

IMPACT OF THE DISTRIBUTION OF COST OF REFORM ON THE PACE OF INSTITUTIONAL REFORMS

A STUDY OF POWER-SECTOR REFORMS IN INDIAN STATES

(First Draft Report of the Study Carried out with the Outstanding Research
Award (2003) of the Global Development Network)

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1. Introduction

The manner in which the distribution of the costs of economic reforms among different sections of society affects the pace of reform has been the focus recently of a number of studies³. With this focus, this study is carried out in the context of power-sector reforms in different states of India. It is a modest contribution to the emerging literature on the (new or neoclassical) political economy of institutional reforms. It has been noted that systematic empirical evidence on social/interest group support for (or opposition to) reform is scarce and that empirical studies in developing countries are constrained by the fact that such reforms are initiated only recently and hence comparable data is not available (Fidrmuc and Noury 2002). In this context, the different pace of implementation of power sector reforms in Indian states may provide comparable data and insights on the factors influencing social support/opposition and political willingness to reform.

A study of factors that facilitate/discourage factors of power sector reforms is also important in the more general context of Indian economic reforms. The public utilities in power sector are the single largest contributor of fiscal deficits in the country and the efforts to change the situation have not been very successful so far (Singh and Srinivasan 2002). Reforming power sector is a major item of the unfinished and ongoing agenda of economic reforms in India. There is a need to analyse the reasons that make power sector reforms a politically intractable issue in the country.

This study attempts to analyse the distribution of costs and benefits among different sections in society due to (the lack of) power sector reforms. There are three sources

³ Fidrmuc and Noury (2002) provide a review of literature on this issue prepared as part of the 'understanding reform' project of GDN.

of costs (and benefits) to each individual household: (a) The subsidy they currently receive for the electricity which might be reduced as part of the reform (2) The losses due to the poor quality of electricity supply, which can be improved as an outcome of reform (3) The general loss on account of non-viability and inefficiency of the power sector, including the losses due to the fiscal problems of the state, which are expected to be eased after the reform. How does the distribution of these costs and benefits for different sections of people affect the pace of power sector reforms in different states of India? This is the central question analysed in this study.

The paper is in 12 sections. The following section reviews the extant literature on the political economy of reform. This is followed by a concise discussion in section 3 on the current state of power sector reforms in India, in order to highlight the context of this study and section 4 analysing the existing political economy arguments related to Indian power sector reforms. The sections 5 to 7 deal with certain definitions and assumptions used here and the reasons for focussing on the losses/gains of the households to analyse the political economy in this study. Section 8 consists of a number of hypotheses for further analysis, followed by description of the data used here and its sources in section 9. The empirical evidence from six states of India is discussed in the section 10 (under different sub-sections). The implications of the study are mentioned in section 11, followed by a list of activities yet to be carried out under this study funded through the GDN outstanding research award (in the final section).

2. Review of Literature on the Political Economy of Reform

As noted by Rodrik (1996) there are two sets of studies analysing the political barriers against reforms: one set focuses on myopia and irrationality of actors, and other set explains how does the interaction of rational actors itself could block those reforms that are beneficial to the society as a whole. In this study the focus is on those explanations within the rational choice framework. As noted by Bardhan (1997)⁴, the use of incentive analysis as part of political economy (or the new political economy) to analyse the governance problems of developing countries has started only recently.

The theoretical literature unravels the role of different factors influencing the political support for reform⁵. Alesina and Drazen (1991) have identified a war of attrition in which each group waits for the other to bear a disproportionate share of adjustment costs. Williamson (1994), Rodrik, (1994), Drazen and Grilli (1993), Bruno and Easterly (1996) and Drazen and Easterly (2001) have noted the role of crises in facilitating reform. Uncertainty of benefits at the aggregate and individual levels has also been considered as a constraint to get support for reforms in Fernandez and Rodrik (1991) and Dewatripont and Roland (1992a, 1992b). Krueger (1993), Hellman (1998) and others have discussed the role of interest groups. They have noted the impact of lobbying and the problems associated with giving commitments on ex-post compensation ex-ante. There was also a debate in literature on whether autocratic governments or democratic ones are better positioned to implement reforms, as evident in Williamson (1994), Cheung (1998), and Fidrmuc (2003). The discussion on whether the leftwing or right-wing parties can implement reform effectively can be seen in Williamson (1994), and Cukierman and Tommasi (1998). The dynamics of political support has also attracted the attention of a number of scholars (Williamson, 1994; Rodrik, 1996; Fidrmuc, 1999). Median voter preference has been used to analyse this issue (Alesina and Rodrik, 1994; Persson and Tabellini, 1994; Bernard and Roland, 1997), and the broader role of the middle class has also been discussed (Birdsall, 2001). Most of these studies with the 'new political economy' perspective have analysed political support for macro-economic reforms (or economic reforms in general) or changes in trade policies or labour legislation. Weyland (2002) has analysed political decision-making as part of general economic reforms in a few Latin American countries. Bernard and Roland (1997) used median voter preference to explain why governments are reluctant to institute marginal cost pricing in the case of publicly owned electricity utilities, in the context of Canada. Fidrmuc (2000a, 2000b) notes that support for reform is negatively affected by unemployment and by the proportion of retirees and blue-collar and agricultural workers, and positively affected by the size of private sector and the number of white-collar workers.

⁴ He has analysed issues such as corruption, centralisation and ethnic conflicts.

⁵ See reviews such as Rodrik (1996) and Fidrmuc and Noury (2002).

However the situation can be different in countries such as India for particular reforms where white-collar workers and some sections of private sector can be the beneficiary of non-reform. We have not seen analysis of the systematic relationship between the characteristics of losers (or winners) such as their economic position and their population size and the political readiness to implement institutional reforms in a democratic developing country such as India. It is also to be seen whether poor people can positively affect reform even if they are numerous and beneficiaries of reform. Moreover the studies on the determinants of political support for reforming institutions providing public goods (and others traditionally provided by the state) such as water supply, electricity and other infrastructure such as roads, with a focus on developing countries are rare. This study is a modest attempt to address this gap in literature.

To some extent the literature on political economy of reform have similarities with the literature that dealt with the political economy constraints of economic growth in developing countries. There have been such studies on India as well. If we take a representative sample of these studies carried out in the eighties such as Bardhan (1984), and Lal (1989), one can see a broad argument that economic growth or capitalist development is not taking place adequately in India due to the behaviour and lack of incentives for the 20% of population who occupies the top position of the income ladder in the country. On the other hand, there is a popular perception in India especially among those who oppose reforms that the economic and institutional reforms are driven by the needs of the richer sections of Indian population. Probably a study of the determinants of the political willingness to reform would provide insights on the role of these richer sections vis-à-vis other income groups in encouraging/blocking reforms. Such an attempt is made in this study taking the case of the power sector reforms being carried out in different states of India.

