principle for tariffs charged by the SEBs. The Annual Report of the Working of State Power Utilities and Electricity Departments, 2011- 12, says that even though the SEBs were expected to give a rate of return of 3% 'there was trouble right from the beginning … while the policy makers while debating on the Electricity Bill 1946 had envisaged that the Boards would be professionally run by competent personnel, whose work would not be interfered with, nothing of that sort happened. The SEBs virtually functioned as extension of the Government department in charge of power'. The finances of the SEBs had started causing concern by the mid-fifties itself.

The Venkataraman Committee (Government of India, 1964) noted one reason for the poor rate of return was the high cost of and poor returns on rural electrification. It recommended a rate of return of 11% on the capital base within a period of ten years consisting of 6% on interest charges, 1.5 for electricity duty, 0.5 % transfer to general reserve fund and 3% net return.

The Annual Report notes that the onset of green revolution around the mid-sixties had a direct bearing on the financial performances of the SEBs. It says that 'the political decision to provide free or subsidized electricity in many states completely destroyed the financial position of the SEBs. Subsidies which were announced by the State Governments were not necessarily paid. Announcement of subsidies was done purely to garner votes during elections. Farmers were offered

electricity at flat rates based on pump capacity rather than by extent of use measured through a meter' (p 9). The negative effects include "de-meterisation", cornering of the subsidies by well-off farmers, attributing unmeasured losses under agricultural consumption, power theft and increasing cross-subsidization of agriculture and domestic consumers by commercial and industry consumers. The Report says, 'to make things worse, the tariff that is set is not determined on the basis of any economic rationale but on political expediency. No political party would like to increase tariffs for fear of loss of vote banks and as a result, power subsidies kept on rising to astronomical levels' (p 10).

The Rajdhyaksha committee (Government of India, 1980) suggested that;

(a) The financial returns should be adequate to sustain the growth of the utility without excessive dependence on external finance;
(b) Tariffs should be related to both costs and the consumers capacity to pay ;and
(c) Tariffs should discourage waste and increase capacity utilization by flattening the load curve. It recommended an annual rate of return of 15% of the average capital base.

The Electricity Act 2003 states that 'the tariff progressively reflects the cost of supply of electricity and also, reduces and eliminates cross-subsidies within the period to be specified by the Appropriate Commission'. It also says that it is made mandatory for SERCs to fix tariff in a manner that none of class of consumers shall be charged less than fifty per cent of the average cost of supply.

Finance Commissions

The Finance Commissions have been assessing the financial positions of SEBs and the impact of their finances on the state budgets and offer suggestions for improving their financial viability. Observations of recent Finance Commissions are given below.

The 9th Finance Commission noted that the poor financial performances were due to poor operating efficiency, lop-sided tariff structure, disproportionately high T&D losses and delays in the construction and commissioning of power plants. It pointed out that the financial losses affected not merely their viability but even the overall availability of resources required to fund the steadily growing plan programmes in the power sector. It regarded the Boards as commercial undertakings liable to provide a return on their investments. It prescribed gradually rising rate of return starting

from 3% in 1990-91, increasing by 1% in each successive year and reaching 7% in the fifth year 1994-95.

The tenth Finance Commission, noting that the total investments by State Governments in the Boards and power undertakings would exceed Rs 45,000 crore by the end of 1994-95 and the commercial losses would exceed Rs 6,000 crore for 1994-95, observed that 'we have reached a stage where the poor financial health of the Boards is not only hindering their own development but is also inhibiting from investing in the power sector. The inability of the Boards to pay promptly for the power purchased from other organizations … slowed down investment in this sector' (3.34). After reviewing the poor physical and financial performances of SEBs, it assumed a gross rate of return of 3% on investments in 1995-96 and 1996-97, 5% in 1997-98 and 1998-99 and 7% in 1999-2000.

The 13th Finance Commission noted that subsidy for the power sector was the largest component of State government subsidies. It noted that losses in the power sector are expected to be a major drag on the finances of State Governments, and therefore the problems confronting this sector need to be addressed in a time-bound manner. It estimated the aggregate impact of the support to SPUs on state finances in 2007-08 at Rs 30,000 crore, of which the direct subsidy as Rs 18,000 crore. Guarantees extended on loans raised by the power sector amounted to 36% of the total guarantees extended by State Governments in 2007-08 (p 53). It reported that the net losses of state transmission and distribution utilities at 2008 tariffs, was expected to increase from Rs 68,643 crore in 2010-11 to Rs 116,089 crore in 2014-15 (p. 105).

The 13th FC gave the following reasons for the uncovered gap:

(i) Inability to enhance operating efficiencies and reduce T&D losses adequately,
(ii) High costs of short-term power purchases (an average of Rs 7.31 per kWh) as compared to Rs 4.52 per kWh in 2007-08; and
(iii) Absence of timely tariff increases

It recommended the strengthening of the regulatory institutions in the following manner:

(i) The regulatory institutions, in general, lack sufficient capabilities, which is evident from the fact that even routine tariff increases have not taken place in the recent past. There is need for massive capacity building efforts to strengthen them and help them discharge their functions effectively. There is also need to promote consumer education to apprise consumers on the

imperative for such increases. Tariffs should be linked to service levels and performance improvement. Tariff reforms (including Multi-year Tariff implementation as required by the Act) need to be expedited.

(ii) Institutional strengthening and corporate governance of utilities needs reinforcement. Unbundling of utilities, a statutory requirement, should not be deferred any further.

(iii) Public sector companies, whether they have raised funds from the market or not, should follow the provisions of the Company Law in finalising accounts, appointment of independent directors, appointment of audit committees, and implementing the guidelines on Corporate Governance issued by the Department of Public Enterprises.

Reform Measures

Chapter 4 covered power sector reforms undertaken in India. The reforms include unbundling and restructuring of SEBs, creation of SERCs, creation of whole sale and retail power markets, incentivizing states for improving physical performances via R-APDRP and, measures for increasing credit worthiness of SPUS aimed at improving financial sustainability of SPUs. -The expectation was that these reforms would improve their financial sustainability.

3. Financial profitability of SPUs

(a) Profit / Loss without subsidy

Data relating to profit and loss of SPUs for the periods 1992-93 to 2001-02 and 2007-08 to 2011-12 are given in Table 5.1. Table 5.2 gives number of profit making years for the two periods. During the ten year period 1992-93 - 2001-02, 21 out of 25 SPUs incurred losses all these years. One SPU made profit for one year, 3 SPUs made profit for three years and one SPU made profit for 4 years. During the five year period, 2007-08 - 2011-12, 19 out of 28 SPUs incurred loss every year; in six cases the losses were increasing and in another six cases the losses were decreasing. Only 5 units made profits all the five years. These states are Goa, Kerala, Sikkim and West Bengal. Kerala and West Bengal which incurred losses all the ten years during 1992-93 - 2001-02 earned profits all five years during 2007-08 - 2011-12.

Table 5.1: Commercial Profit / Loss of State Power Utilities - Without Subsidy (Rs. Crore)																				
SPU / ED	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Andhra Pradesh	-4.3	-22.8	-981.4	-1255.2	-938.9	-1375.6	-2679.4	-3117.2	-2558.6	-2820.3						-2937.6	-8152.7	-6832.9	-6611.7	-6463.1
Arunachal Pradesh					-33.0	-42.5	-57.7	-68.1	-68.4	-60.7						-82.6	-48.1	-33.4	-72.7	-72.9
Assam	-205.4	-197.3	-255.3	-261.2	-244.2	-439.1	-322.5	-213.8	-378.9	-370.4						-139.4	-121.7	-290.2	-418.2	-222.6
Bihar	-279.6	-189.7	-188.9	-211.4	-441.6	-494.9	-605.1	-511.5	-669.5	-753.5						-1670.6	-1934.9	-2415.8	-2621.9	-2868.4
Chhatisgarh																424.4	794.3	-483.3	-895.8	-1102.7
Delhi	-207.3	-	0.0	-578.0	-626.4	-760.2	-1039.0	-1103.4	-1055.0	-1092.4						-222.0	121.0	615.0		
Goa					22.2	22.9	35.7	-5.3	-28.1	-36.7						139.0	225.3	182.1	169.0	158.6
Gujarat	-519.0	-493.0	-550.0	-1003.0	-952.0	-1364.0	-2039.1	-3778.1	-3919.8	-3490.8						-976.0	-950.0	-715.0	-587.0	-458.0
Haryana	-403.6	-506.9	-467.9	-553.8	-635.0	-764.7	-704.1	-1247.5	-1960.4	-1949.4						-3099.0	-4018.5	-4963.6	-5222.1	-5449.2
Himachal Pradesh	1.7	-50.6	19.4	10.6	-19.3	-33.0	-88.1	-205.7	-92.4	-47.9						-25.4	32.3	-153.0	-125.6	115.2
Jammu & Kashmir	-224.5	-293.2	-346.7	-363.2	-507.2	-660.6	-834.5	-793.3	-990.4	-1141.1						-1312.5	-1316.4	-1540.6	-1949.7	-1968.4
Jharkhand																-970.5	-1220.8	-1662.2	-1014.4	-1099.4
Karnataka	-19.4	-1.9	-164.2	-502.4	-651.8	-321.7	-846.9	-974.9	-1674.9	-2340.1						-1714.2	-3099.3	-1738.0	-1361.7	-1172.9
Kerala	-65.4	-75.0	-128.9	-183.2	-208.0	-199.0	-411.0	-645.7	-1129.0	-1353.7						217.4	217.4	240.7	287.0	361.4
Madhya Pradesh	-492.9	-377.1	-594.2	-601.9	-463.9	-1057.6	-2655.0	-3150.8	-3264.1	-3681.8						-2598.2	-3166.4	-4944.9	-4796.9	-4585.3
Maharashtra	161.6	189.0	276.0	-408.2	-92.1	-10.8	160.4	-1479.5	-1403.6	-3527.2						40.1	-1381.2	-1023.0	165.0	149.5
Manipur					-61.4	-32.8	-32.2	-60.9	-90.7	-105.3						-93.4	-113.5	-105.7	-173.0	-190.3
Meghalaya	-8.4	-3.3	-20.5	-19.9	-15.4	-26.1	-50.2	-52.5	-44.5	-49.2						-40.6	55.8	32.4	-67.6	-7.5
Mizoram					-30.7	-40.9	-40.5	-65.4	-51.0	-63.9						-44.0	-74.0	-130.8	-150.3	-142.5
Nagaland					-21.1	-20.6	-26.3	-27.1	-32.9	-26.7						-81.3	-66.3	-111.4	-133.8	-129.1
Orissa	-85.4	-196.1	-136.1	-230.7	-374.9	-391.7	-538.3	-186.8	-215.8	-230.3						-114.0	-148.0	-172.0		
Pondicherry					-3.9	-7.3	-16.2	-26.3	-33.0	-40.6						20.8	-80.5	-47.2	-120.4	-37.2
Punjab	-626.3	-693.2	-680.6	-643.7	-603.4	-943.3	-1354.4	-2112.9	-1476.7	-1633.1						-4459.4	-3894.4	-4445.8	-6602.5	-4230.4
Rajasthan	-259.5	-414.5	-412.2	-429.9	-497.5	-639.5	-1330.7	-1899.0	614.6	-2412.1						-3949.2	-7836.0	-10808.4	-10379.6	-11585.9
Sikkim					-7.3	-9.3	-12.0	-15.2	-19.8	-21.5						90.6	144.0	132.4	25.9	25.9
Tamil Nadu	-257.6	-301.6	-2.4	-76.7	-256.9	-296.4	-741.1	-1442.1	-1446.9	-2510.1						-4969.1	-9600.0	-11352.4	-10940.2	-10426.1
Tripura					-62.9	-61.9	-53.6	-69.1	-93.8	-92.3						-21.8	37.6	-47.8	-106.8	-102.6
Uttar Pradesh	-807.5	-1201.5	-1152.0	-1136.2	-3378.3	-3692.0	-3692.0	-2595.5	-2534.0	-2687.3						-4969.1	-6643.3	-6786.4	-5651.8	-3390.1
Uttrakhand																-243.1	-354.6	-390.7	-450.3	-831.0
West Bengal	-257.5	-231.2	-339.2	-321.8	-398.2	-492.4	-1089.2	-842.5	-1059.4	-1086.2						102.1	48.5	100.8	195.6	204.4

Source: Government of India (Planning Commission), Annual Report of the Working of State Public utilities and State Electricity Departments, 2002-03 and 2011 -12

Notes:

(1) For Delhi and Orissa data are not given available for 2010-11and 2011-12 . According to Power Finance Corporation report on the performances of SPUs for the years 2008-09 to 2010-11, the profit/loss without subsidy on accrual basis, was Rs. -720 crore for Orissa and Rs. 1057 for Delhi; the aggregate loss for all states was Rs 61998 crore.
(2) Data for Chattisgargh, Jharkhand and Uttarakhand are from 2007-08.
(3) Data for Goa, Manipur, Mizoram, Nagaland, Pondicherry, Sikkim and Tripura are from 1996-97.

Goa made profits for three years during the first period and all five years in the second period. Himachal Pradesh made profits for three years in the first period and two years in the second period. Maharashtra made profits for four years in the first period and three years in the second period.

Table 5.3 gives Commercial Profit / Loss with subsidy and Table 5.4 gives information on number of profit-making years. It may be noted that 6 SPUs (Assam, Bihar, Jammu and Kashmir, Madhya Pradesh, Punjab and Uttarakhand) incurred losses in both periods and in 4 of them the losses are increasing. The number of loss-incurring units for all years increased from 9 in the first period to 11 in the second period.

The aggregate losses of the 28 SPUs increased by 56% during 2007-08 - 2008-09 and by 14% during 2008-09 - 2009-10, but decreased by .05% during 2009-10 - 2010-11 and by 7.0% during 2010-11 - 2011-12. In 2011-12 three states, Rajasthan (Rs -11586 crore), Tamil Nadu (Rs. -10426 crore) and Andhra Pradesh (Rs. -6463 crore) accounted for 51% of the total losses.

Table 5.2: Profit/Loss without Subsidy - Profit Earning Years			
	1992-93 to 2001-02	2007-08 to 2011-12	
Profit Earning Years	State/UT	State/UT	Trend if any
0	Andhra Pradesh	Andhra Pradesh	Decreasing loss
0	Arunachal Pradesh	Arunachal Pradesh	Increasing loss
0	Assam	Assam	
0	Bihar	Bihar	Increasing loss
0	Gujarat	Gujarat	Decreasing loss
0	Haryana	Haryana	Increasing loss
0	Jammu & Kashmir	Jammu & Kashmir	Increasing loss
0		Jharkhand	
0	Karnataka	Karnataka	Decreasing loss
0	Kerala		
0	Madhya Pradesh	Madhya Pradesh	Decreasing loss
0	Meghalaya		
0	Manipur	Manipur	
0	Mizoram	Mizoram	
0	Nagaland	Nagaland	
0	Pondicherry		
0	Punjab	Punjab	
0	Sikkim		
0	Tamil Nadu	Tamil Nadu	Decreasing loss
0	Tripura		
0	Uttar Pradesh	Uttar Pradesh	Decreasing loss
0		Uttarakhand	Increasing loss
0	West Bengal		
0		Rajasthan	Increasing loss
0		Tripura	
1	Rajasthan		
1		Pondicherry	
2		Chhattisgarh	Decreasing loss
2		Meghalaya	
2		Himachal Pradesh	
3	Goa	Maharashtra	Decreasing loss
3	Himachal Pradesh		
4	Maharashtra		
5		Goa	Profit
5		Kerala	Profit increasing
5		Sikkim	Profit
5		West Bengal	Profit

Profit / Loss (with subsidy)

State Governments impose certain social obligations on SPUs like sale of electricity at subsidized rates for certain consumer categories like agriculture and domestic and reimburse whole or part of the subsidies. Hence, profit/ loss with subsidy can also be viewed as a performance measure of a SPU. Data relating to this measure is given in Table 5.3. The same data reorganized under years of profit is given in Table 5.4.