3. The Context of Analysis: Power Sector Reforms in Indian States

The generation, transmission and distribution of electricity are being carried out by the public sector organisations namely State Electricity Boards (SEBs) in most of the states of India (barring a few metropolitan areas) and these organisations are

financially non-viable (Government of India, 1996; Rao et al, 1998, Morris, 1996). Financial difficulties are mainly due to the burden of providing power at subsidised rates to a few sections of consumers (mainly farmers and residential consumers) without compensation from the government (and where governments have attempted compensation it has led to fiscal crises). Inefficiencies of the electricity boards (Kannan and Pillai, 2001a, 2001b; Pillai and Kannan, 2001), partly facilitated by the state ownership and lack of autonomy, accountability and adequate incentives for their employees have also contributed to financial difficulties. Thus SEB's are not in a position to generate and distribute adequate quantum of electricity, which has led to the deterioration of quality of supply and increased the effective cost of power for consumers. It was in this context that the Government of India had initiated power sector reforms in the early nineties. There were attempts to have private participation in power generation with government guarantees on assured return on capital, but that was not very successful, as the basic problem of the financial non-viability of SEBs was not addressed. This has led to several state-level initiatives to reform SEBs, including unbundling, making corporations or privatisation of distribution and institution of regulatory bodies. A legislative framework facilitating independent regulation and competition came to exist when Government of India passed the Electricity Act in 2003. An important aspect of this electricity act is the provision of open access for direct contracting between generators and bulk consumers in order to foster competition (Sinha, 2005).

The reforms carried out in Indian power sector can only be reckoned as partial. Some important steps have already been taken. Regulatory commissions have been put in place in almost all the major states. Privatisation has been attempted in two states namely Orissa and Delhi, and a few states such as UP may move in this direction in the near future. The utilities have been unbundled and made corporations in some states including Karnataka, Andhra and Madhya Pradesh. The release of special grant by the central government in tune with certain reform (such as loss reduction) indicators through the Accelerated Power Development and Reform Program (APDRP) has provided incentives to the state governments to take certain tangible steps to strengthen the distribution network. The Central Electricity Regulatory Commission has brought in the Availability Based Tariff that has created

some discipline and rationalisation in the exchange of power between central generating companies and state electricity boards. State regulatory commissions have also been making earnest efforts to bring in considerations of efficiency and cost reduction in the fixation of tariffs. The reform environment in general has also created an 'imminent threat of privatisation' and this has compelled the electricity trade unions to accept, albeit reluctantly, certain organisational measures that reduce cost burden in a number of electricity boards.

However in spite of these measures, it is widely recognised that the progress in reforming Indian power sector has been very difficult and slow (World Bank, 2004)⁶. Asian Development Bank (2003:66) has noted that transforming the Indian power sector to operate on a long-term sustainable financial footing is proving to be an elusive and difficult goal. Though some states have moved ahead on certain aspects, others are lagging behind. The constraints to the implementation of power sector reforms continue to be far more numerous. There is a big gap between the suggested reform measures (privatisation, tariff reform, anti-theft measures) and their implementation (Lal, 2005). Though regulators are in place, there is a perception that their services are not utilised to the required extent. Government owned SEBs do not file tariff petitions or ask for tariff hike often under pressure from the state government⁷. Regulators frequently complain that utilities do not provide adequate information to them. This has forced them even after years of reform to use ad-hoc ways of estimating the cost of supply (Sinha, 2005), transmission losses and so on. Though electricity act provides for the removal of cross subsidy, the regulators have taken an arbitrary approach to its reduction without any time frame (Sinha, 2005). They have been somewhat unsuccessful in compelling state governments to compensate without delay the revenue losses that arise due to their subsidy policies. There have also been difficulties in the implementation of orders of regulatory commissions. Judicial and sometimes legislative measures are sought to delay their implementation⁸. Not many SEBs

⁶ World Bank (2004), Country Strategy Paper for India, Washington, D.C.

⁷ Such instances were noted by this author in the states of MP and Kerala where he was associated with the reform process as a consultant of the Asian Development Bank.

⁸ The Government of West Bengal used judicial and legislative means to avoid the implementation of the order of state regulatory commission.

have taken explicit steps to improve their efficiency. The reduction in T&D losses achieved so far seems to be much less than what could have been done. Losses seem to be still around 25 to 30% in many states. The initial problems faced in Orissa and Delhi seemed to have cast doubts about the effects of privatisation. Rationalisation of tariffs to make it compatible with what government can pay without much difficulty continues to be an intractable issue. In fact it is this issue that makes the state governments reluctant to make regulatory commissions fully functional. Regulators have not been much successful in handling the problems of power supply to agriculture (Sinha, 2005). Though there have been some attempts to rationalise partially the tariff for agriculture, the results of the state elections conducted last year have encouraged a number of state governments to bring back the populist program of 'free power to farmers'⁹. It has been noted that electricity is widely regarded in India as a social good to be funded by the state rather than through a recovery of costs from the consumers, and changing this situation would require a major shift in political attitude (Asian Development Bank, 2003). The results of the state elections held in 2004 have created a popular perception that power sector reforms are costly for political decision makers, even though the governments that implemented full-scale privatisation in two states were re-elected. It is recognised that overcoming the entrenched political opposition is a greater challenge for power sector reforms in India (World Bank, 2004). There has also been a slowing of reform process after the United Progressive Alliance (UPA) came to power at the Government of India. This discussion shows the importance of understanding the factors influencing the political willingness or reluctance to reform power sector in India.

4. The Limits of the Political Economy Studies on Indian Power Sector Reforms

A number of studies¹⁰ have expressed surprise over the slow implementation of measures such as the reduction of T&D losses and better governance of the state-owned utilities for which there seem to be wide support among political and civil society organizations and academics of different ideological backgrounds. (It may be noted that there are conflicts among these groups on the desirability of enhancing

⁹ The cases of Andhra, Tamilnadu, and Maharashtra are examples in this regard.

tariffs or privatisation.) Some of these studies would also prescribe technical and managerial solutions for 'non-controversial' reforms such as loss reduction¹¹. It is not clear whether these studies have analysed the possible linkage between the components of these two sets of reforms, i.e., controversial and non-controversial reforms, for example between loss reduction and tariff reform. There are a number of 'political economy' studies of Indian power sector reforms, which essentially analyses the groups or interests, which work against the reforms considered 'ideal' by the authors (and/or those who propagates reform considered unwarranted by the authors). The political inability to raise the price of power for the domestic and agricultural sectors has been discussed in Morris (1996) but it did not analyse systematically the factors contributing to this political inability. Kannan and Pillai (2001a) have argued that the reforms are driven by the demands of external agencies on the one hand and the intermediate classes within India which include middle class. (Anyway they do not consider these reforms necessary but support efficiency-enhancing measures within the framework of state ownership). However they have not linked this argument systematically with the empirical evidence, explaining why reforms do take place in some states and how relevant the role of these classes in such contexts. Sagar (2004) makes an interesting argument that the reforms in Delhi were not driven by any budgetary advantage of the state government, but due to the understanding of the government that without a turnaround in power sector there was no prospect of improving the quality of service to the level the electorate expected. This highlights the possibility of gains for a significant section (if not majority) in terms of better quality. How far such potential gains vary from state to state, and such gains can explain the differential social support for reform is an interesting question. A study by an NGO namely Prayas (reported by Katiyar, 2005: 644) notes that 'a clique of large farmers and corrupt utility employees has vested interests in continuing with the current set of inefficiencies including high levels of T&D losses. The resistance of the employees exists in all the states, and hence it is not clear why some states could go ahead with reforms in spite of this resistance. Moreover it is not clear from their study how a small set of large farmers could make reforms politically costlier through elections. It is often argued that as in Lal

¹⁰ For example, see two recent articles by Lal (2005) and Ranganathan (2005).

¹¹ For example Ranganathan (2005).

(2005: 651¹²) 'the big farmers are usually the patriarchs of their clans and communities and function as political intermediaries who deliver blocs of votes to their favoured political party'. How far this 'herd voting behaviour' explains the political reality even in south Indian states marked by conflicts and political action between large and small farmers is unclear. Moreover the fact that power sector reforms have also been stalled in states where agricultural consumption of power is insignificant indicates the inadequacy of this explanation based on the influence of powerful farmers. Another explanation for the gap between politicians' reformist rhetoric at policy level and failure to implement, is that they address two audiences: (a) financial and policy elite (including international donors) to whom politician behaves as a reformer; and (b) electoral constituency whose legitimate concerns or who has electoral power as influential swing voters, which makes politicians unwilling to implement reform (Lal, 2005)¹³. However it is not clear in this argument why reform is viewed as costlier for the electorate in general, and this explanation is also inadequate to explain why reform measures such as privatisation could be implemented in states such as Orissa and Delhi¹⁴ without any electoral setback. Yet another general explanation forwarded as in Lal (2005: 653) is that reform is less likely in areas where costs are concentrated on a small number of powerful actors while benefits are dispersed among a wide number of prospective beneficiaries. Such a distribution of costs and benefits is unlikely to see in the case of power sector reforms in Indian states, because benefits (such as the reduction in subsidising tariff and improvement in quality of supply) are more likely to be felt by the powerful groups (industry, trade, and higher income groups), where as the short-term costs (increase in subsidised tariffs) are likely to be falling on more dispersed middle-class

¹² Lal (2005: 651) notes that 'the pump-owning class is also the most articulate rural class. In an era of fragile coalitions and volatile vote swings, the big farmer's control over bloc votes is a potent weapon. This group commands 'swing power' and it is very risky for political leaders to alienate it.

¹³ Corruption among staff, inertia among bureaucrats, lack of commitment among even reform-oriented politicians to actual reform, lack of credibility of reform programme and electricity utilities etc. are also mentioned as constraints to power sector reforms in Lal (2005), but these too are inadequate to explain why reform is possible in certain contexts but not in others. How could Government of India implement reforms in telecommunication sector but not in power sector, or how could some states go ahead with privatisation in power sector but not others? These questions warrant a more systematic analysis.

¹⁴ In surveys such as HT-CSDS quoted in Lal (2005), though many people opined that privatisation has not been beneficial, it must be noted that the Government that implemented privatisation in Delhi has been re-elected.

groups. Thus such generalised political explanations are unlikely to throw many insights on how power sector reforms could progress reasonably well in some states but not in others.

However there are indications that pressures from different sections of society and their effect on political decision-making are a major factor for the not-so successful attempts to reform the power sector in Indian states. For example, in the state of Kerala reform in power sector would cause no major loss to the majority of poor, even though the political legitimisation for not going ahead with the reform was that it would affect the poor (Santhakumar, 2003a). In fact, the middle class would have been the major losers and this has discouraged political parties from implementing reforms that would be socially beneficial in the long run. Given this context, only very small changes (or marginal reforms) have been implemented so far. On the other hand, in the state of Assam, where only less than 25% of the population have access to electricity and the quality of supply is very poor, the prevailing situation is one of less opposition to more drastic reforms (Santhakumar, 2003c). Does the nature of the distribution of the losers and gainers in the pre-reformed state of electricity sector in each state, throw some insights on why reform could progress reasonably well in a few states and not in others? This is relevant since different states in India are at different stages of power sector reform and the pace varies from state to state.

5. What constitutes 'power sector reform'? The Concept used in the study

In order to understand the distribution of losses and gains of reform, a definition of reform is necessary. This is important since there is a debate on whether the reforms already initiated in India, for example the ideas enshrined in the Electricity Act passed by the Indian parliament in 2003, are the right kind of reforms to achieve efficiency and financial viability, given the market failures and conditions associated with the provision of electricity in India¹⁵. It seems that the popular aversion to institutional change in the Indian power sector (including the use of competition) as well as the 'support' for unfettered competition in some circles, are not based on a

¹⁵ See Bhattacharya and Patel (2003) for a discussion on how information asymmetries affect market-oriented reforms in infrastructure services such as electricity.

meaningful analysis of the ground realities. There may be optimal combinations of regulation and competition, ideal for different stages of growth of the sector and other socio-economic variables. However this issue of 'ideal reform strategy' is not much relevant for this study, since many Indian states are yet to make any serious attempt to reduce the losses of SEBs, improve efficiency, and to have a fully functional regulatory process. This study takes a position that certain broad reform objectives such as improving the financial viability and efficiency of SEBs are necessary (and it is not concerned much with the question whether privatisation or state ownership is the best means to achieve it). Financial viability can be achieved if governments are able to compensate without delay the losses of the utilities due to tariffs that do not recover the cost of supply. However many state governments are not in a position to do such compensation without creating fiscal problems. Hence this study starts with the assumption that *some rationalisation of tariff to reduce the gap between the revenue and cost of supply is needed as part of power sector reform*. Similarly, it is also assumed that *certain tangible steps are needed to improve the efficiency of these utilities*. How do different sections of society gain or lose from (and hence support or oppose) these two reform components (i.e., tariff rationalisation and efficiency improvement) is the main focus of this study. However the study has analysed only the gains and losses of the households (and not industrial units or commercial establishments) for a number of reasons discussed in the following sections:

6. The Reasons for Focussing only on the Response of Households

In general, industries and commercial establishments pay a tariff rate higher than the average cost of supply in most Indian states as evident from Table 1. Thus they are in general subsidising consumers (though there are some specific industrial units getting subsidised electricity). Thus they are expected to gain from, and hence to be the supporters of, tariff and efficiency reform. Moreover public consultations carried by this author in a number of states including Kerala, Assam and MP have shown that industrial associations and traders' groups are in fact vocal in their support for tariff and efficiency reform (Santhakumar, 2003b; 2003c; 2004a). Hence the real question should be why is reform not taking place in some states despite the support of industry and trade.

Table 1: Average Cost of Supply and Average Tariff for Industrial and Commercial Consumers

SEB/Utility	Av. Commercial Tariff (Ps per unit)	Av. Industrial Tariff (Ps/unit)	Av. Cost of supply (Ps/unit)
Andhra Pradesh	426.00	441.50	360.7
Assam	485.68	447.56	589.1
Bihar	276.60	362.26	377.1
Delhi(DVB)	420.00	427.79	469.6
Gujarat	501.00	476.67	365.4
Haryana	451.14	477.94	411.9
Himachal Pradesh	270.00	275.00	235.4
Jammu& Kashmir	160.00	135.00	412.3
Karnataka	572.12	480.73	374.6
Kerala	436.40	226.69	347.3
Madhya Pradesh	430.64	437.84	324.9
Maharashtra	456.39	208.84	357.5
Meghalaya	192.13	208.84	265.0
Orissa (GRIDCO)	0.00	0.00	184.9
Punjab	374.81	306.48	285.2
Rajasthan(Transco.)	432.00	395.13	368.2
Tamil Nadu	430.77	395.35	309.8
UP(Power corp.)	466.72	482.00	383.6
West Bengal	271.31	352.82	376.8

Source: Government of India (2002)

Since this is a study of political support/opposition to reform which is determined by the choice of voters, it was felt that we should focus on households, and get their revealed and stated preference in response to the performance of power sector in all sectors (i.e., industrial, commercial, agricultural and commercial). For example, if a household runs a shop and suffers due to poor quality of supply, or a member of another household lost his job due to the closing down of a factory due to the non-availability of adequate power, then such losses are expected to be reflected in the preferences of the households.