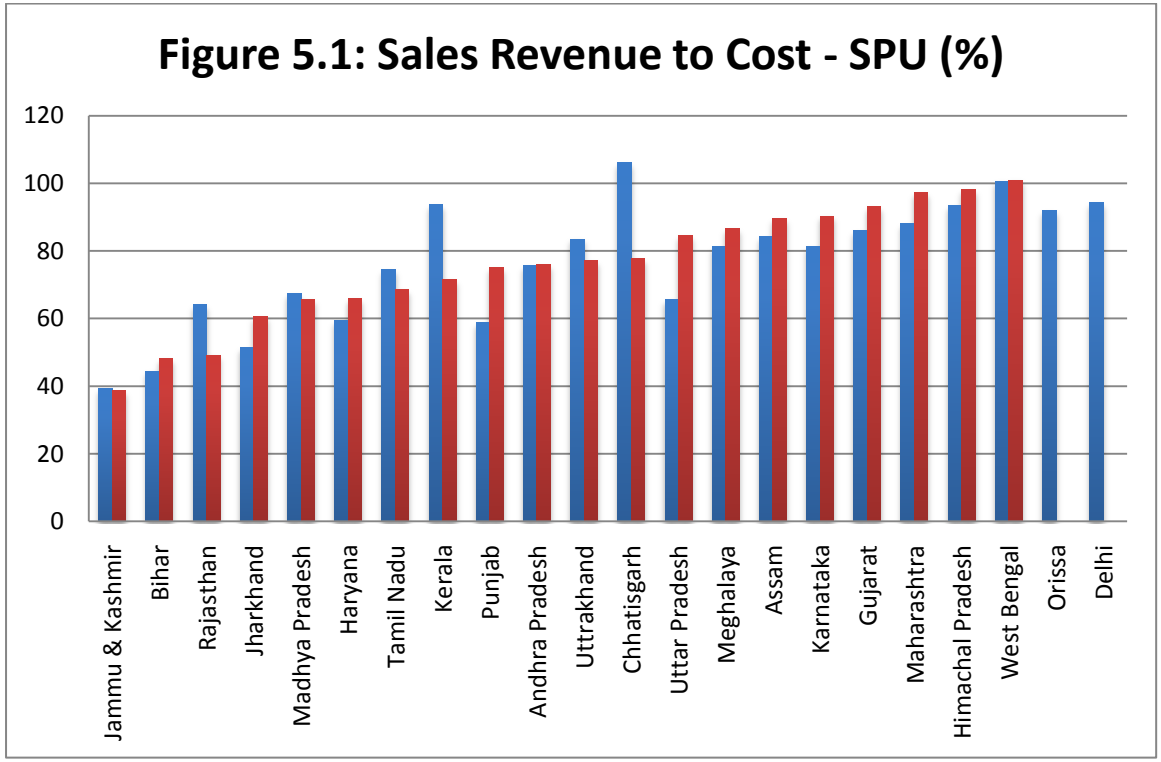
It may be seen from Table 5.4 that during the first period only Karnataka made profits in all the ten years. Maharashtra made profits in eight years and Rajasthan and Tamil Nadu for seven years. Nine SPUs incurred losses in all the ten years. During the second period, five states- Goa, Gujarat, Kerala, Sikkim and West Bengal- earned profits for all the five years. Fourteen of the SPUs incurred losses during the five years.

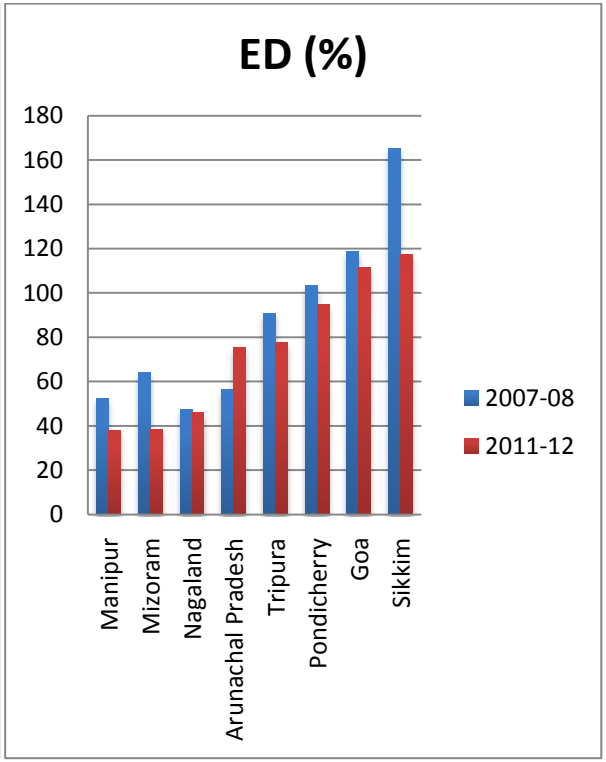
Table 5.3: Commercial Profit / Loss of State Power Utilities - With Subsidy (Rs. Crore)																				
SPU / ED	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Andhra Pradesh	-4.3	-22.7	-37.3	3.9	-88.52	-1375.64	-130.25	-52.81	-932.37	-1194.04						-71.16	-173.18	-123.84	-6611.68	-6463.12
Arunachal Pradesh																-82.58	-48.09	-33.39	-72.73	-72.89
Assam	-205.4	-197.3	-255.3	-260.7	-244.15	-439.05	-322.46	-213.84	-378.89	-370.39						-139.42	-121.69	-290.19	-206.22	-222.59
Bihar	-279.6	-189.7	-188.9	-211.4	-441.56	-494.9	-605.12	-511.47	-669.52	-753.46						-950.55	-1214.86	-1575.78	-1541.87	-1788.42
Chhatisgarh																464.38	846.25	-333.17	-693.67	-900.63
Delhi	-207.3	NA	NA	-578	-626.43	-760.24	-1038.95	-1103.4	-1055	-1092.42						-222	121	615		
Goa																139.04	225.27	182.11	168.98	158.64
Gujarat	100	92	106	108	111	119	-366.11	-2501.12	-2603.81	-2134.76						124	150	385	513	642
Haryana	-368.3	-446.9	-12.9	46	6.69	-32.27	-340.11	-835.47	-1548.36	-1537.37						-822.6	-1381.52	-1674.92	-1797.09	-2024.25
Himachal Pradesh	1.6	-50.6	19.4	10.7	-19.31	-33.02	-88.13	-205.67	-92.36	-47.88						-25.38	32.31	-152.82	-125.56	115.2
Jammu & Kashmir	-224.5	-293.2	-346.7	-363.2	-507.17	-660.6	-834.51	-793.26	-990.44	-1141.12						-1312.52	-1316.44	-1540.58	-1949.71	-1968.4
Jharkhand																-761.29	-140.79	-488	-314.4	100.6
Karnataka	32.2	33.9	43.1	51.2	54.06	58.49	66.99	75.7	76.29	86.4						33.33	-1608.97	-257.9	174.7	385.16
Kerala	-65.3	-75	-120.3	-130	-176.46	-199.04	-205.24	-180.99	-347.98	-444.67						217.42	217.42	240.73	286.99	361.37
Madhya Pradesh	-112.9	38.1	-79.5	-8	-163.45	-812.19	-2534.48	-2717.72	-2799.62	-3182.9						-1981.24	-2260.04	-3661.29	-3363.88	-3130.31
Maharashtra	161.6	189	276	221.7	166.47	294.85	515.46	604.71	-1403.59	-3527.22						40.12	-1381.16	-622.97	164.95	149.54
Manipur																-93.37	-113.48	-105.71	-172.95	-190.25
Meghalaya	-1.9	3.7	-13.5	-11.9	-6.9	-17.14	-40.74	-43.22	-33.99	-38.19						-7.78	67.49	44.69	-53.95	6.5
Mizoram																-44	-74.02	-130.81	-150.32	-142.5
Nagaland																-81.26	-66.27	-111.4	-133.81	-129.07
Orissa	26	29.9	24.9	26.9	-363.48	-386.41	-538.26	-186.81	-211.78	-230.32						-114	-148	-172		
Pondicherry																20.8	-80.46	-47.21	-120.41	-37.19
Punjab	-626.3	-693.2	-680.6	-643.7	-603.43	-943.29	-1354.42	-1709.2	-1476.65	-1633.13						-1611.37	-1292.62	-1301.54	-3475.12	-4230.43
Rajasthan	22.1	10.4	77.1	80.8	63.22	65.35	-134.27	-132.86	614.59	-2412.13						-2703.07	-6743.29	-9455.68	-9128.24	-10238.1
Sikkim																90.61	143.98	132.44	25.92	25.94
Tamil Nadu	92.4	225.5	347.8	339.2	329.64	273.64	334.94	-1192.14	-1196.88	-2260.13						-3512.08	-7768.39	-9680.25	-8871.65	-8143.91
Tripura																28.16	52.03	-33.33	-85.89	-77.14
Uttar Pradesh	-807.5	-1201.5	85	380.8	-1821.29	-1853.11	-1853.11	-2595.53	-1733.99	-1887.28						-3146.96	-5111.26	-4954.38	-3611.8	604.88
Uttrakhand																-243.05	-354.58	-390.69	-450.31	-830.95
West Bengal	-257.5	-158	-242.1	-240.1	-343.24	-402.38	-1039.98	-793.04	-1009.37	-1036.21						102.11	48.54	100.75	195.61	204.42

Source: Government of India (Planning Commission), Annual Report of the Working of State Public utilities and State Electricity Departments, 2002-03 and 2011 -12

Table 5.4: State Power Utilities Profit/Loss with Subsidy: Profit Earning Years				
1992-93 to 2001-02		2007-08 to 2011-12		
State/UT	Profit Years	State/UT	Profit Years	Trend
Assam	0	Assam	0	
Bihar	0	Bihar	0	Loss increasing
Jammu & Kashmir	0	Jammu & Kashmir	0	Loss increasing
Madhya Pradesh	0	Madhya Pradesh	0	
Punjab	0	Punjab	0	Loss increasing
Uttarakhand	0	Uttarakhand	0	Loss increasing
Kerala	0	Kerala	5	Profit increasing
Meghalaya	0	Meghalaya	3	
West Bengal	0	West Bengal	5	Profit increasing
Andhra Pradesh	1	Andhra Pradesh	0	Loss increasing
Haryana	2	Haryana	0	Loss increasing
Uttar Pradesh	2	Uttar Pradesh	1	
Himachal Pradesh	3	Himachal Pradesh	2	
Gujarat	6	Gujarat	5	Profit increasing
Rajasthan	7	Rajasthan	0	Loss increasing
Tamil Nadu	7	Tamil Nadu	0	
Maharashtra	8	Maharashtra	3	
Karnataka	10	Karnataka	3	
		Arunachal Pradesh	0	
		Manipur	0	Loss increasing
		Mizoram	0	Loss increasing
		Nagaland	0	Loss increasing
		Jharkhand	1	
		Pondicherry	1	Loss increasing
		Chhattisgarh	2	Loss increasing
		Tripura	2	
		Goa	5	
		Sikkim	5	

Another indicator of financial profitability is the ratio of average revenue to average cost of electricity. This information is given in the bar diagrams for 2007-08 and 2011-12 for SPUs and Electricity Departments. If it is earning profit, the ratio is above one. Between the two years, 12 SPUs showed increases in the ratio and in 6 the ratio decreased. In case of EDs, the ratio increased in only one





A frequency distribution of SPUs by AR/AC in 2011 -12, given in Table 5.5, shows in 6 out of 28 SPUs the ratio for all sectors was below 50%; only in 3 SPUs this ratio exceeded one. The major factor for financial loss was high subsidies for agriculture and domestic categories. In comparison to the Electricity Act provision that the tariff for no consumer category be less than 50% of the cost of supply, 22 out of 28 SPUs fixed agricultural tariff below 50% of the cost of supply; in the domestic category, 10 out of 28 SPUs fixed average domestic tariff below 50% of the cost of supply. Even the average tariff for the industrial category in 15 SPUs and commercial category in 11 SPUs was less than 1. 13 SPUs in industrial category and 17 SPUs in commercial category cross subsidize agriculture and domestic categories.

Table 5.5: Tariff Structure and AR/AC ratios in 2011-12

Sector	Domestic		Agriculture		Industrial		Commercial		All Sectors	
Avg. Tariff %	No	%	No	%	No	%	No	%	No	%
< 25	2	7.14	15	53.57	0	0.00	0	0.00	0	0.00
25 - 50	8	28.57	7	25.00	4	14.29	2	7.14	6	21.43
50 - 75	12	42.86	5	17.86	2	7.14	3	10.71	5	17.86
75 -100	8	21.43	1	3.57	9	32.14	6	21.43	14	50.00
100 - 125	0	0.00	0	0.00	10	35.71	10	35.71	3	10.71
125 - 150	0	0.00	0	0.00	3	10.71	3	10.71	0	0.00
> 150	0	0.00	0	0.00	0	0.00	4	14.29	0	0.00
Total	28	100.00	28	100.00	28	100.00	28	100.00	28	100.00

Note:

(1) AR/AC less than 0.5 for commercial category in Jammu and Kashmir and Manipur.

(2) AR/AC less than 0.5 for industrial category in Jammu and Kashmir, Manipur, Mizoram and Nagaland.

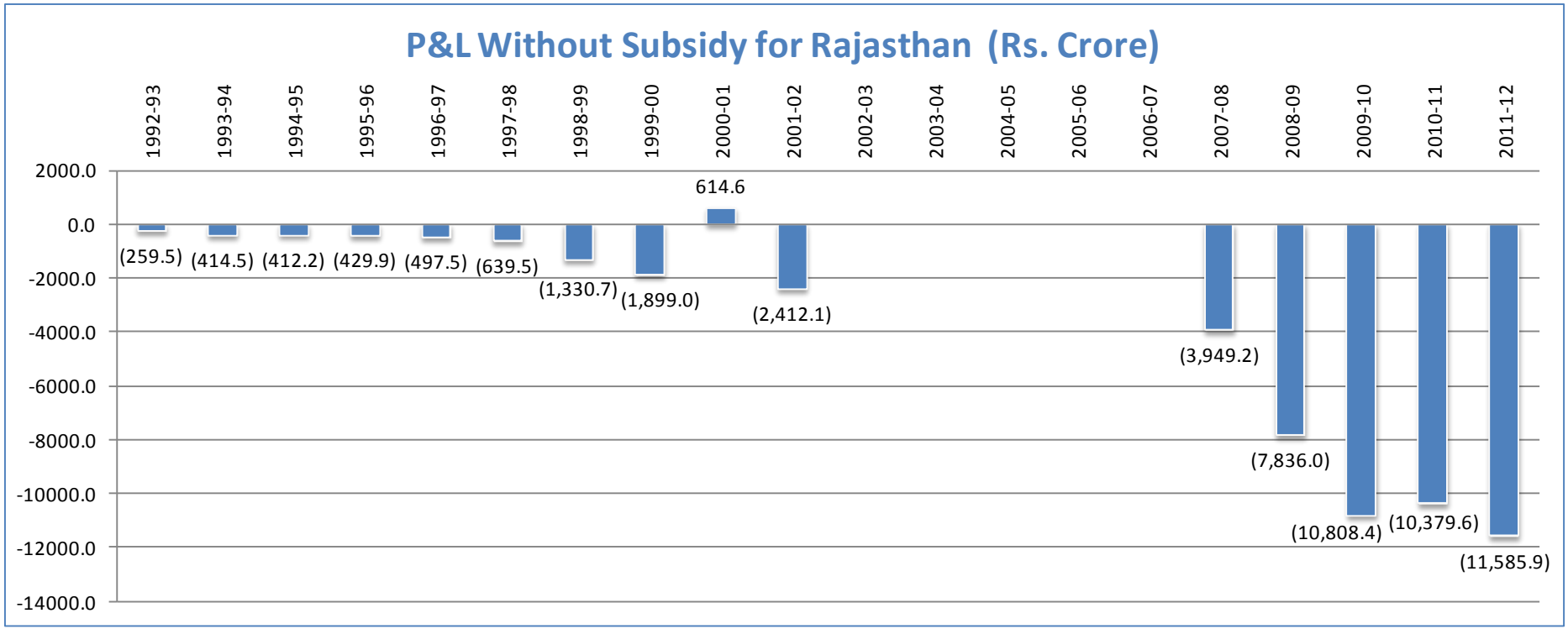
(3) AR/AC for agriculture and irrigation is 0 in Arunachal Pradesh and Tamil Nadu.