Like industrial and traders' associations who openly support reforms, this study has also not included the role of utility employees, external funding agencies (such as the World Bank or Asian Development Bank), the regulatory framework of the central Government of India and also the ideological position of the parties ruling each state, as explanatory variables for analysing the progress of reforms in some states and not in others. This is discussed in the following section.

7. Setting aside a few Variables

7.1 The role of utility employees

This study has not explicitly analysed the role of the employees of the government-owned utilities. The reform programmes that have already been implemented or that are remaining in plans in different states have ensured that there is no retrenchment of the existing employees. However, it is true that the current employees would encounter inconveniences or be forced to take up their tasks more efficiently and carefully under any reform plan. In general, the employees' and officers' organisations have opposed the reform programmes (such as unbundling, forming corporations, privatisation, competition, open access and independent regulation) though they accept the need for some efficiency measures within the present organisational set up¹⁶. (However there are individual officers and workers who accept the need for more drastic reforms in all the states.) Thus the opposition of the employees of the utilities is expected and by and large prevails in all the states. In this context, the question addressed in this study is the following: How could some states go ahead with reforms despite this opposition by the employees but not others?

7.2. Ideological position of the party ruling the states

The ideological position of the state government can also be considered as a factor supporting/opposing reform. However the two mainstream centrist parties in the country namely, Indian National Congress (hereafter congress), and Bharatiya Janata Party (here after BJP) have shown that they are not averse to initiate reforms

¹⁶ This is also evident from the consultations with employees' organisations carried out by this author in three states namely Kerala, Assam and Madhya Pradesh, as a consultant of the Asian Development Bank.

while in power, but do not mind criticise reforms while sitting in opposition¹⁷. The major local parties such as the Telugu Desam (in Andhra) or Dravidian Parties in Tamil Nadu are also not against reforms while ruling, but not so firm while encountering electoral setbacks¹⁸. Ruling and opposition parties compete each other to air populist slogan of free power at the time of elections¹⁹. The same political party, which makes such populist offers at the time of elections, finds it to implement while ruling, and is forced to moderate the offer²⁰. The position of the left parties (led by the Communist Party of India – Marxist) in Kerala and West Bengal is also ambivalent. Though there have been no significant changes in the West Bengal State Electricity Board, the successive left governments have had a by and large comfortable co-existence with the privately owned electric utility in the metropolitan city of Kolkatta during the last 25 years. In Kerala, the previous left government had attempted power sector reforms with the concept of profit centres (within the framework of state ownership) and also with the financial assistance from the Government of Canada (Santhakumar 2003a; EISP, 2000). On the other hand, the more centrist government in Kerala led by the Congress had failed to go beyond the reforms carried out by the previous left government. Considering all these tendencies regarding the behaviour of Indian political parties, it would be hard to say that any particular party is ideologically for or against reforms, and such an ideological position can explain the implementation of (or the lack of it), or the differential pace of, power sector reforms in Indian states.

7.3. Role of external agencies and the framework provided by the Government of India

There is also a debate on the role of external funding agencies such as the World Bank or the Asian Development Bank. These external parameters such as the

¹⁷ Congress had attempted tariff reform and made the SEB into smaller corporations in Madhya Pradesh towards the end of its tenure, but these steps were not taken forward by the newly elected BJP government in the state. On the other hand, BJP government in the state of Gujarat was more firm on attempting partial tariff reforms for agricultural consumers. Congress came back to power in Andhra with the slogan of free power to farmers recently.

¹⁸ Thus one Dravidian party, AIDMK attempted to increase tariffs but forced to withdraw after the setback in elections.

¹⁹ Thus the opposition party, a partner of BJP, offered free power in Maharashtra in the elections conducted in 2005, but the ruling Congress government implemented it before the elections to outsmart the opposition.

²⁰ This is the case of Congress in the state of Punjab in the previous elections and in Andhra very recently.

availability of advice or funding from external agencies have also been neglected in this study for the valid reason that such enabling factors are available for almost all the states of India. Because of this reason, such external factors fail to explain the implementation of reforms in some states and not in others. Similar is the case with the reform-oriented measures taken by the (federal) Government of India. It has made amendments in the Electricity Act in the nineties to facilitate reforms, culminating in the passing of a comprehensive Electricity Act in 2003, which facilitates privatisation, competition, open access and the removal of cross-subsidy. The federal government has also implemented the Accelerated Power Development and Reform Program (APDRP), which provided grants to the state governments based on performance indicators in the areas of T&D loss reduction, revenue collection efficiency, etc. Definitely these facilitating regulations and programs initiated by the Government of India had a positive impact on all states to start certain reforms, and had a greater impact on the reforming states. However since such enabling external environment is there for all the states, it fails to explain why some states could do well in terms of reforms where as others lagged behind. Thus this study focuses on the internal factors, mainly the incentives/disincentives of the households in each state in supporting/opposing power sector reforms.

8. Some Hypothetical Arguments Analysed in the Study

Incentives (and net benefits), determine an individual's decision to support/oppose reform, and this gets communicated to or internalised by the political decision-makers. The net benefit (or net cost) is determined by the direct costs (for example, potential loss of subsidy due to reform), indirect gains in term of electricity consumption (for example, the reduction in expenditure on supplementary equipments due to the improvement in quality of supply), and also the indirect gains in economy or public service as a whole due to the improvements in power sector. It is assumed that reforms would provide net positive gains for the society as a whole in the long run. (Or conversely, only those measures that create benefits to the society as a whole are considered as part of reform in this study.) However, certain sections of the society may lose in the immediate context and there can be institutional problems in providing them compensation or giving credible commitments to compensate them ex-ante. (The uncertainty at the aggregate level on future benefits would also

influence the expected benefits and the assessment of net benefit). Depending on the position of the losing sections in the income ladder or voting spectrum and their population size, their influence on political decision-making varies, and under certain circumstances even a minority of losers could discourage politicians in a democratic set up from going ahead with reforms (even if their lobbying power is overlooked).

Some of the hypotheses for the analysis of the study are discussed in the following sections with the help of the figures. In all the following figures, households in a society are represented as different points on X-axis in a decreasing order of their monthly consumption of electricity. Both the cost of supplying one unit of electricity (C) and tariff paid per unit (T) by the household are represented in the Y-axis. One can think about a basic hypothetical situation as in figure 1 where all households have electricity connection and the cost of supply and tariff paid per unit are the same. In such a situation, there is no issue of tariff reform (since there is no gap between tariff and cost). However one can assume that there will be enough support for efficiency reform, since everybody pays the cost of supply and would gain by reducing it through efficiency measures.