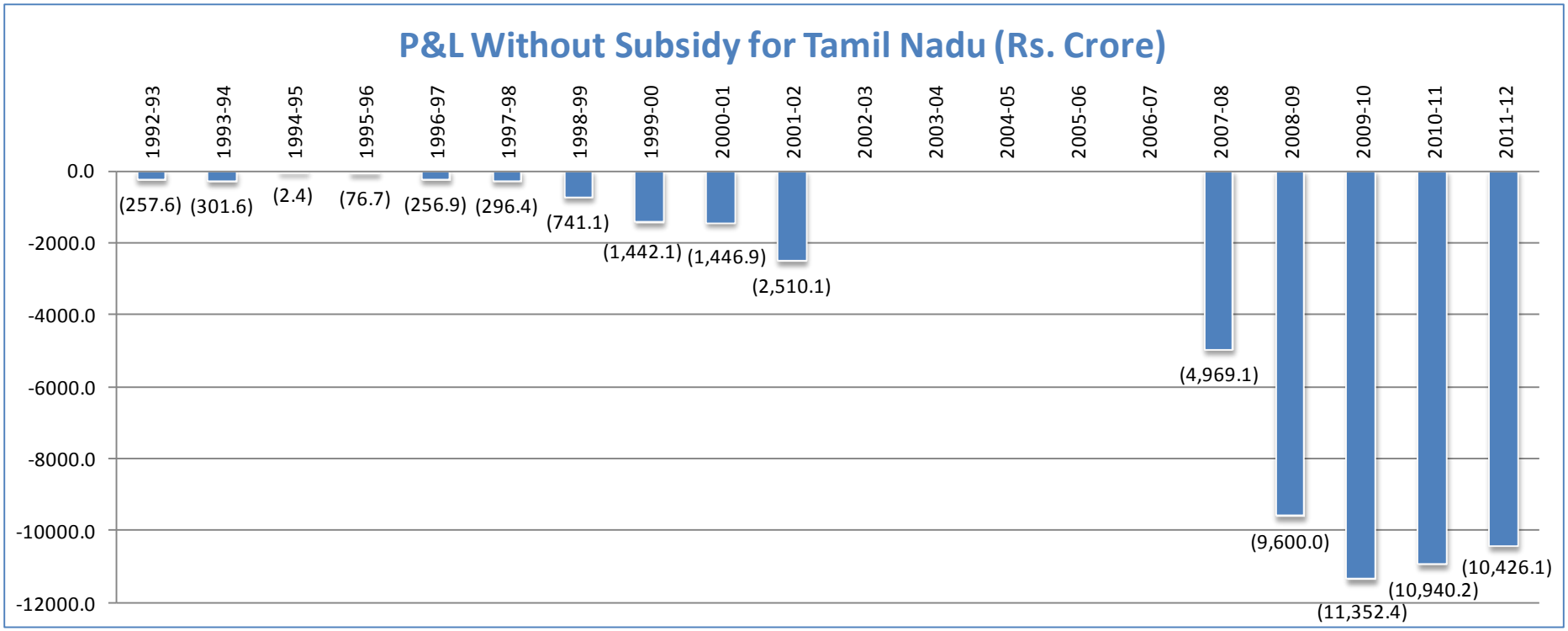
4. Comparative Performance of poor performing and better performing SPUs

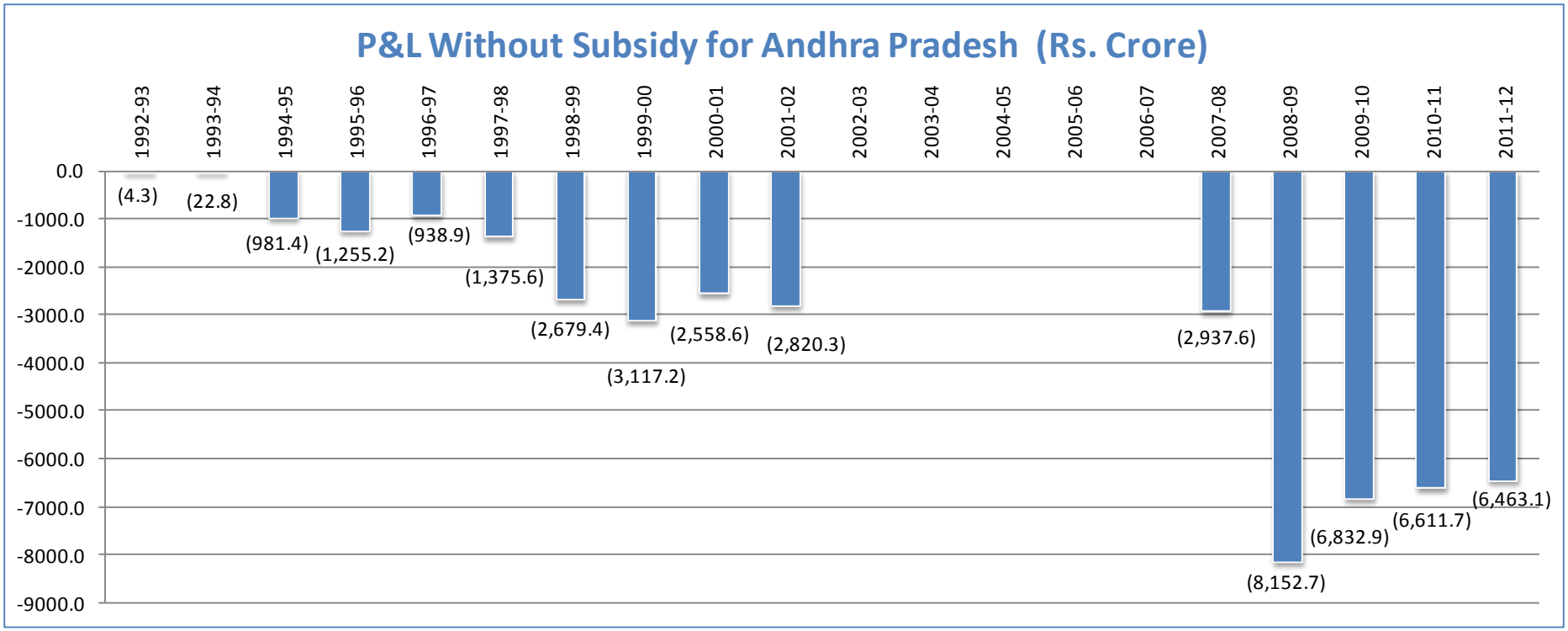
From Table 5.1 five SPUs with poor financial performances, namely, Rajasthan, Tamil Nadu, Andhra Pradesh, Haryana and Jammu & Kashmir and five SPUs with relatively better financial performance, namely Kerala, West Bengal, Gujarat, Maharashtra and Sikkim are chosen for a comparative study. Time series plots for these 10 SPUs are given in Figure 5.2. It should be noted that this selection is based largely on profit/ loss without subsidy.

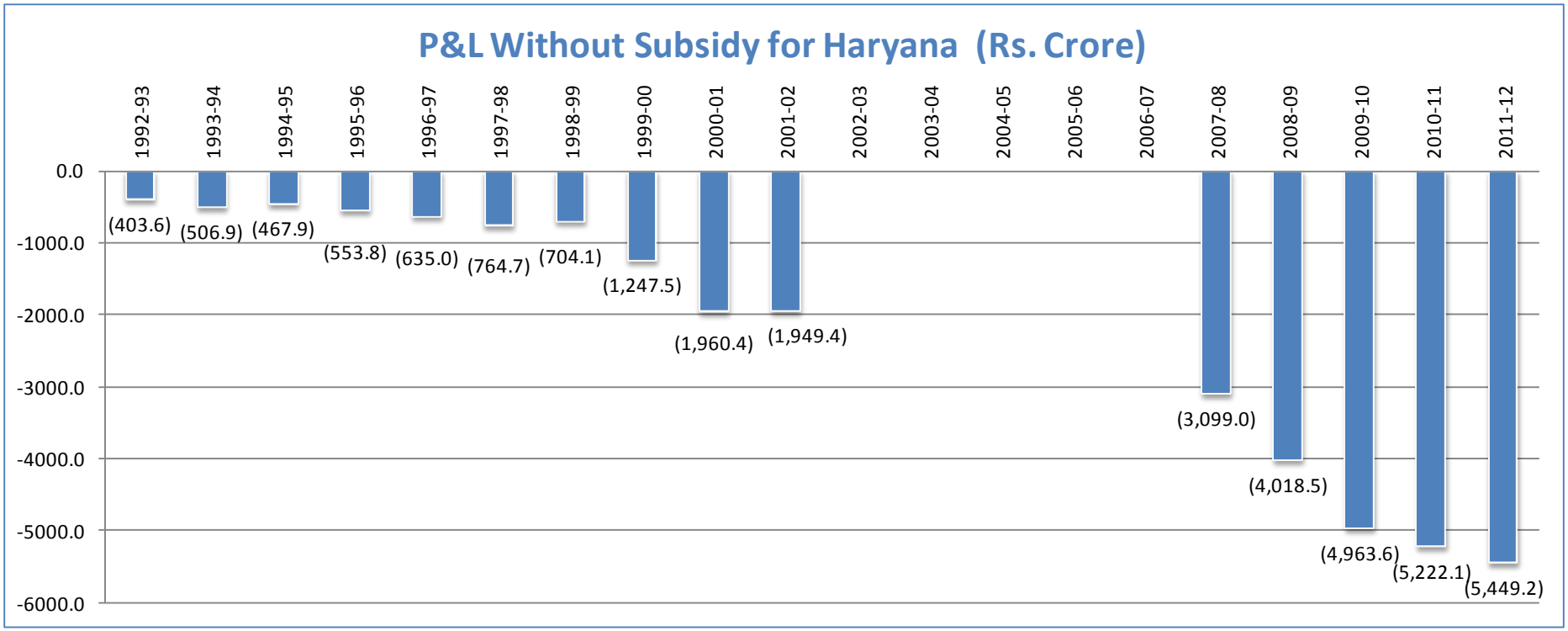
Data on a few physical indicators and performance indicators are given in Table 5.6. These data are taken from the Planning Commission Annual Report 2011-12 on the Working of SPUs and EDs.

Figure 5.2: Loss without Subsidy: Poor Performing SPUs




P&L Without Subsidy for Tamil Nadu (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
0.0
-2000.0
-4000.0
-6000.0
-8000.0
-10000.0
-12000.0
(257.6)
(301.6)
(2.4)
(76.7)
(256.9)
(296.4)
(741.1)
(1,442.1)
(1,446.9)
(2,510.1)
(4,969.1)
(9,600.0)
(11,352.4)
(10,940.2)
(10,426.1)


P&L Without Subsidy for Andhra Pradesh (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
0.0
-1000.0
-2000.0
-3000.0
-4000.0
-5000.0
-6000.0
-7000.0
-8000.0
-9000.0
(4.3)
(22.8)
(981.4)
(1,255.2)
(938.9)
(1,375.6)
(2,679.4)
(3,117.2)
(2,558.6)
(2,820.3)
(2,937.6)
(8,152.7)
(6,832.9)
(6,611.7)
(6,463.1)


P&L Without Subsidy for Haryana (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
0.0
-1000.0
-2000.0
-3000.0
-4000.0
-5000.0
-6000.0
(403.6)
(506.9)
(467.9)
(553.8)
(635.0)
(764.7)
(704.1)
(1,247.5)
(1,960.4)
(1,949.4)
(3,099.0)
(4,018.5)
(4,963.6)
(5,222.1)
(5,449.2)

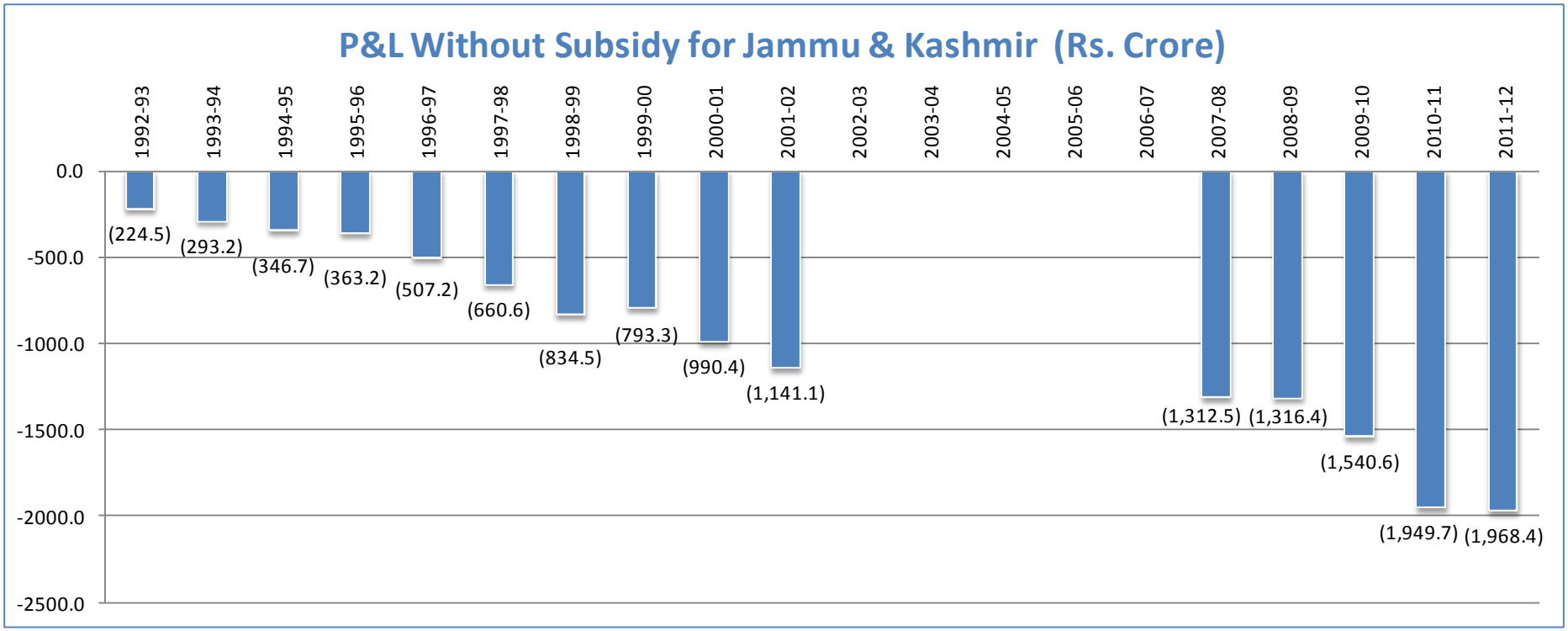
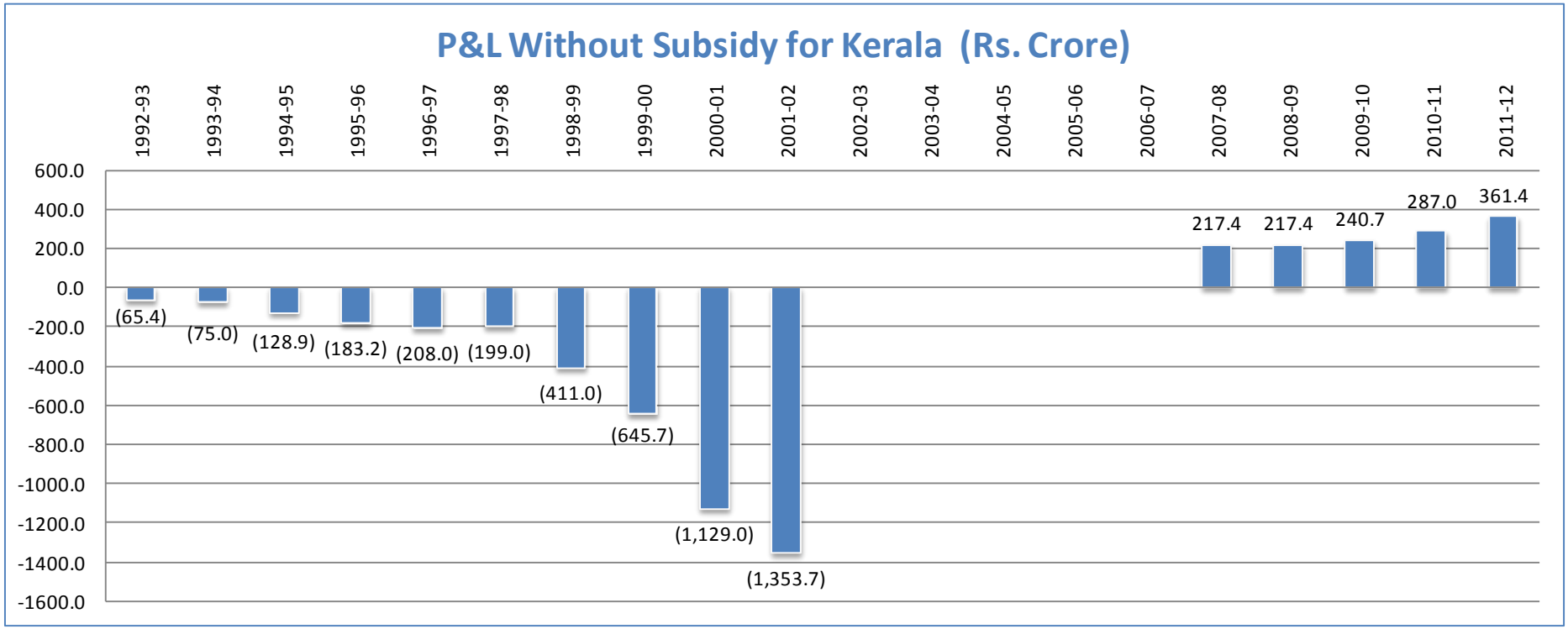
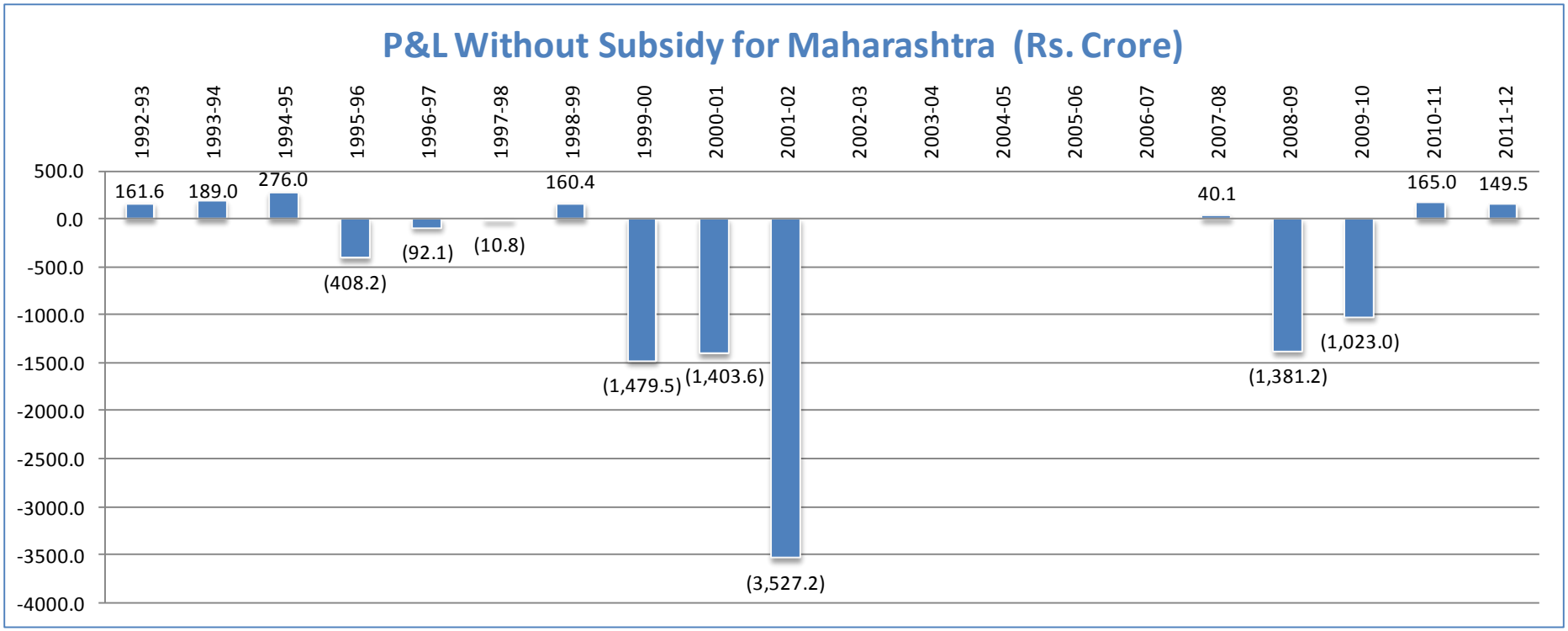
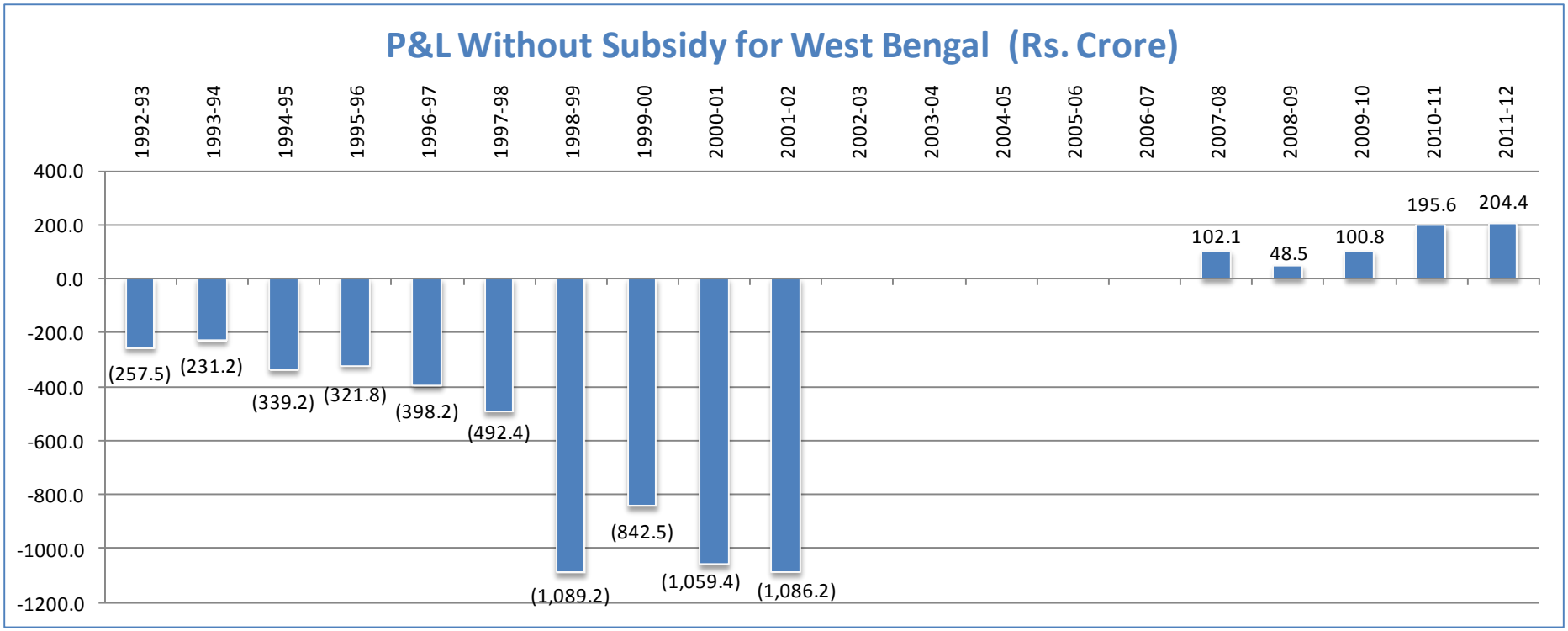
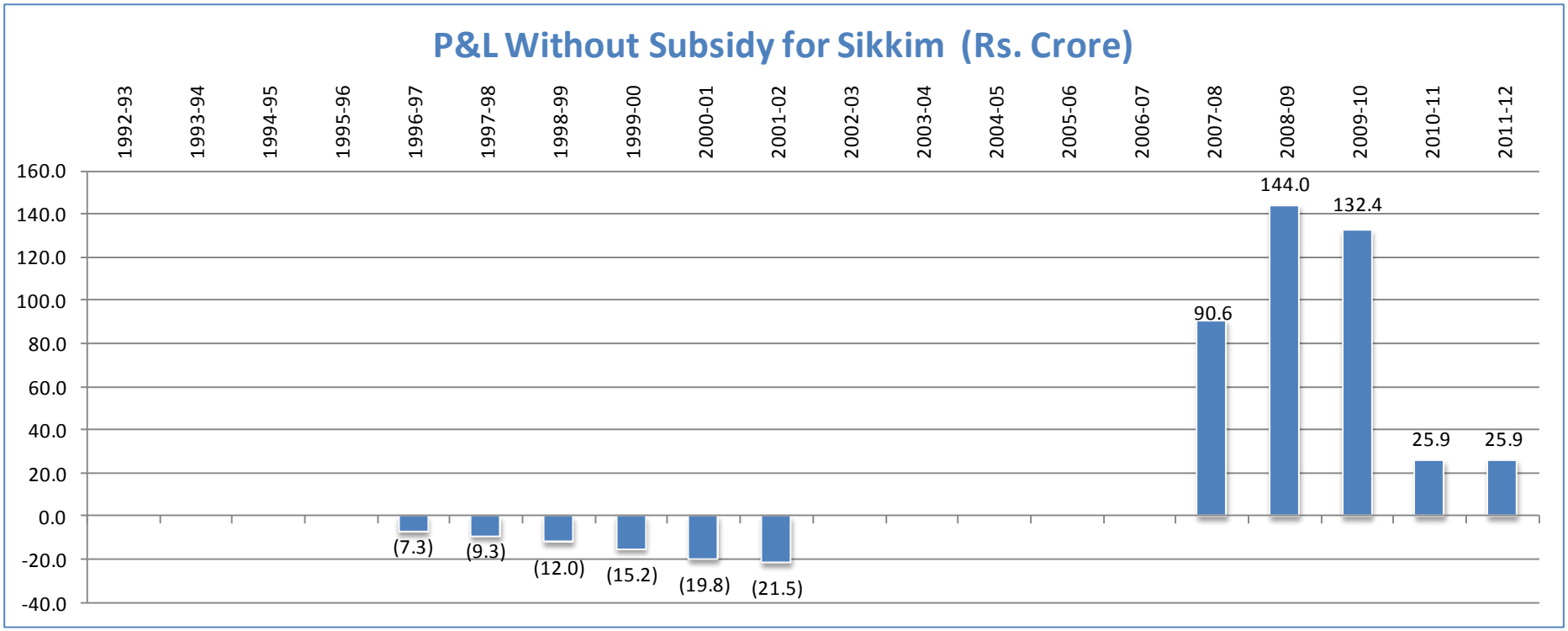

P&L Without Subsidy for Jammu & Kashmir (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
0.0
-500.0
-1000.0
-1500.0
-2000.0
-2500.0
(224.5)
(293.2)
(346.7)
(363.2)
(507.2)
(660.6)
(834.5)
(793.3)
(990.4)
(1,141.1)
(1,312.5)
(1,316.4)
(1,540.6)
(1,949.7)
(1,968.4)

Figure 5.3: Profit/ Loss without Subsidy: Better Performing States




P&L Without Subsidy for Maharashtra (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
500.0
0.0
-500.0
-1000.0
-1500.0
-2000.0
-2500.0
-3000.0
-3500.0
-4000.0
161.6
189.0
276.0
(408.2)
(92.1)
(10.8)
160.4
(1,479.5)
(1,403.6)
(3,527.2)
40.1
(1,381.2)
(1,023.0)
165.0
149.5


P&L Without Subsidy for West Bengal (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
400.0
200.0
0.0
-200.0
-400.0
-600.0
-800.0
-1000.0
-1200.0
(257.5)
(231.2)
(339.2)
(321.8)
(398.2)
(492.4)
(1,089.2)
(842.5)
(1,059.4)
(1,086.2)
102.1
48.5
100.8
195.6
204.4


P&L Without Subsidy for Sikkim (Rs. Crore)
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-20.0
-40.0
(7.3)
(9.3)
(12.0)
(15.2)
(19.8)
(21.5)
90.6
144.0
132.4
25.9
25.9

Rajasthan had the highest net loss (without subsidy). It had only 69% of villages electrified and its per capita electricity consumption is below the national average. Its AT&C loss and share of agricultural consumption in total electricity consumption are relatively high.The average cost of electricity is very high at 620 paise/kWh, 27% higher than the corresponding national figure, but the average revenue is 20% below the All-India average. Rajasthan provides large subsidy for agriculture. The subsidy -sales ratio of 81% is unsustainable.

Tamil Nadu had the second highest loss. Its physical performances are good. But the AR/AC is below the national average. There were only two tariff revisions during the last 12 years. It provides electricity free to all farmers. Its domestic subsidy is also relatively high.

Andhra Pradesh has 100% village electrified and low AT&C loss percentage but per capita consumption is below the national average. Its unit cost of electricity is low and its average revenue is also low, only 76% of the average national price. It subsidizes agriculture heavily. Its average price for agriculture is below 50 paise/kWh. Haryana performs well in rural electrification and per capita electricity consumption but its AT&C loss and agriculture share in total electricity sales are relatively high. Its price cost ratio is two-third; its average agricultural tariff was less than 50 paise kWh. Jammu and Kashmir had a very high AT&C loss of 61.5%. It has a low share of agricultural consumption in sales. Its unit cost of electricity is very high but its average revenue is only 70% of all-India price. Its AR/AC of 0.39 is highly unsustainable.

Regarding the relatively better performing SPUs (all reporting profits with subsidy during the second period) West Bengal, Kerala and Sikkim have per capita consumption below the national average. All the three states have low share for agriculture in electricity consumption. Maharashtra, Gujarat and Goa have achieved the target for per capita consumption. Regarding AR/AC, in West Bengal, Goa and Sikkim, the ratio is above 1, in Gujarat and Maharashtra between 0.9 and 1.0 and only in Kerala it is.0.72. The average agricultural tariff in all the 6 states are above Re 1 , in Maharashtra and West Bengal above Rs 2; only in West Bengal the agricultural tariff is above 50% of the average cost of electricity. As for agricultural subsidies the amounts are large in Gujarat and Maharashtra, small in West Bengal and Kerala and zero in Sikkim. Domestic subsidy is high only in Kerala. The subsidy/ sales ratio is negative in Sikkim, less than 20 % in Maharashtra and West Bengal, 22% in Gujarat and 41% in Kerala.