Figure 1

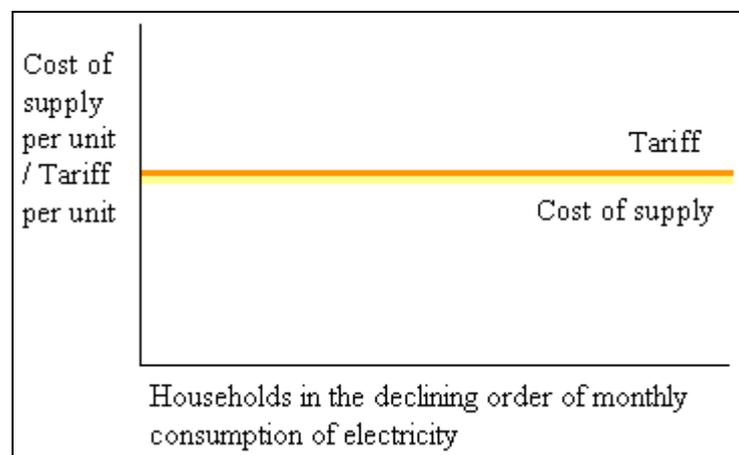
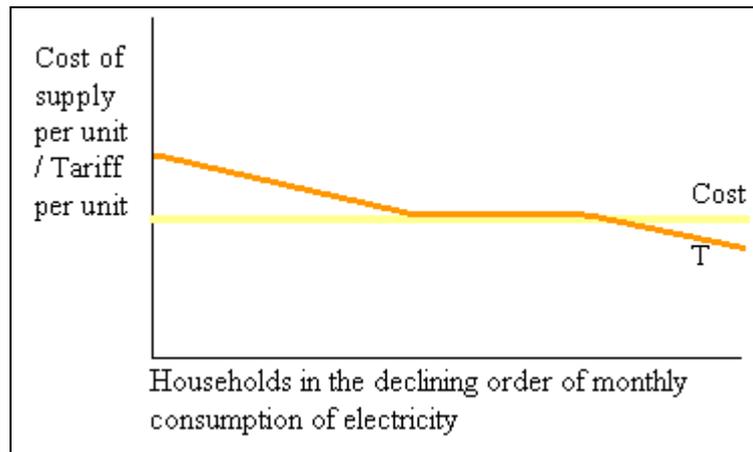


Figure 2



A slightly different situation is represented in Figure 2, in which a section of those who consume more, pay a rate of tariff higher than the cost of supply, whereas the tariff is lower than the cost for another section taking less amount of electricity. The middle group pays the cost of supply as tariff. Even under this situation one can see that majority will be, at least indifferent to (if not supporting) tariff reform and, supporting efficiency reform. What will be the situation if the majority of households do not have electricity connections? This is represented in figure 3 (a case in which 60% of the households do not have electricity connections). In this case too, it is not difficult to infer that opposition to either tariff reform or efficiency reform will not be substantial, if the unconnected consumers are indifferent²¹. However if the situation is one as in Figure 4, we have to consider factors other than the gap between tariff and cost of supply to see whether there will be opposition to tariff or efficiency reforms.

²¹ Here the assumption is that those who do not have connections today do not perceive to receive it immediately and be part of that category of connected consumers who gets electricity at rate less than that of cost of supply

Figure 3

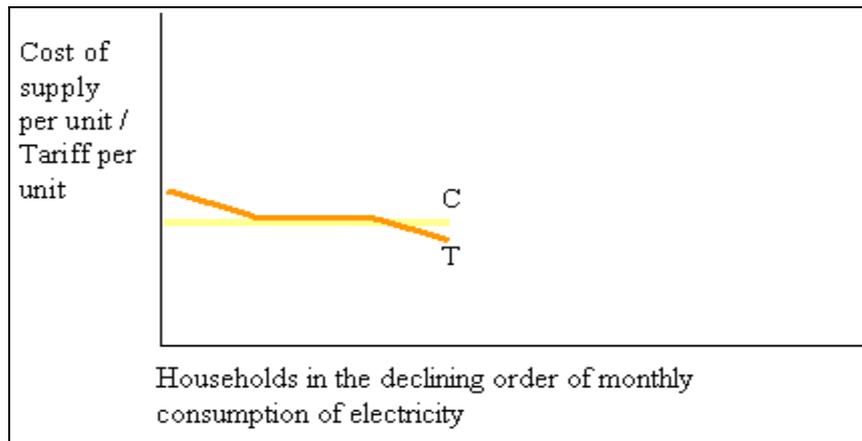
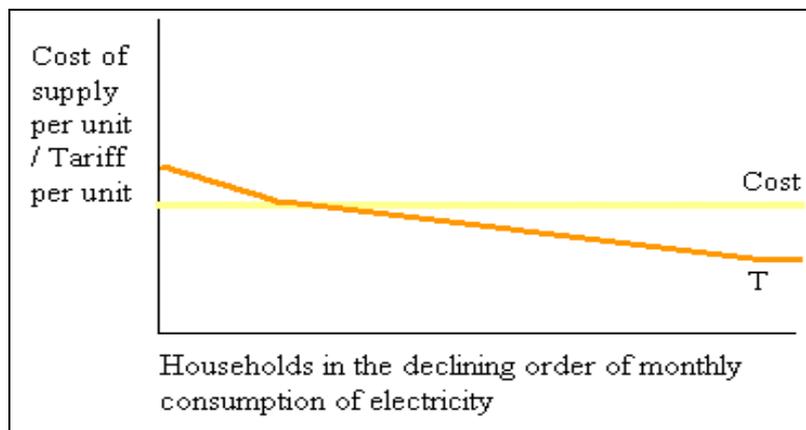
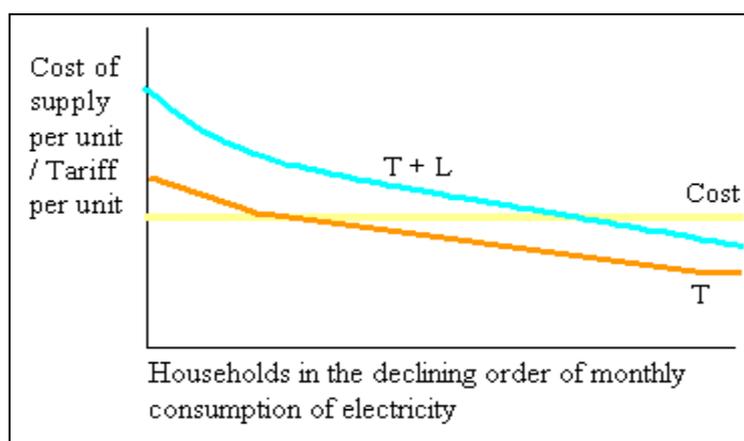


Figure 4



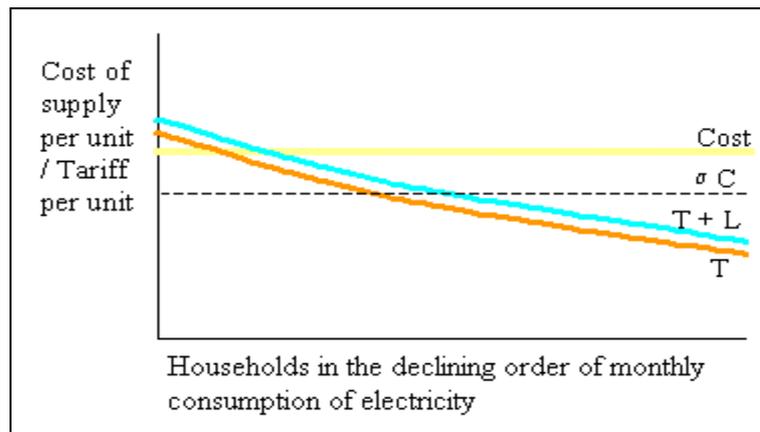
Let us consider a situation as in figure 5. Here the majority gets electricity at rates lower than the cost of supply. But all the consumers incur a loss (L) due to poor quality supply (for example, their expenditure on generators, invertors, voltage stabilisers, candles, kerosene lamps etc., to be used when there is no power supply), which when added to the tariff makes it (T+L) higher than the cost of supply. Under such a condition, majority is likely to support tariff reform (and efficiency reform), even if they pay a tariff lower than the cost of supply.

Figure 5



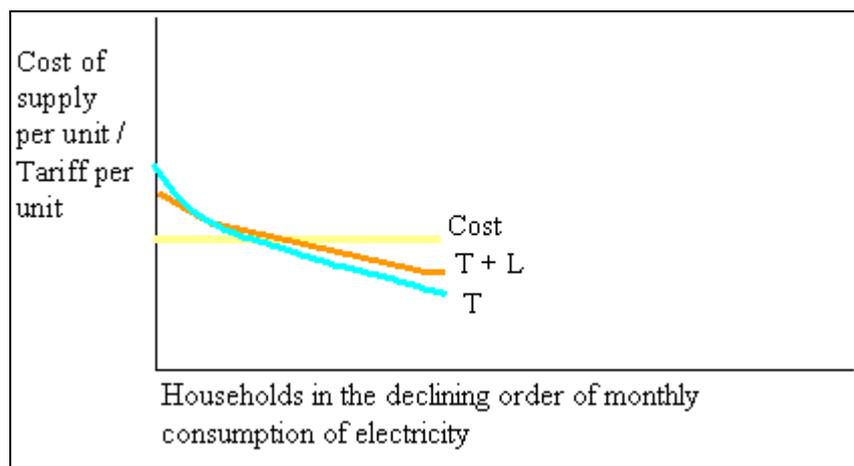
However there can be situations where $T+L$ need not be higher than the cost of supply for the majority of consumers. This can happen when the losses (L) are small due to not-so-poor quality of supply, or when T is much lower than C , so that even when L is added, $T+L$ still remains lower than C for the majority. This is represented in figure 6. To analyse whether there will be adequate social support for tariff and efficiency reforms under such a condition needs further investigation. This may depend on whether people feel that they are still losing in spite of their expenditure on account of electricity (tariff plus losses due to poor quality) being less than the cost of supply. This situation can arise for a number of reasons. For example, this can be the case if people feel that an unviable power sector and its consequences on economy are costly to them. An entrepreneur can perceive that he/she could not develop an industrial unit due to non-availability of power, and hence the sector should be reformed (despite getting power at subsidised rates for domestic consumption). An unemployed person can feel that jobs are not available because enough electricity is not provided to the industries, and thus he can perceive the status quo of power sector costly (despite being the beneficiary of subsidised electricity for domestic consumption). Some people can also perceive that the government expenditure to compensate the gap between cost and tariff of electricity deprive them adequate quantity or quality of some other more valuable governmental service. It is theoretically possible to conceive a situation, in which the beneficiary of electricity subsidy can consider the status quo costlier, if s/he thinks that s/he has to spend more for health care, schooling, etc., due to the poor quality of governmental services in these areas, as a consequence of the higher governmental spending to provide electricity subsidy.

Figure 6



However, if for some reason people do not see the opportunity cost of governmental resources used to subsidise electricity as high, or the current situation of power sector and its impact on economy costlier, then there is unlikely to have adequate social support for tariff reform in a situation depicted in figure 6. The support for efficiency reforms under such a situation can be analysed further. If people perceive that the efficient cost is σC , and if the reduction in cost through efficiency measure is not going to reduce their tariff any further, then the majority can be indifferent to efficiency reform. However if only a minority have electricity connections, and if these connected consumers face a situation similar to that depicted in figure 6, then their opposition/indifference need not be decisive politically. (This is depicted in figure 7).

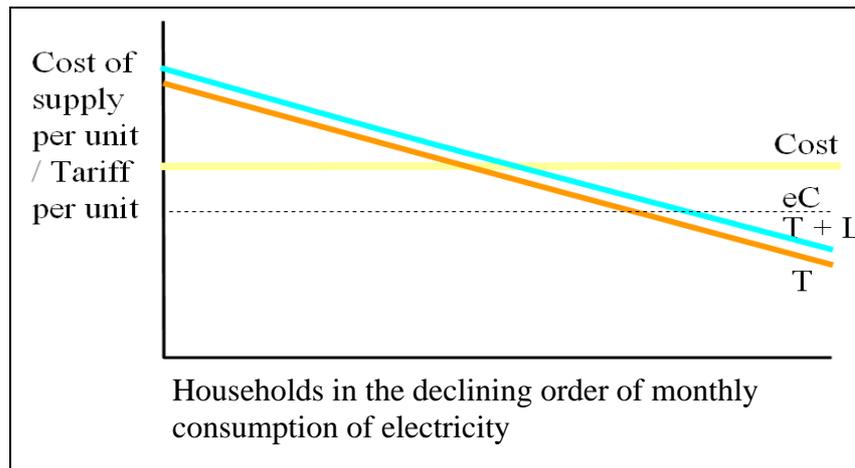
Figure 7



It would also be interesting to know under what conditions people currently in a situation as in figure 6, develop a positive response to tariff reform. This can develop when many people start consuming more electricity, which will make their

average tariff rate higher or near the cost of supply, and which when added to the losses (due to poor quality) $T+L$ becomes higher than C for the majority of the consumers. This is depicted in figure 8. (Thus there is an economic factor that can shift an opposing situation as in figure 6 to a supporting one depicted in figure 8.) This situation can be similar to the one existing in many metropolitan cities in India.

Figure 8



The discussion so far has hypothetically analysed different situations in which there can be support for or opposition to reforms in power sector. Then the issue is whether the situation in different states of India can be empirically related to the hypothetical situations described in the previous section. The data required are of the following categories: (1) Ratio of households having electricity connections out of the total households in each state; (2) The average tariff paid per unit by households consuming different amounts of electricity; (3) The average cost to supply electricity to households incurred by the utility²²; (4) The quality of power supply (power interruptions, voltage problems, etc.) and the losses to households, if

²² There is an issue what is the real cost. It is quite possible that the real cost of supply to supply to households can be different from that of industry and sectors of consumption. The cost of supply can also vary between urban and rural domestic consumers, and also between those who consume more and those who take smaller quantities of power. The differences in T&D losses associated with each consumption category should also be ideally considered for fixing the cost of supply. It is well known that the cost of supply to agriculture (which can be interrupted and supplied at non-peak hours) can be cheaper than the cost to provide electricity to domestic consumers, which is mainly at peak hours. (Such a distinction is made in the orders of the Andhra Pradesh Electricity Regulatory Commission). However since such consumer category-wise cost of supply is not available in most of the states, we have taken the average cost of supply provided by the utility for this analysis. There is some justification for using the information of cost of supply available in public domain for this analysis, since it is this information that people might respond as voters, and not to any technically correct actual estimates of cost of supply known only to a few experts and insiders.

any, due to the poor quality of supply; (5) How do people feel about the opportunity cost of resources spent by the government to meet the gap between the cost of supply and tariff; (6) the support or opposition to reform, also for reasons beyond tariff (subsidy) and quality of supply (which can be due to the general losses arising from the unviable power sector and its impact on economy) by asking people whether they are willing to support strategies of tariff and efficiency reforms; (7) Some information on the net social support or opposition to reform can also be deduced by seeing whether a particular state has gone ahead with explicit strategies of reform such as privatisation. The availability of data and information and their collection and compilation are discussed in the following section.

9. Data and the Sources

Ratio of the households having electricity connections out of the total households in each state in the year 2001 is available in census data. Another estimate of this information can also be taken from 57th round of National Sample Survey (NSS), in which the source of lighting as electricity can be taken as an indirect indication of the presence of electricity connection (with the assumption that every connected household would use electricity for lighting).