Table 5.6: Comparison of poor performing and better performing SPUs

Physical Performance				
SPU	Villages Electrified %	Per capita Cons. 2009-10 (kWh)	AT&C Loss %	Share of Agr. in Sales %
Rajasthan	69.0	736.0	27.3	39.4
Tamil Nadu	100.0	1132.0	17.9	17.8
Andhra Pradesh	100.0	779.0	15.4	28.2
Haryana	100.0	1222.0	23.1	29.6
Jammu&Kashmir	98.0	952.0	61.5	7.4
West Bengal	97.0	550.0	25.0	7.5
Kerala	100.0	525.0	24.0	1.8
Maharashtra	88.0	1028.0	23.1	19.9
Gujarat	100.0	1645.0	22.1	28.6
Goa	100.0	2264.0	17.6	0.7
Sikkim	94.0	850.0	46.5	0.0

Financial Performance							
SPU	AC p/kWh	AR p/kWh	AR/AC %	Ag tariff p/kWh	Ag subs Rs. Crore	Dom sub Rs. Crore	Sub/Sales %
Rajasthan	620.0	305.0	49.0	122.0	7741.0	1854.0	81.0
Tamil Nadu	514.0	353.0	69.0	0.0	6162.0	5796.0	51.0
Andhra Pradesh	384.0	292.0	76.0	32.0	7336.0	1671.0	39.0
Haryana	527.0	347.0	66.0	38.0	4780.0	1036.0	53.0
Jammu&Kashmir	698.0	270.0	39.0	142.0	189.0	886.0	86.0
West Bengal	484.0	489.0	101.0	270.0	356.0	397.0	8.0
Kerala	488.0	349.0	72.0	110.0	101.0	2053.0	41.0
Maharashtra	480.0	466.0	97.0	215.0	4632.0	743.0	13.0
Gujarat	427.0	398.0	93.0	176.0	3637.0	392.0	22.0
Goa	337.0	376.0	112.0	153.0	4.0	99.0	<1
Sikkim	189.0	221.0	117.0	-	0.0	2.0	-15.0
India	487.0	382.0	78.0	153.0	45561.0	25006.0	30.0

Source: Annual Report of the Working of State Power Utilities and Electricity Depts., 2011-12.

We observe inter-state variations both in physical and financial performances. The wide variations in average unit cost of electricity supply are due the composition of energy supply and X- inefficiency due to statutory monopoly and cost-based regulation. The average revenue realization is due to operational inefficiency like high AT&C loss, poor collection efficiency and political compulsions for subsidies. The "soft budget constraint" weakens motivations of SPUs to minimize costs. However, it is heartening to note that 5 SPUs earned positive profits (without subsidy) in 2011-12.

Recent Tariff Orders: Agricultural and Domestic tariffs

As reported in Chapter 4, Ministry of Power, Government of India, initiated a number of measures such as financial restructuring, ranking of state-owned discoms, and model bill for management of state – owned SPUs. The Appellate Tribunal order of 2011 prescribed measures for timely issue of tariff orders by SERCs, truing up procedures if SPUs do not submit tariff revision petitions, liquidation of regulatory assets etc. Many states have signed MoUs with the Ministry of Power for financial restructuring and central government financial support is available subject to certain conditions. As a result there has been a significant increase in the number of tariff orders issued and also upward revisions in tariffs from 2012. As the two highly subsidized sectors are agriculture and domestic, using the tariff information for the two consumer categories taken from the tariff orders of 2012 and 2013 assess whether the tariff changes are in the right direction.

Current domestic tariffs for the selected SPUs, based on the tariff orders issued in 2012/2013, are given in Table 5.7. All of them have increasing block tariffs, but the slabs are not uniform. Except Andhra, others have both fixed charge and energy charge. Most states have lifeline tariffs up to 40 or 50 kWh per month. The lifeline tariff for the first slab varies from 76 paise/kWh in Maharashtra to 441 paise/kWh in West Bengal; it is between 100 and 200 paise/kWh in Tamil Nadu, Andhra Pradesh, Jammu and Kashmir and Kerala, between 300 and 400 paise kWh in Gujarat and Rajasthan. The tariff for the last slab varies from 241 paise to 950 paise per KWh in Maharashtra. Except in Jammu and Kashmir, there has been increase in domestic tariffs.

Table 5.7: Electricity Domestic category tariffs in selected states

Rajasthan (2012)		
Monthly	**Energy charge**	**Fixed Charge**
Upto 50	300	80
Above 50		
Upto 50	300	160
51-150	465	
151-300	485	175
301-500	515	210
Above 500	600	

Tamil Nadu (2012-13)		
Monthly	**Energy charge**	**Fixed Charge**
Upto 50	100	10
51-100		
0-100	150	10
101-250		
0-100	200	
101-250	300	15
251-500		
0-100	300	20
151-250	400	
>250	575	

Andhra Pradesh (2013-14)		
Monthly	**Energy charge**	**Fixed Charge**
Upto 50	145	No fixed charge
Above 50		
First 50	260	
51-100	325	
101-150	488	
151-200	563	
201-250	638	
251-300	688	
301-400	738	
401-500	788	
Above 500	838	

Haryana (2013-14)		
Monthly	**Energy charge**	**Fixed Charge**
Less than 100		
0- 40	298	6
41 – 100	475	
Above 100		
0 – 250	490	
251- 500	560	
Above 500	598	

Jammu and Kashmir(2012-13)		
Monthly	**Energy charge**	**Fixed Charge**
Metered		
up to 30	119	Upto .25 - 15
31-100	154	.25-.50 kw - 25
100-200	190	.50-1kwh - 40
above 200	291	Above 1kw - 10/250w
Unmetered	**Flat rate**	
upto .25kw	89	
.25-.50kw	260	
.50-.75	397	
.75-1kw	534	
1-2kw	1041	
>2	every .25kw	

Kerala (2012 -2013)	
Monthly	**Paise/kWh**
0 - 40	150
0 - 80	240
81 - 120	290
121- 150	360
151- 200	480
201 -3 00	600
301- 500	750

West Bengal 2012-13			
Life line tariff upto 25 kWh per month Paise 291 Fixed charge Rs 5 per month			
Monthly	**Paise/kWh**	**Monthly**	**Paise/kWh**
Upto 25	441	Upto 25	446
Next 35	486	Next 25	497
Next 40	583	Next 50	585
Next 100	633	Next 50	640
Next 100	643	Next 150	660
Above 300	810	Above 300	810

Gujarat			
Fixed charge	**Rs per month**	**Energy charge**	**Paise/kWh**
Upto 2 kw	15	Upto 50	315
2 - 4 kw	25	Next 50	360
4 - 6 kw	45	Next 150	425
Above 6	65	Above 250	520
BPL households		Upto	150

Maharashtra			
Fixed charge	Rs. per month	Energy charge	Paise/Kwh
BPL - Upto 0.1 kw	10	upto 30	76
Others		0-100	336
Single phase	40	101-300	605
Three phase	130	301-500	792
		501-1000	878
		Above 1000	950

Agricultural Tariff

There are wide inter-state variations in agricultural tariff. At one extreme, Tamil Nadu provides free electricity to all farmers. Andhra Pradesh makes distinction between wet land and dry land and farmers coming under demand side management (DSM) and non-DSM. It provides free electricity to farmers with land less than 2.5 acres and dry land with less than 3 acres coming under DSM. It charges 50 paise/kWh for the other farmers. For farmers coming under without DSM the energy charge is 50 paise/kWh for the small farmers and 100 paise/kWh for others. Even though the rates are low there is some targeting. Haryana still provides electricity at 25 paise or 20 paise/kWh. In Rajasthan the energy charge is 90 paise/kWh for supply in block hours and 110 paise/kWh for others.

In the better performing state, the energy charge is the lowest in Kerala (150 paise/kWh) followed by 170 paise/kWh in Gujarat, 210 paise/kWh in Maharashtra and 354 paise/kWh in West Bengal.

The wide variations in the tariffs in these two categories reflect, apart from location –specific cost variations and operational inefficiencies, differences in the abilities of states to overcome political compulsions and improve the financial performances of SPUs.

Table 5.8: Agriculture tariff in Selected States		
Rajasthan		
Category	**FC**	**EC**
Supply in block hours	Rs 15/HP	90p/kWh
Others	Rs 30/HP	110p/kWh
Tamil Nadu		
Free electricity		
Andhra Pradesh		
Category	**FC**	**EC**
With DSM		
Wet land upto 2.5 acres	free	free
Wet land Above 2.5 acres	Rs 525 /HP	50p/kWh
Dry land upto 2 acres	free	free
Dry land Above 3 acres	525/HP	50p/kWh
Without DSM		
Wet land upto 2.5 acres	Rs 525/HP	50p/kWh
Wet land Above 2.5 acres	Rs 1050/HP	100p/kWh
Dry land 3 numbers	Rs 525>HP	50p/kWh
Dry land Above 3 acres	Rs 1050/HP	100p/kWh
Haryana		
Tube well	**EC**	
Motor upto 15 Hp	25 p/kWh	
Above 15 kWh	20p/kWh	
Unmetered	170 KVA but not less than Rs 850/pm Lo	
West Bengal		
Category	**FC**	**EC**
Metered		
6-17 hrs	Rs 20	354p/kWh
17-23 hrs		700p/kWh
Kerala		
Category	**FC**	**EC**
	Rs 6/kw	150 paise/kwh
Gujarat		
Category	**FC**	**EC**
For connected load upto 125 HP	Rs 40/HP	Rs 170p/kWh

Maharashtra		
Category	**FC**	**EC**
0 – 5 HP	In Zone 2 Rs	
Above 5HP	In Zone 2 Rs	
Metered	Rs 20/HP	210 paise/kWH

5. Conclusion

Since 2011 there has been some effort in tariff innovations and increasing the average tariff levels in most states but as the unit costs are also increasing the overall financial losses are still very high. Effective implementation of R-APDRP scheme, Appellate Tribunal Order of 2011, financial restructuring and passing of Model Responsibilities Bill may result in reduction aggregate financial losses of SPUs overtime. But they are unlikely to make all the SPUs financially viable unless statutory changes are made to redefine the roles of governments, regulators and the distribution companies to operate SPUs under “hard budget constraint”, free from political interventions, new information system is adopted for management, and a built-in system of incentives and disincentives are used to make the discoms accountable.

CHAPTER 6

DEVELOPMENT OF AN INFORMATION SYSTEM FOR RATIONAL ELECTRICITY PRICING AND MEASUREMENT OF SUBSIDIES AND CROSS SUBSIDIES

1. Introduction

There are many drawbacks in the existing costing practices and determination of electricity tariffs. The costing system is based on embedded (historical) costs and the concern is on verifiability of reported costs than on whether the reported costs reflect the opportunity costs. There is also reason to believe that the reported costs are higher than the costs necessary to supply electricity because of X-inefficiency. The tariffs for different consumer groups are to be based on system –wise average cost and not on the costs of providing electricity to different consumer categories, and the actual tariffs are arrived at by adjustments to the cost satisfying equity and political compulsions. The timing of tariff announcements and the extent of price adjustments to cost escalations are influenced by politics. The method of computing subsidy and cross subsidy for a consumer category as the difference between the average cost for the system as a whole and the average tariff realization for the consumer category is also flawed as a consumer category cost depends on many factors like load, voltage, coincidence with system demand, time of consumption etc. This system persists because of lack of data about costs of supply and demand characteristics at consumer end and also subsidized consumers and political authorities prefer this way of subsidy measurement as it would give lower estimates of subsidy burdens.

In Government of India (Planning Commission) (2012) and in most tariff orders, subsidy for a consumer category is measured as the difference between the average costs for the system as a whole less the average realized for that category. Mundle and Rao (1991) articulated three elements of subsidy which are implicit in the accounting measure of subsidy in most official calculations. Using partial equilibrium analysis, they showed that the difference between the actual cost and the average price consists of three elements: producers' subsidy, allocative subsidy and distributive subsidy. They noted that 'it is not possible to disentangle these three elements of the subsidy without detailed estimates of cost and demand functions for all the different functions' (p.1158).

Table 6.1 provides extent of cost recovery for some major electricity consumer categories in India for 2011-12. The following inferences are drawn from this table:

(i) In 25 out of 28 SPUs the cost recovery was less than 100%;

(ii) In agriculture the cost recovery ratio was less than 25% in 15 out of 28 SPUs and in none there is full cost recovery;

(iii) In domestic in 10 SPUs the recovery ratio was less than 50% ;

(iv) In industrial category in 15 SPUs there is under recovery and in 13 there is cross subsidy; and

(v) In commercial in 11 SPUs there is under recovery and in 17 there is cross subsidy.

These inferences are subject to the following criticisms:

(i) The subsidy estimates for domestic and agriculture are underestimates even in accounting sense because these categories get power at LT-end and the costs of supplying power at LT-end are higher than the costs of supplying power at EHT and HT ends;

(ii) As agricultural consumption is not metered by many SPUs , it is argued that agricultural consumption is derived residually and hence subject to some error;

(iii) The extent of cross subsidization may be an over estimate for two reasons – actual unit costs may be lower than the estimated costs which are based on the system wide average cost and the embedded costs are likely to be lower than the current costs, even after allowing for X-inefficiency.

Table 6.1: Extent of Cost Recovery in selected consumer categories, 2011-12

Sector	Domestic		Agriculture		Industrial		Commercial		All Sectors	
Avg. Tariff %	No	%	No	%	No	%	No	%	No	%
< 25	2	7.14	15	53.57	0	0.00	0	0.00	0	0.00
25 - 50	8	28.57	7	25.00	4	14.29	2	7.14	6	21.43
50 - 75	12	42.86	5	17.86	2	7.14	3	10.71	5	17.86
75 -100	8	21.43	1	3.57	9	32.14	6	21.43	14	50.00
100 - 125	0	0.00	0	0.00	10	35.71	10	35.71	3	10.71
125 - 150	0	0.00	0	0.00	3	10.71	3	10.71	0	0.00
> 150	0	0.00	0	0.00	0	0.00	4	14.29	0	0.00
Total	28	100.00	28	100.00	28	100.00	28	100.00	28	100.00

Note:

(1) AR/AC less than 0.5 for commercial category in Jammu and Kashmir and Manipur.

(2) AR/AC less than 0.5 for industrial category in Jammu and Kashmir, Manipur, Mizoram and Nagaland.

(3) AR/AC for agriculture and irrigation is 0 in Arunachal Pradesh and Tamil Nadu.

This system could work in a vertically integrated monopoly structure where there is no threat of entry or exit. Economic reforms - -unbundling, competition in generation and distribution, creation of markets for wholesale trade and bulk purchase, possibility of competition in retail electricity markets, and need for including external costs in prices- - necessitate reforms in the accounting system, information system for costing and pricing, and procedures for periodical price revisions. The current system where wholesale prices, at the margin, are influenced by current marginal cost of producing electricity and the retail price of electricity determined by embedded average cost of electricity is not sustainable in the long run as it will result in bankruptcy of discoms or/ and increase in financial burden of State Governments.

It is recognized that the accounting, costing and price reform requires development of the necessary information system, the capacity to apply the new costing and pricing methods, and the political will to implement them. As such a transition would require behavioral change and initiating preparatory steps, in the short run, say up to next five years, for introduction of new costing and pricing methods. Section 2 deals with these issues. The elements of the proposed costing system and alternative pricing rules which are incentive based and market friendly are discussed in Section 3. Section4 deals with measurement of subsidies and cross subsidies Section 5 is conclusion.