The average tariff paid per unit by households consuming different amounts of electricity is not easily available. Though one would expect that the each SEB would have compiled information on who among its consumers pays how much tariff, such information is not available in a readily usable form. Tariff structures are known but these are increasing bloc rates (for instance: 1 Rupee for first 50 units and 1.5 Rupees for those units above 50, and so on) and they do not give the average rate of tariff paid by each consumer. Even though the total tariff paid by each consumer is available in the ledgers of the field offices of SEB, such information is not compiled due to the near absence of computerisation in many electricity boards. For this study, average tariff is taken from two sources: (a) Different rounds of NSS data provides the value paid out and the number of units of electricity consumed for each sample household, using which an average tariff can be worked out; The data on value paid out in NSS seem to include not only the charges for the units consumed but also other rental and fixed charges; (b) a primary survey of a cross-

section of consumers (the details of which is described in a later paragraph) in which recent electricity bill is used to record the number of units consumed and their charges during the billing period.

The average cost of supply of electricity for the utility in each state till 2002 is recorded in the annual compilation by the Planning Commission (Power and Energy Division) of Government of India, on 'the working of State Electricity Boards (SEB) & Electricity Departments'. More recent estimates for some states can be worked out from the Annual Revenue Requirement (ARR) submitted by their utilities to the respective Electricity Regulatory Commissions.

In order to have information on the quality of supply received by a cross section of consumers and also to know how much people of different socio-economic characteristics lose by using supplementary sources such as kerosene, candles, batteries, generators, etc. due to the poor quality of electricity²³, a primary survey was carried out in each state. In addition to the losses due to poor quality of supply, the survey has elicited information on how does people feel about the opportunity cost of resources spent by the government to meet the gap between the cost of supply and tariff and whether they are willing to support strategies of tariff and efficiency reforms. It was asked whether the household is willing to pay a tariff higher than the prevailing one, for an improvement in the quality of supply. There was also a question seeking the preference of the household in terms of the privatisation of the utility, wherever state government owns the utility currently. (The questionnaire used for the survey is given here as Appendix 2.) To some

²³ The expenditure on such supplementary sources will not give a complete picture of the losses (and difficulties) due to the poor quality of power supply. These are part of the economic costs of unreliability (outage) of power supply and the methods of estimating these are discussed in studies on power systems reliability such as those reviewed in Munasinghe (1979). As noted in this study, there are two approaches to measure the costs of unreliability of power supply. The first one is based on observed or stated willingness to pay for better quality, and the second approach attempts to estimate outage costs by the effects of outages on the production of goods and services. Since the focus here is the households, we would be using the revealed preference approach here. In fact, it would have been ideal to carry out a survey on how much people are 'willingness to pay' for better levels of quality of supply. Such WTP surveys (Carson, 2000) have also been carried in developing countries (Anand and Perman, 1999; Singh et al, 1993; Whittington et al, 1993). However there are many difficulties for conducting such a 'contingent valuation' study in the context of a developing country such as India. Thus we have collected only the expenditure on alternative sources, which is part of the revealed preference method of assessing the willingness to pay.

extent, such questions in the survey, which were used to understand the preference of the households as stated by them, can be interpreted as part of ‘contingent valuation’. If a household is willing to support tariff and efficiency reform (based on their statements) even when their current expenditure (i.e., tariff plus additional expenditure on supplementary sources) is lower than the cost of supply, one can interpret that the losses other than the supplementary expenditure (probably due to the economic impact of unviable power sector or fiscal problems created through power subsidy) that the household incurs due to the non-viability of power sector is higher than the net subsidy (C-T-L) it receives.

The sample of the primary survey is selected in such a manner to get a cross section of connected consumers in each state. The sample size varying between 500 and 600 households in each state has been designed to take into account the regional variations in connectivity and quality of supply, and urban versus rural households. The exact design of the sample varied from state to state, but an idea of this can be obtained from the details of sample design used in the state of Kerala and the city of Chennai (in the state of Tamilnadu), given in the following box.

A description of the sample of the primary survey in Kerala, and Chennai

Kerala: We have decided to do a survey of about 600 households in the state. Considering the urban/rural ratio of state’s population, 200 urban households and 400 rural households were surveyed. The survey was conducted in the selected Panchayath (rural) wards and Municipal/Corporation (urban) wards, given in Table 2. The wards are selected in such a way that enough representation is given to three different regions (i.e., North, Central and South) of Kerala and topographies (coastal, midland and highland) which have different levels of electricity connectivity and problems related to quality of supply, as evident from the previous studies (EISP, 2000). A systematic random sampling was used within each ward to select the households to be surveyed.

Table 2: Villages and city divisions where primary survey was carried in Kerala

Name of the Village	Region	Topography	Urban/Rural
Champakulam	South	Coastal	Rural
Chavakkad	Central	Midland	Urban
Chittar	South	Midland	Rural
Cochin corporation	Central	Coastal	Urban
Enmakaje	North	Highland	Rural
Makaraparambu	North	Midland	Rural

Chennai: As part of the primary survey in the state of Tamilnadu, it was decided to conduct a survey of 100 households in the city of Chennai. In order to select these sample households, the list of streets in the city and the respective land prices were collected from the land registration department. Based on a listing in the declining order of land prices, the streets were divided into five categories. The median street under each of this category was selected for the survey. Again a systematic random sample of households was selected from each street.

Though this study was proposed to cover about 15 Indian states, so far primary survey has been completed only in 9 states. (It is expected that the survey in the remaining states will be over in the next three months). The states surveyed so far are the following: Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Gujarat, Uttar Pradesh, Bihar, West Bengal. In addition to the primary survey, a number of stakeholders and analysts of the power sector (such as central government officials, consultants, industry and commercial associations, academics, consumer organisations, etc.) who have interacted with decision-makers in multiple states have also been consulted. Detailed analysis of the documents and discussions with the officials of the Asian Development Bank, which has been involved in a number of Indian states supporting program loans to reform power sector, have also been carried out.

10. Some Preliminary Results of the Study

Though the primary survey has been carried out in 9 states, results are available only from 6 states now, at this time of writing the first draft report. (It is expected that the results of other three states will be ready within a month.) The following sections discuss the preliminary findings of this study based on secondary data from all the states and primary data from these six states. The discussion of the hypotheses for the study, have shown that the support or opposition to reform is possibly affected by the following:

- a. Distribution of electricity connections
- b. Distribution of electricity subsidy
- c. Distribution of losses due to poor quality of supply

- d. Reasons beyond subsidy and quality of supply, probably the higher opportunity cost of governmental expenditure in power sector or economy-wide losses due to an unviable power sector (as evident from the consumers' stated preference on tariff and efficiency reforms)

The preliminary findings are discussed in the above order of different distributions, to see whether each of them singly or in combination with others can explain apparent difference in the pace of reform of various Indian states. Some idea of the state of power sector reforms in the six states considered here are summarised in Table 3.