2. Improvements within the existing costing and pricing regime

Discoms must develop the information base for costing and pricing. One lacuna for determining tariff based on cost of service is lack of cost data and demand data at the consumer category level. Section 62(3) of the Electricity Act 2003 states that the Appropriate Commission may 'differentiate according to the consumer's load factor, power factor, voltage, total consumption of electricity during any specified period or the time at which the supply is required or the geographical position of any area, the nature of supply and the purpose for which the supply is required'. National Tariff Policy clause 8.5 defines cross subsidy charge as the difference between (i) the tariff applicable to the category of consumers and (ii) the cost of the distribution licensee to supply electricity to the consumers of that category.

Measurement of consumption at voltage level is the first necessary step. This means compulsory metering for all consumers. There must be a time limit, say three years, for providing electricity without meters for farmers and certain other domestic categories i.e. life line consumers. Second , by sampling or other methods, estimate consumer category load curves, seasonal and time of day consumption, category's coincident demand with the system's coincident demand, technical losses at EHT, HT and LT levels, and if possible at consumer category levels. Recent developments in

technology permit meter reading even in remote regions .There are also new developments in costing of transmission services. The information would be useful in determining tariff based on cost of supply for each consumer category and measuring subsidies and cross subsidies.

Recently, the Forum of Regulators (2010) and TANGEDCO (2013) sponsored cost of service studies. The first study was confined to agricultural subsidy and cross subsidy. The second study covers all HT and LT categories. The TANGEDCO sponsored study is based on embedded costs. It computes cost of service at voltage level taking into account a few other factors influencing demand for different consumer categories such as load factor. The numbers obtained are sensitive to the assumptions made about other factors. It needs probe. Nevertheless, it is obvious that the costs for the two subsidized categories are higher than the subsidizing categories, and hence the derived subsidies will be larger for agriculture and domestic categories. See Table 6.2

Table 6.2: TANGEDCO cost of service estimates at voltage ends for subsidized and subsidizing consumer categories, 2013 (Figures in Rs)

Category	Demand related	Energy related	Customer related	Total
LT Domestic	2.14	4.33	0.5	6.97
LT Agriculture	1.73	3.5	0.4	5.63
HT Industry	1.46	2.95	0.34	4.74
HT Commercial	1.49	3.02	0.35	4.93

Note: Variation in LT end cost from Rs 5.25/kWh to Rs 7.93/kWh

Variation in HT end cost from Rs 4.33/kWh to Rs 5.53kWh

On the demand side, information relating to seasonal variations and variations between peak hours and off peak hours would be useful. Estimates of own - price elasticity, income elasticity and consumers' willingness to pay for electricity in different time periods and periods of power shortages would be useful for demand forecasting and assess the impacts of increases in tariffs on consumer demands. This information would also help in experimenting with developing policy for rationing via price rather than quantity.

Many SPUs have introduced seasonal and time of day prices for large users of electricity, but the prices are not based on economic analysis.

State governments must devise plans to liquidate regulatory assets and past liabilities of the discoms via central government finance restructuring scheme or on its own so that the discoms will be bankable and financially viable, so that the hard budget constraint can be enforced on them in the

future. They may give franchisees to achieve reduction in AT&C losses, introduction of time of day pricing, improving collection efficiency and technological modernization in their service areas.

There is need for capacity building in SERCs. This becomes necessary when state-owned discoms fail to submit tariff petitions annually for political or other reasons. The Appellate Tribunal order now allows SERCs to initiate truing up procedures for determination of tariffs. They need expertise in costing, cost allocation, and demand analysis to scrutinize the tariff petition submitted by the discoms and, when necessary, to initiate tariff revisions in time.

3. Towards an Incentive-based pricing regime

Both discoms and SERCs must gather information on current and future best – practice technologies in generation, transmission and distribution, time of day metering, demand forecasting, and benchmarks suitable under Indian conditions for assessing performance standards of SPUs. Surveys may be conducted about consumer demand patterns, consumers' willingness to pay for improved services and willingness to surrender contract load during power shortage.

The incentive based pricing methods which have been applied in practice include long-run marginal cost (LRMC) pricing, price caps and competitive bidding. Application of LRMC price rule for retail electricity pricing has strong a theoretical basis; the price reflects current economic cost for the most efficient firm ; it provides correct price signal to the user of electricity to conserve the scarce resource and is consistent with the price in a wholesale electricity market. SERC can estimate LRMC based on normative costing for a most efficient power system.

Attempts should be made to measure the external costs of using fossil fuels, the costs of conversion of forest land in mining coal and lignite, petroleum exploration, opportunity costs of generation of hydro electricity, and nuclear risks by the concerned Ministries /Planning Commission and made available to the Discoms and SERCs so that the relative social costs of generating electricity are known. This information will help in framing policies for sustainable use of energy.

The price-cap approach is desirable for a basket of goods/ services. Its advantage is that one needs information on only baseline prices, weights for elements in the basket and a judgment about the productivity improvement in the discom. It does not require information on costs for every year. It is of the form CPI-X, where CPI is a consumer price index and X is the productivity improvement factor. The idea is that the increase in the price of a regulated utility's basket is less than the CPI by a factor X. It provides an incentive to the firm to minimize cost and earn profit. Social goals can be met by keeping the targeted services outside the basket and regulating their prices in the public interest.

Competitive bidding for right to serve a market based on lowest prices is one possible option. It is desirable when there is information asymmetry. However, design and effective implementation must address issues such as sunk costs in transmission, long gestation periods in generation and consideration of social goods, and existence of adequate potential entrants. When one tries to introduce too many parameters in the bidding, the selection process may become complex.

One may view cost allocation (benefit sharing) as a cooperative game with members being different consumer categories. Developments in cooperative game theory have been helpful in introducing new pricing methods for public utilities. Of the new methods, two deserve special mention- Shapley value and Aumann-Shapley prices. Both satisfy a number of reasonable axioms like individual rationality, group rationality and coalition reality. Shubik (1985) views the Shapley value as 'the natural extension of the type of thinking in economics that made the use of marginal analysis so fruitful. In essence, the value is the combinatorial version of marginal analysis, p 86.

Aumann-Shapley prices are incentive based but their measurement requires knowledge of values of marginal cost for any quantity along a ray between 0 and the quantity vector. The welfare maximizing pricing approach requires only values of the marginal costs at the optimum output combination. Using normative costing approach, data is in digital form, and with the new techniques, the computations are feasible. Discoms may be incentivized to explore application of such pricing rules.

4. Subsides and Cross Subsidies

Developments in cooperative game theory have resulted in incentive based cost allocation procedures, and new ways of measuring subsidies, and testing whether the tariffs are subsidy -free or not. See for example, Young (1985). There are two cost measures—stand alone cost (SAC) and incremental cost (IC). SAC is the cost of producing the output or bundle of output for each possible coalition and IC is the incremental cost of producing the total output when a subset of coalition is added to an existing coalition. When there are economies of scale and scope the total cost for the entire coalition will be lower than the sum of SACs of each sub-coalition. In order to induce each group to cooperate, the utility prices should be such as to make it costly for any group to go it alone. Faulhaber (1975) noted that subsidy-free prices imply that, the revenues contributed by the set of groups should be at least as great as the added cost of supply. In simple words, the subsidy free prices should be between ICs and SACs for each possible coalition.

It makes an intuitive sense that when an existing large industrial or commercial consumer (or groups of consumers) decides to leave the present supplying arrangement the SAC of an alternative supply

arrangement is lower than the present cost. With exit option available in the Electricity Act, 2003 large consumers can leave the system if they perceive that the current costs are higher than their potential SACs. Thus there is an upper limit to cross subsidy in each price category.

5. Conclusion

The Planning Commission, Ministry of Power and Central Electricity Authority may take the initiatives for designing and implementing the new information system and bear 50% of the cost. They may develop a system of incentives and penalties to pressurize the discoms and SERCs to adopt the system and use it. They may sponsor studies to academic institutions to explore the feasibility of application of incentive based costing and pricing policies in the Indian context.

CHAPTER 7

STATE ROAD TRANSPORT UNDERTAKINGS

1. Introduction

An efficient, reliable, punctual and safe bus transport system yields many economic, social and environmental benefits. It provides connectivity to people especially in rural and remote areas. In most rural areas bus transport is necessary for access to government and business services in urban areas, marketing rural produce, and access to medical and education facilities. In urban areas an efficient and safe bus transport system would enable passengers from switching from personal vehicles to bus services and thereby reduce road congestion. Compared with other means of road transport, bus transport is energy efficient. The 12th Plan Sub-group on State Road Transport Undertakings notes that 'on an average, a car consumes nearly 6 times more energy than an average bus, while two wheelers consume about 2.5 times and three wheelers consume 4.7 times more energy in terms of per passenger kilometer'. As lower energy consumption implies lower pollution per passenger km, bus transportation is environment-friendly. However, the share of buses in total registered vehicle in India declined from 11.15 in 1951 to 1.1 % in 2004. Most state governments use public road passenger transportation as a means to achieve social goals such as concessional fares for blind, handicapped, sportsman, students, senior citizens and many other groups. Many states do not reimburse fully these social costs to the SRTUs. They are also reluctant to increase the fares periodically and pass on increases in diesel and other costs by raising the bus fares.

Section 2 deals with expectations on financial performances and observations on the financial performances of the SRTUs by previous Finance Commissions. Section 3 assesses the physical and financial performances of the SRTUs based on time series relating to SRTUs and identify the factors influencing their poor financial performance. Section 4 deals with subsidies. Section 5 considers various measures and proposals for ensuring financial sustainability of SRTUs.

2. Expectations on Financial Performances of SRTUs

Section 18 of the Road Transportations Act, 1950 specifies that 'it shall be the general duty of a Corporation so to exercise its powers, as progressively to provide or secure or promote the provision of, an efficient, adequate, economical and properly coordinated system of road transport services in the State or part of the State'. Section 22 of the Act dealing with corporation finance states that 'it

shall be the general principle of a Corporation that in carrying on its undertaking it shall act on business principles'.

The 9th Finance Commission noted that the requirement that the corporations should carry out their activities on "business principles" as per Section 22 of the Road Transport Corporation Act, was not fulfilled by most corporations. Most of them did not have sufficient surpluses to provide for depreciation and pay interest and taxes. The estimated total loss for all the corporations in 1981-82 was Rs 82.65 crore. It attributed the losses to unrealistic fare structure, increased input costs, growing interest burden and the compulsion of socially oriented concessions. For non-hill states it recommended progressively increasing rate of return on investment - at least 1% in 1990-91, 2% in 1991-92, 3% in 1992-93, 4.5% in 1993-94 and 6.5% in 1994-95.

The 10th Finance Commission said that there was considerable scope for improving the physical and financial performances of the SRTUs. It recognized compensation for social obligations as a matter of state policy. Regarding rate of return on investment, it suggested 2.5% for 1995-96 and rising to 6.00 in 1999-2000.

3. Physical and Financial Performances of SRTUs

Physical Performances

Village bus connectivity in an important policy goal. In the northeastern states the connectivity is very poor. In Assam out of 26,312 villages only 2,236 villages are connected by Assam SRTC. In Meghalaya, only 640 out of 6,020 villages are connected. In Nagaland and Andaman and Nicobar less than 50 % of villages have bus connection, Government of India (Planning Commission (2012). Low economies of density and low traffic would result in uneconomic routes. But in order to fulfill the social obligation, central and state governments must bear the infrastructural and part of capital costs of buses/minibuses.

Ministry of Road Transport & Highways Transport Research Wing provides data on physical and financial performances of SRTUs. Physical performances of SRTUs are measured by indicators like fleet utilization, average vehicle age, accident rate, occupancy ratio, staff bus ratio, staff productivity, vehicle productivity, and fuel efficiency. These measures can vary due to location-specific factors like terrain, road conditions, and economies of density and also due to differences in managerial and X-inefficiencies. Table 7.1 indicates the minimum and maximum value for each measure. In many physical indicators there are large variations of the order 100% to 200 % or even more. Staff productivity and fuel efficiency are important productivity measures as labour cost and

fuel cost account for about 70% of the total cost. Here we find variations of the orders 36 times in staff productivity and more than 100 % in fuel efficiency. Similarly, variation in vehicle productivity is enormous It is time that that the Ministry undertakes an in-depth study of the factors contributing to the sources of inefficiency, develop physical efficiency norms and prepare a time bound plan for the SRTUs to achieve the norms.

Table 7.1: Variations in Physical and Financial Performances of SRTUs, March 2012

Name of State Road Transport Undertaking (SRTU)	Minimum		Maximum	
	State	Value	State	Value
Avg. Fleet Held (Number)	Mizoram ST	47	Andhra Pradesh SRTC	22170
Fleet utilization (%)	Bihar SRTC	39.10	TN STC (Salem)Ltd.	99.20
Avg Age of Fleet (Years)	Karnataka SRTC Metro.TC (Chennai) Ltd.	3.40	Kolhapur MTU	12.00
Number of Fatal Accidents per lakh Reveue Earning Kilometres	Bihar SRTC Himachal RTC Meghalaya STC Tripura RTC	0.00	Ahmedabad M T Corpn.	17.14
Staff/Bus Ratio	Pepsu RTC	2.49	Mizoram ST	13.83
Staff Productivity (Kms/Staff/Day)	Mizoram ST	3.59	TN STC (Salem) Ltd.	131.76
Vehicle Productivity (Kms/Bus/Day)	Mizoram ST	49.70	State Exp.TC TN Ltd.	556.78
Fuel Efficiency (Km/litre of HSD)	Delhi TC	2.48	TN STC (Kumbakonam) Ltd.	5.52
Occupancy Ratio (%)	Delhi TC	41.00	Himachal RTC	100.00
Revenue/Km (Paise)	North Bengal STC	1683.97	Tripura RTC	9606.74
Cost/Km (Paise)	Uttar Pradesh SRTC	2094.43	Mizoram ST	19060.94
Profit/Loss per Km (Paise)	Mizoram ST	-16562.57	Kolhapur MTU	65.50

Source: Government of India (Ministry of Road Transport & Highways Transport Research Wing) (2012), Review of the Performance of State Road Transport Undertakings (SRTUs) (Passenger Services for April, 2011 – March, 2012), New Delhi.

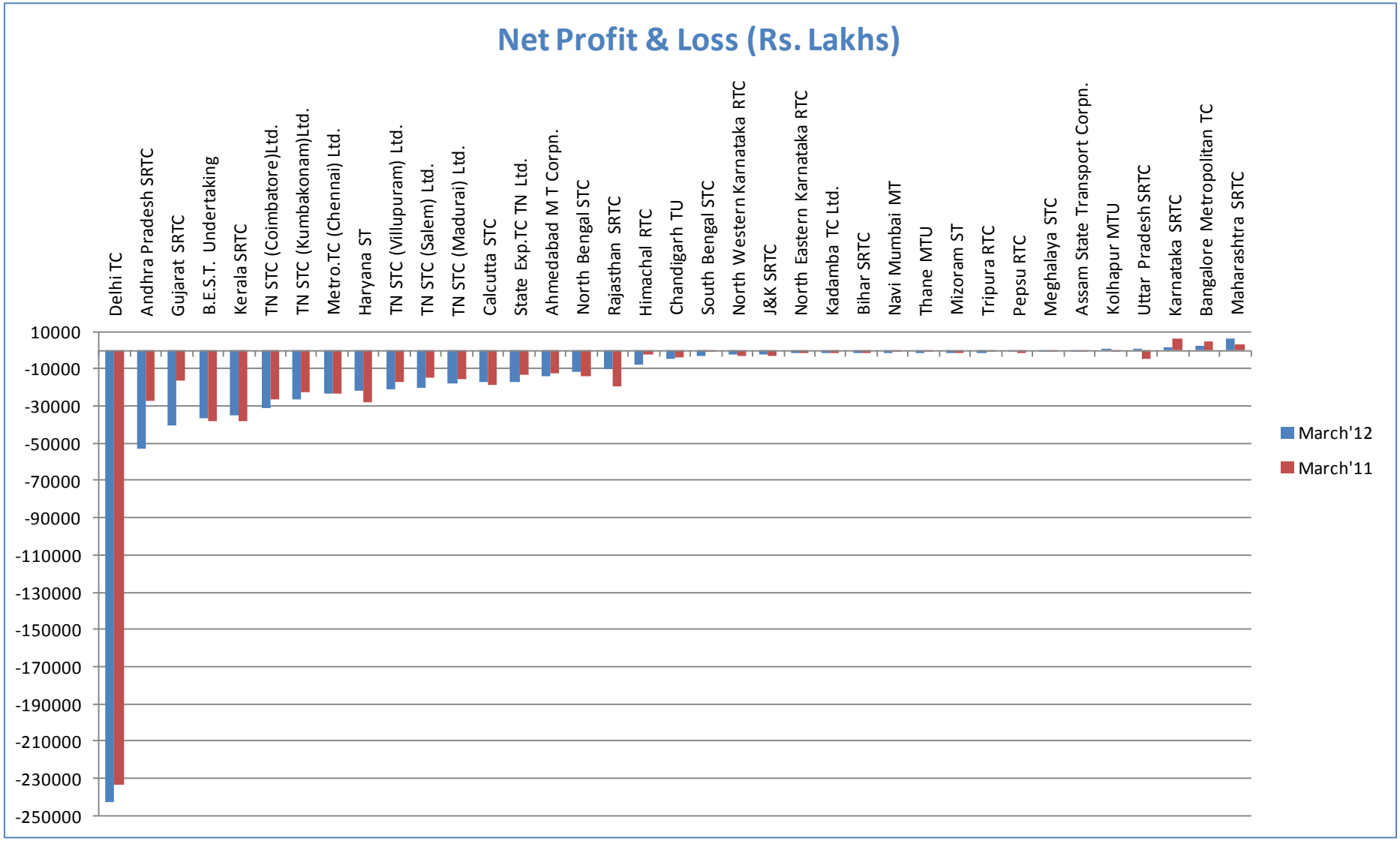
Financial Performances of SRTU

According to Ministry of Road Transport & Highway of Government of India, Review of the Performance of State Road Undertakings, 2011-12, of the 37 corporations only 5 reported profits in that year. The aggregate loss was Rs 6588 crore. Three SRTUs – Delhi TC (Rs 3431 crore), Andhra Pradesh SRTC (Rs 529 crore) and Gujarat SRTC (Rs 402 crore) - accounted for 51% of the total loss.

Of the 44 SRTUs for which data are available on net profit/loss from 2002-03 to 2011-12 (with some missing years), only Bangalore Metro Transport Corporation earned profit for all the ten years, 5 SRTUs earned profits for 5 to 8 years, 12 SRTUs for 1 to 4 years, and 27 (61%) incurred losses for all these years. Among the six metros, only Bangalore TC earned profits all these years.

The net profit/loss of SRTUs for 2010-11 and 2011-12 is shown in Figure 7.1.

Figure 7.1 Net Profit / Loss of SRTUs in 2010-11 and 2011-12



Revenue / total cost gives cost recovery ratio. It is given for each of the SRTU from 2002-03 to 2011-12. A value equal to one or above one implies full cost recovery; a value above one implies net profit and a value less than one implies net loss. This information is given in Table 7.2. The frequency distribution by cost recovery is given in Table 7.3. It may be noted that, on an average, about one-fifth of SRTUs earned revenues sufficient to cover their costs. About 30% of SRTUs covered 50% or less of the total costs. The information for 2011-12 is given in a bar chart in Figure 6.1. Mizoram, a north eastern state, had the lowest cost recovery rate of 0.13. Among metro SRTUs, Calcutta and Delhi had poor cost recovery rates of 0.26 and 0.32 respectively.

Table 7.2: Cost Recovery 2002-03 to 2011-12

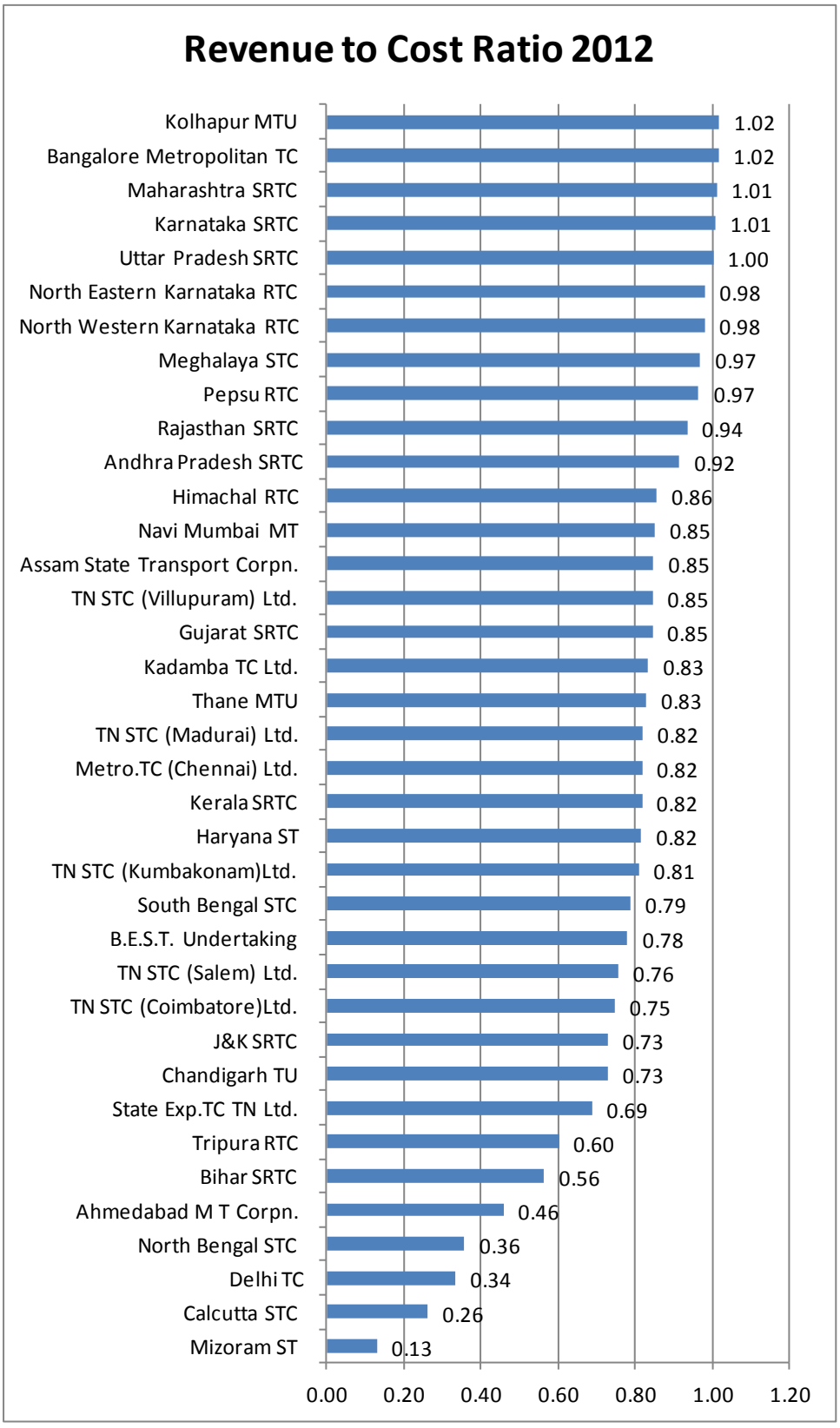
Name of State Road Transport Undertaking (SRTU)	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Mizoram ST	0.13	0.15	0.14	0.14	0.14	0.16	0.14	0.12	0.17	0.22
Calcutta STC	0.26	0.26	0.34	0.37	0.39	0.39	0.34	0.41	0.42	0.42
Delhi TC	0.34	0.30	0.21	0.21	0.28	0.29	0.37	0.38	0.45	
North Bengal STC	0.36	0.32	0.40	0.43	0.44	0.37	0.38	0.38		0.40
Ahmedabad M T Corpn.	0.46	0.47	0.50	0.88	0.59		0.62	0.58	0.50	0.58
Bihar SRTC	0.56	0.55	0.42	0.32	0.41	0.50	0.60	0.54	0.33	
Tripura RTC	0.60	0.63		0.19			0.32	0.33	0.31	
State Exp.TC TN Ltd.	0.69	0.72	0.81	0.79	0.85	0.94	0.85	0.85	0.92	0.86
Chandigarh TU	0.73	0.75	0.72	0.85	0.84	0.83		0.94		
J&K SRTC	0.73	0.58								
TN STC (Coimbatore)Ltd.	0.75	0.75	0.83	0.85	0.90	0.91	0.90	1.02	1.01	0.98
TN STC (Salem) Ltd.	0.76	0.79	0.89	0.87	0.93	0.93	0.92	1.04	1.01	1.01
B.E.S.T. Undertaking	0.78	0.74	0.64	0.76	0.71	0.72	0.78	0.82	0.81	0.82
South Bengal STC	0.79	0.94	0.87	0.87	0.72	0.71	0.79			
TN STC (Kumbakonam)Ltd.	0.81	0.81	0.92	0.90	0.95	0.95	0.93	1.05	1.04	1.02
Haryana ST	0.82	0.76	0.77	0.79	0.88	0.85	0.85	0.88	0.91	0.92
Kerala SRTC	0.82	0.77						0.85		
Metro.TC (Chennai) Ltd.	0.82	0.80	0.88	0.88	0.87	0.88	0.85	0.97	0.97	1.10
TN STC (Madurai) Ltd.	0.82	0.82	0.89	0.84	0.90	0.91	0.90	0.99	0.98	0.95
Thane MTU	0.83	0.90	0.87	0.86	0.96	0.90	0.98		1.02	0.89
Kadamba TC Ltd.	0.83	0.84		0.82	0.82	0.90	0.82	0.84	0.91	0.92
Gujarat SRTC	0.85	0.92	0.88	0.98	1.01	0.97	0.93	0.83	0.82	0.73
TN STC (Villupuram) Ltd.	0.85	0.86	0.94	0.93	1.00	1.01	0.96	1.02	1.01	1.01
Assam State Transport Corpn.	0.85	0.80								
Navi Mumbai MT	0.85	0.91	0.89							0.93
Himachal RTC	0.86	0.95		0.80	0.79	0.76	0.74	0.77	0.78	0.72
Andhra Pradesh SRTC	0.92	0.95	0.91	1.03	1.03	0.97	0.99	0.94		0.94
Rajasthan SRTC	0.94	0.86	0.94	0.86	0.98	0.98	0.97	0.95	0.98	
Pepsu RTC	0.97	0.96		0.98	0.98	0.96	0.94		0.96	0.94
Meghalaya STC	0.97	0.71	0.81	0.70	0.76	0.74	0.59	0.71		
North Western Karnataka RTC	0.98	0.97	0.94	0.94	0.93	1.02	0.96	0.97	0.98	1.02
North Eastern Karnataka RTC	0.98	0.99	0.94	0.97	1.02	0.97	0.95	0.94	0.93	
Uttar Pradesh SRTC	1.00	0.98	0.97	1.01	1.03	1.04	1.01	1.00	0.96	0.94
Karnataka SRTC	1.01	1.03	1.03	1.04	1.03	1.03		1.03		1.05
Maharashtra SRTC	1.01	1.01	1.03	1.06	1.05	1.00	0.99	0.96	0.94	0.97
Bangalore Metropolitan TC	1.02	1.04	1.06	1.06	1.18	1.34	1.20	1.16	1.19	1.10
Kolhapur MTU	1.02	0.93	0.90					0.93	0.94	0.99
Madhya Pradesh SRTC										0.69
Nagaland ST			0.40	0.43	0.39	0.47	0.47	0.50	0.30	0.37
Pimpri Chinchwad MT							0.71	0.66		0.74
Pune Mahamandal										0.86
Punjab Roadways			0.44	0.44	0.60			0.66	0.73	0.67
PUNBUS, Chandigarh			0.99	1.01	1.02					
Orissa SRTC			1.17	1.14		1.02	1.03	1.02	1.02	1.02

Table 7.3: Frequency Distribution by Cost Recovery (%)

Class	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Above 1.00	5	3	4	7	9	7	3	8	7	8
0.75 to < 1.00	22	23	20	20	15	16	19	16	15	14
0.50 to < 0 .75	5	6	3	1	6	4	5	6	2	6
Less than 0.50	5	5	7	8	4	5	6	5	6	4
Total	37	37	34	36	34	32	33	35	30	32

During this period total cost for all SRTUs increased at a compound annual rate of 2.6 % while the total revenue increased at a compound annual rate of 2.4%, resulting in increasing the loss over time. In most SRTUs, the two major cost categories are staff cost and fuel and lubricants cost. Staff cost as percent of total cost varied from 29% in Karnataka SRTC to 91% in Mizoram, the average for all SRTUs being 39.6%. The share of fuel and lubricant in total cost varied from less than 1% in Haryana ST to 41% in North Eastern Karnataka RTC, the average being 30.1%. Thus the combined share of the two items in 2011-12 was 69.7%.Most State Governments are reluctant to pass through the increases in these costs by increases in bus fares. Karnataka is one of the few states which is allowing the pass through.

Figure 7.2 Revenue cost ratios for SRTUs in 2011-12



Metro SRUTs

There are 6 metro SRUTs. Their financial performances are given in Table 7.4. The metro fleet size varied from 839 in Calcutta STC to 6077 in Delhi TC . The percentages of over-aged vehicles in total number of vehicles were 35.3 in Delhi and 32.4 in Ahmedabad. Vehicle productivity was lowest in B.E.S.T in Mumbai at 150/km/bus/day and highest at 278/km/bus/day in Chennai metro TC. Delhi uses CNG. Delhi had the highest revenue/km (paise) but it had also the highest profits. The cost recovery ratios were less than 50% for Ahmedabad (0.46), Delhi (0.34) and Calcutta (0.26).

Table 7.4: Financial Performances of SRTUs Metros

SRTUs	Revenue/Km (Paise)	Cost/KM (Paise)	Profit/Loss per Km (Paise)	Staff Cost as % of Total Cost	Fuel and Lubricant Cost as % of Total Cost
Andhra Pradesh SRTC	1986.35	2170.47	-184.12	39.69	32.39
Bangalore Metropolitan TC	3187.42	3133.59	53.83	37.80	37.53
Delhi TC	3425.80	10221.02	-6502.46	30.38	12.10
Gujarat SRTC	2147.74	2541.02	-393.28	40.01	32.86
Karnataka SRTC	2507.62	2486.62	21.01	29.26	39.47
Maharashtra SRTC	2822.98	2790.73	32.25	36.63	32.76
All India Average	2907.56	4489.58	-1573.66	45.99	28.03

4. Concessional Fares

SRTCs offer a wide range (as many as 37 in Rajasthan) of concessional fares to students, blind and deaf persons, physically handicapped, local body and other elected members ,sportsman, senior citizens, freedom fighters, war widows, and others. In addition there are schemes like “Travel as You Like” on daily, weekly and monthly basis charging 50% of the usual costs or unlimited travel subject to certain restrictions. Some of the concessional fares are free while others are at 50% of regular fares are below.

There is no time series data on the financial implications in terms of foregone revenues of the concessions. The 12th Plan Sub-group on bus report notes ‘that these concessions cost the STUs heavily in terms of foregone revenue. According to statistics available with the CIRT, the cost of these concessions to the STUs amounted to Rs.1137/- crores in 2001-02 and Rs 2504/- crores in 2008-09. ‘While some states reimburse the cost of these concessions to STUs partly, in most cases such compensation by way of reimbursement is grossly inadequate’ (p.17). One may get a rough

measure of the implication of the subsidy burden to financial profitability of SRTUs using the reported total cost and total revenue for 2008-2009. The total cost exceeded total revenue (Rs 28410-25201) by Rs3209. Assuming no reimbursement from states the uncovered gap was only Rs 705 crore.

5. Measures for ensuring financial sustainability of SRTUs

There is an urgent need to improve physical, managerial and financial performances of SRTUs. As a first step, it is necessary to separate the social obligations like bus connectivity to all villages and concessional fares to socially deserving target groups, where government financial support is needed, from other activities where they must be made accountable by imposing and enforcing a hard budget constraint in the form of a specified return on capital invested. . In addition, environmental considerations must figure in pricing and other policies. We list the measures under accounting, institutional, technological, fiscal, financial and environmental groups.

Accounting

At present, the accounting information system is incomplete, not transparent and the annual reports are not released timely. As SRTUs are corporations, they must follow corporate accounting practices. The accounting system must make explicit the types of subsidies, the basis for determination of the extent of subsidies, and also the extent of reimbursement by state governments. Gradually, they must move from embedded cost to current economic costs, from fully distributed cost allocation to incentive based cost allocation methods. Indicators of physical performances must be compared with the bench marks/ norms along with road maps for reaching the bench marks/norms.

Institutional

There is a need to redefine the roles of State Government, legislature and SRTUs.The SRUT management must be knowledge-based with experts in the relevant fields, The State Government's role should be restricted to policy decisions involving modernization; support for implementation of nationally decided policies; identification of socially deserving target groups for subsidies, including extent of subsidies and prompt reimbursement of subsidies to SRTUs; enforcing hard budget constraint, monitoring performances of SRTUs, reporting their achievements and shortfalls in state legislatures during the budget session. The SRTUs must be given the freedom to determine the bus fares taking into account government subsidies and timing of fare revisions (preferably at pre-announced date). A mechanism must be evolved for an expert assessment of physical and financial performances once in five years.

Technological

It is necessary to replace over-aged vehicles by improved new vehicles which save fuel and are eco-friendly. This measure will result in fuel saving, benefit environment, increase bus safety and comfort. MoRTH initiated a central assistance scheme for use of intelligence technology systems such as GPS/GSM based vehicle tracking system, computerized reservation, electronic ticket vending, and passenger information system with 50% cost share. State Governments and SRTUs must avail of the scheme. The fleet augmentation scheme under Jawaharlal Nehru National Urban Mission provides central assistance under certain conditions.

Fiscal

The Sub-Group on SRTUs for the 12th Plan recommended a number of tax reliefs based on positive externalities of bus transport. These measures are reduction in excise duty for passenger public transport vehicles, reduced sales tax on spares and parts, lower excise duty on diesel, lower rate of motor vehicle tax and passenger tax, income tax exemption for SRTUs, and service tax exemption from casual contract scheme.

Financial

The financial viability of bus services in rural and remote areas, hilly areas and low density areas can be increased by reducing the capital cost via loans on concessional interest rates or/ and government bearing part of the bus cost. This will help in achieving bus connectivity in a short period and also reduce losses from uneconomic routes.

Environmental

Sustainable development requires integrating and balancing of economic, social and environmental considerations in policies for public bus transport. The tax concessions suggested above would lower the cost of capital for purchase of bus and parts for eco-friendly vehicles. Lower taxes for diesel for buses can be implemented using IT based system. Promotion of eco-friendly fuel substitutes is desirable to achieve energy security and reduce the pollution loads.

6. Conclusion

Compared with the power sector the problems of SRTUs are relatively simple. In case of power, the transition from a vertically integrated monopoly structure to an unbundled market –friendly structure was a big challenge. In case of bus transport, most of the infrastructural costs which are sunk e.g. road are borne by government. Even in bus services, technically there is no sunk cost. However, government policies such as hiring staff on permanent basis amount to sunk investment. Here the major issues are containment and rationalization of socially motivated concessional tariffs, improvement in managerial efficiency, timely revision of bus fares and enforcement of hard budget constraint on the public firms.

CHAPTER 8

RECOMMENDATIONS

A. State Power Utilities

Global and Indian experience

International experience in power sector reform, particularly California electricity crisis of the1990s, clearly shows that retail price electricity reform is the most difficult and complex segment of the power sector reform. The Indian experience also reveals that while we have made some progress in unbundling vertically integrated monopoly, entry of independent power producers in generation, creation of wholesale market for power trading, privatization of distribution in a few states and giving franchises for technological modernization, metering and improving collection efficiency, our progress in enhancing financial sustainability of SPUs has been very slow. Despite the incentives provided by Ministry of Power via R-APDRP scheme, financial restructuring scheme, integrated credit rating of state-owned discoms, so far only 6 SPUs could report net profit in 2011-12. The accumulated losses are about Rs 1.9 lakh crore. Since power is a universal intermediate good in production and an essential good in consumption, India's growth prospects will be curtailed unless immediate actions are taken in the retail price reform.

It is obvious that the present system of determination of electricity prices at the wholesale level, at the margin, by market forces based on current marginal costs and retail prices based on below embedded average costs is unsustainable. Unless retail prices yield revenues sufficient to cover all costs of generation, transmission and distribution, either some suppliers are not fully paid or/ and debts of SPUs and State Governments will increase. Such a situation will affect the expansion plans of generators, affect investment plans of SPUs and State governments curtail their development expenditures.

The major bottleneck for the retail price reform is the lack of will on the part of most State Governments to increase tariffs or revise tariffs at periodical intervals. Fearing that they would lose votes, they are reluctant to take these decisions. This political populism is also seen in the failure to appoint competent mangers of SPUs and selection of independent and talented experts as members of SERCs. In fact some membership posts are vacant. In a state where all major political parties are against subsidy reduction, it becomes difficult for the ruling party to support the retail price reform. To make matters worse, the state owned utilities operate in monopoly markets under soft budget constraint with no regular appraisal of either SPU or SERC.

B. Institutional and policy changes for ensuring financial viability of SPUs

a. Electricity in concurrent list

Electricity is in the Concurrent List - Item 38 in List III of the Seventh Schedule of the Constitution of India. Hence both the central and state governments have jurisdiction. This means that the Centre takes charge of all interstate and international matters, as well as where the ownership is with the Centre. The state government is responsible for matters within the state. S.L.Rao, the first Chairman of CERC, says 'the central government cannot direct the state governments to improve distribution or generation efficiencies or to run the power system in a way that there is no drain on the financial resources of the state'. He says that 'the Centre, in the absence of powers over the state systems, has tried financial incentives to encourage state governments to run their systems more efficiently, privatize distribution, separate load dispatch functions from their transmission and distribution enterprises, renovate and modernize their generation, but with very moderate success….This is a situation in which all political parties are participants … and unless they together change their attitudes to inefficient and below-cost electricity, there is little hope of any sustained and large increase in electricity supplies in India'.(www,slrao.com)

However, there is scope for the Centre to change state governments behavior via better enforcement of existing laws and regulations, structuring incentives based on outcomes and penalties for poor performance, and educating the stakeholders of the costs of inactions.

b. Electricity Act, 2003

The Electricity Act,2003, provides in Sections 107 and 108 that central and state governments may issue directions to the CERC or the concerned SERC in matters of policy involving public interest. However, the final decision on whether such direction relates to a matter of policy involving public interest or not rests with the concerned government. Rao (2004) notes that this provision gives overwhelming power to the governments to overrule the commissions and acts as the sword of Damocles; it also provides scope for political lobbying with the concerned government. Whether the direction is in the public interest or not should be decided by courts. Given the coalition politics, it may be difficult to amend the Act .However, every effort should be made to enforce provisions in existing laws, regulations and court orders.

(a) Enforce Electricity Act provisions

- That the tariff progressively reflects the cost of supply of electricity and also, reduces and eliminates cross-subsidies within the period to be specified by the Appropriate Commission;

- It is made mandatory for SERCs to fix tariff in a manner that none of class of consumers shall be charged less than fifty per cent of the average cost of supply. It enables the State Governments to provide subsidies to weaker sections on the condition that the State Governments through a subsidy compensate the SEBs. Regarding agriculture, it allows the agricultural consumers to be charged less than 50% for a maximum period of three years. It enables the State Governments to fix any tariff for agriculture and other sectors provided it gives subsidy to SEBs to meet the loss.

(b) Enforce Appellate Tribunal Order **11** November 2011

* Every SERC must ensure that ARR and tariff determination take place annually.

* Tariff should be decided well before 1, April and shall be applicable for the whole year.

* In the event of delay in filing such application beyond one month, the SERC must initiate suo- moto proceedings.

* Truing –up should be annual exercise.

* Fuel and power purchase costs should be allowed as monthly adjustments

* Do not create regulatory assets to avoid tariff increase.

(c) Central government incentive measures

Performance under central government incentives such as sharing SPUs financial liabilities, incentives for AT&C loss reduction etc must be strictly monitored and that the fulfillment of the stipulated conditions verified. This is needed to avoid the moral hazard problem. Bank loans for SPUs with high accumulated deficits must be discouraged.

SERCs

The concept of independent regulation is new to India. In USA where independent regulatory commissions are functioning for public utilities, the federal and state commissions continue to remain apolitical. The federal commissions are created by a statue. The commission members are nominated by President/Governor and confirmed by the concerned Senate. They are independent from political influence because of the five commissioners no more than three are from the same

party. They are independent from President/ Governor and legislatures and their decisions are reviewed by courts. Seldom utility pricing becomes a political or election issue.

Andres , Guasch, Diop and Azumendi (2007) assess the governance of electricity regulatory commissions in Latin America and Caribbean region using four key governance characteristics :(I) autonomy from political authorities , (ii) transparency before institutional and non-institutional stakeholders, (iii) accountability to the three branches of government , and (iv) regulatory tools such as mechanisms for tariff revision, regulatory accountability, instruments for making technical standards and institutional tools and capacities for the conduct of the regulatory policy and the improvements of its institutional development.

Dubash (2001) notes that the electricity regulators work under government constraints that do not enable them to be active on electricity reform. Pressures on regulators that constrain their independent working include explicit and implicit government pressures, pressures from the public, and self-generated pressures. Rao (2001) says public opinion has to recognize the value of independent regulatory commissions for public utilities. It will do so when people see the results in terms of improved quality, availability and in due course reduced tariffs.

The SERCs must have autonomy and they be made accountable to state legislatures. The recommendation of the Appellate Tribunal Order of 2011 on the appointments of members of SERCs must be followed. The SERCs must be knowledge- based and must have the capacity to scrutinize and, if necessary prepare the tariff orders. They must gradually encourage productivity enhancing reforms, shift from embedded cost accounting to current/normative costing accounting, and facilitate adoption of incentive based cost allocation and pricing methods. The current practice of input monitoring, prescription of norms for debt equity ratios, working capital etc must be phased out and the SPUs must be encouraged to utilize their inside information for achieving innovative solutions to achieve cost minimization. Their annual reports must contain to what extent SPUs are complying with the regulations and report on what needs to be done to make SPUs financially viable. The Ministry of Power may initiate ranking of SERCs based on their performances.

SPUs

Most SPUs function like government agencies. Rulet (2002) identifies low tariffs and cost inefficiencies as the major problems because SPUs are managed as administrations and not as firms. He argues that the SEBs have to be “enterprised”, i.e. turned into firms meaning that structural reforms have to design and enforce in them a way to look at cost efficiency without external

discretionary power. SEBs are given commercially based accounting rules but they are not incorporated under the Indian Companies Act, 1956.

Priority must be given to managerial reform including accounting reform, 100 % metering of electricity, penalty for power theft, reduction of AT&C losses to 15% over 5 years, timely submission of annual revenue requirements and tariff revisions to SERC. Financial assistance should be given to encourage preparatory works such as cost-based tariff at voltage and customer end, peak load pricing based on economic principles, shift to retail price index – productivity improvement tariff/ LRMC based tariff, rationing via pricing than quantity during periods of excess demands etc. In the short –run, SPUs must explore the feasibility of public private partnerships or franchise agreements in selected religions with private parties based on competitive bidding for tasks such as reduction of AT&C losses via metering, curbing power thefts, reduction in transformer failures, technological modernization and also achievement of social goals such as 100% access to energy for all. The Taskforce Report [Government of India (Planning Commission) (2012)] notes these models are consistent with the Electricity Act 2003 and also politically feasible because they avoid privatization of SPUs.

Role of State Governments

State governments are largely responsible for the poor management of SPUs and their poor financial performances. They must initiate steps for enhancing the capability of SPUs by selection of competent regulators with proven managerial track record; facilitating measures for complete metering, curb power thefts, reduction of AT&C losses, timely submission of annual revenue requirements and tariff petitions to SERCs; and supporting measures for increasing cost efficiency by technological modernization and other measures, and prepare for incentive-based pricing. They must create distance between government and SPU by ensuring autonomy and accountability of SPUs. The State Government's role lies in facilitating provision of electricity of good quality at affordable prices subject to ensuring financial viability of SPUs. A transparent system of outcome – based performance rating of managers and employees with rewards and penalties is desirable. State Governments must report to the legislatures, preferably during the budget session, the physical and financial performances of the SPUs, their success and failures in achieving the targets and in cases of the shortfalls the actions to be taken to achieve the targets within specified time frames.

The subsidies must be limited to BPL domestic category and marginal and small farmers with the condition that all electricity consumption is metered. The subsidy rates must not exceed 50% of the average costs of service at the appropriate voltage level and there must be limits on subsidized

consumption. State Governments must reimburse the subsidy at the beginning of each financial year. State Governments may provide outcome –based subsidies for technological up gradation, creation of new information system and carrying out studies on application of new techniques for improving physical and financial performances.

The tariff revision must be once a year in the month of April, whether it is an election year or not. Increases in fuel cost, power purchase cost and labour costs must be passed on to the consumers twice a year. State Governments should not have any say either on the timing of tariff orders or on the extent of increase in tariff for any consumer category. The price revision process should be automatic and depoliticized.

State governments must realize that the current situation in SPU is not sustainable. Each state government must come with a White Paper on its SPU explaining the current scenario and the consequences of inaction on the future of SPU, impact on state economy, state government finances, and growth prospect of the state. In preparing the White paper, the State Government must solicit the views and concerns of all the stakeholders indicate short-run and long- run reform measures, and convince all the stakeholders about the need for the reform and the anticipated long-run benefits of the reforms to society. Nudging can help behavioral changes in consumers and others to accept the reform with a promise of reliable supply of electricity at affordable prices.

B State Road Transport Undertakings

State Governments must develop benchmarks for selected key performance indicators such as fleet utilization rate, staff bus ratio, vehicle productivity, and diesel consumption per passenger km, appropriate to the service area and prepare a road map for achieving them. The existing programme of fleet enlargement in hilly and remote areas and in other areas where bus connectivity is low must continue. Governments may design special schemes to mitigate problems due to terrain, low density and clear past liabilities in a time bound manner. The option of contracting the service to private parties conditional on maximum fares; safety standards etc may be explored.

The SRTUs must carry out performance assessment of key indicators against the benchmarks, and in case of shortfalls find reasons for the shortfalls and specify the steps being taken to achieve the benchmarks.

Central government may consider reductions in excise duties on purchase of motor vehicles and spare parts and high speed diesel oil in view of lower energy consumption per passenger km and lower pollution per passenger km compared with other modes of transport. State Governments may also offer similar concessions on state excise duties and sales taxes.

A performance based incentive scheme may be designed for the managers and employees based on mutually agreed indicators.

Regarding subsidies and concessions, the categories of consumption must be reduced to about five. 100 % subsidy (free service) must be phased out in three years; and concessions in other cases should not exceed 50% of the cost of service. Higher cost of bus service due to terrain or meeting the need for bus connectivity be treated as uniform social service obligation and the additional costs may be borne on 50:50 basis by Central and State Governments.

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