Table 3: Summary of Status Power Sector Reforms in 6 Indian States (for which Primary Data is available)

State	Status of Reform
Orissa	SEB unbundled; full privatisation attempted; but one company left the scene
Uttar Pradesh	Unbundled; private companies function in some cities; full privatisation being worked out
Andhra Pradesh	Unbundled and made state-owned corporations; Regulation seems to be relative more effective; problem of free power to farmers persist
Tamilnadu	No unbundling; relatively effective reimbursement of subsidy by government; state-owned SEB seems to be relative more effective in controlling T&D losses
Kerala	No unbundling; 50% hydroelectricity and ABT keep cost escalation under control; agricultural consumption not a major problem
West Bengal	No unbundling; but exposed to private company's power supply in the city of Kolkatta

10.1 Distribution of Electricity Connections

As a first step towards understanding the losses and gains due to power sector reforms, it would be interesting to know who (or which income groups) has electricity connection and who does not have it. The percentage of connected households in each state (based on 57th round NSS data), and the distribution of these households in deciles based on MPCE (Monthly Per Capita Expenditure) are given in Table 4.

Table 4: Percentage of connected households and its distribution in MPCE based deciles in Indian states

State	% of connected hhs	Deciles from the lowest to highest									
		1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Jammu & Kashmir	97.4	95.6	92.8	97.1	97.1	95.6	94.9	94.2	91.2	89.1	79.6
Himachal Pradesh	99.4	80.2	97.2	92.5	92.5	94.3	94.3	91.5	84.9	83.0	84.0
Punjab	95.4	85.5	93.3	97.0	95.2	97.6	97.6	96.4	97.6	97.0	98.2
Chandigarh	99.9	90.5	86.4	95.5	100	95.5	100	100	100	100	95.2
Uttaranchal	42.0	56.8	86.7	77.8	91.1	88.9	84.4	91.1	93.3	97.8	95.5
Haryana	94.7	66.4	88.6	89.5	91.2	92.1	92.1	98.2	92.1	98.2	94.7
Delhi	98.8	83.0	94.1	96.0	93.0	92.1	95.0	91.0	91.1	90.1	96.0
Rajasthan	47.3	38.7	54.2	64.2	74.9	78.2	82.7	85.2	87.5	92.3	91.1
Uttar Pradesh	43.7	31.8	47.7	54.1	64.8	69.3	79.2	81.4	85.8	89.6	91.7
Bihar	16.9	13.2	18.2	28.4	29.3	37.5	54.3	52.5	66.9	74.5	78.3
Sikkim	85.5	46.2	59.3	74.1	77.8	100	81.5	85.2	92.6	96.3	100
Arunachal Pradesh	51.8	32.7	50.0	51.9	73.1	69.2	73.1	84.6	75.0	67.3	80.8
Nagaland	83.8	57.4	79.2	81.3	83.0	89.6	95.8	85.1	95.8	93.8	85.1
Manipur	82.2	72.0	71.1	90.8	80.3	85.3	87.0	81.6	85.5	76.3	78.9
Mizoram	70.8	73.4	85.9	86.2	87.5	86.2	84.4	86.2	84.4	86.2	82.8
Tripura	50.3	29.3	45.5	59.6	68.0	74.7	81.8	86.0	90.9	93.9	96.0
Meghalaya	38.7	52.6	53.4	50.0	49.1	53.4	56.9	59.6	77.6	69.0	66.7
Assam	38.2	10.7	22.8	24.4	38.4	49.8	54.0	61.8	73.7	77.8	75.4
West Bengal	48.4	21.2	31.5	45.7	53.8	63.4	76.3	81.2	88.1	92.2	97.9
Jharkhand	19.9	18.3	27.1	35.8	50.3	60.6	69.3	80.0	79.4	87.9	84.8
Orissa	16.9	10.1	22.3	41.0	44.1	52.6	62.0	69.9	80.8	88.2	93.0
Chattisgarh	51.0	36.1	54.1	46.9	71.4	74.5	79.6	83.7	87.8	90.8	93.8
Madhya Pradesh	73.8	58.4	76.6	77.8	89.2	90.0	94.0	94.3	96.6	96.3	98.0
Gujarat	86.7	67.0	77.9	85.1	95.4	94.4	95.9	95.9	93.8	95.4	97.9
Daman & Dlu	100	100	100	100	100	100	100	100	100	90.0	100
Dadra & N. Haveli	99.8	77.8	90.0	100	100	100	100	100	100	100	100
Maharashtra	81.7	65.8	77.0	85.9	92.2	90.1	91.1	90.5	89.3	91.5	96.2
Andra Pradesh	83.9	58.0	69.9	77.3	86.2	88.7	87.9	92.1	95.8	97.5	96.8
Karnataka	85.0	59.7	73.3	78.1	85.3	90.1	91.6	94.1	96.7	97.1	97.8
Goa	96.0	73.3	100	80.0	87.5	93.3	100	100	100	100	100
Lakshadweep	100	100	100	100	100	100	83.3	100	100	100	100
Kerala	79.2	55.2	69.3	75.1	86.6	85.8	88.5	90.4	93.1	95.0	94.6
Tamil Nadu	83.7	66.4	74.8	81.4	84.5	87.9	91.9	93.9	94.5	97.4	97.4
Pondicherry	89.9	80.0	80.0	84.0	84.6	88.0	80.0	96.2	96.0	96.0	100
A & N Islands	80.3	74.1	78.6	92.9	88.9	89.3	96.4	92.6	96.4	96.4	96.3

Source: Compiled by the Author using and 57th round data, and the cost of supply provided by Govt of India (2002)

Based on connectivity, one can divide the states into three categories. There are some small states which very high level of connectivity either due to special support from the government or with some specific reason (such as the predominance of hydropower in Himachal Pradesh). These include Jammu and Kashmir, Himachal,

A&N islands, Lakshadweep, and so on. There are also some city states or territories such as Delhi, Pondichery, etc, where too there is high-level connectivity. The second category comprises of those larger states which too have higher connectivity including Tamilnadu, Kerala, Gujrat, Punjab, Haryana, Andhra, Karnataka, Maharashtra, located mostly the southern or western parts of the country. The third category is the set of larger states such as Uttar Pradesh, Orissa, Bihar, Assam, West Bengal, etc., located in the North-east and Eastern parts of the country with low levels of connectivity.

One can also see the relationship between connectivity (% of households with electricity connections) and the likelihood of reform. If we take two states, which had gone ahead with full privatisation namely Orissa and Delhi, these are at two extreme ends in terms of connectivity. Orissa has only less 20% of the households with electricity connections, where as the corresponding figure for Delhi is 98. Thus the electric connectivity per se may not be adequate to explain why some states could reform its power sector where as others could not.

10.2 Distribution of Electricity Subsidy

One source of loss due to reform is the potential withdrawal of subsidy as part of the tariff reform. Thus it would be interesting to analyse how different income groups in Indian states benefit from the provision of electricity subsidy. There is a popular (and right) impression among many observers that the major part of electricity subsidy in India is currently received by the middle-class and richer sections of the society. However, there were not many attempts to develop a quantitative evidence for this impressionistic feeling. World Bank (2002) and Santhakumar (2003a) are attempts in this direction. Based on NSS data, and also the poverty impact assessment of power sector reforms carried out in different states, World Bank (2002) has provided a picture at the national level, on the poor targeting of electricity subsidy in India. Santhakumar (2003a) carried out an analysis based on primary survey on the situation in the state of Kerala. Tables 5 and 6 provide the distribution of electricity subsidy for residential consumption among different deciles (based on Monthly Per-Capita Consumer Expenditure –MPCE) in the major

states of India. This is based on National Sample Survey²⁴ 50th and 57th rounds carried out in 1993-94 and 1999-2000 respectively, which has recorded the units of electricity consumed and value paid out for this purpose²⁵. Based on this information, the average tariff rate is worked out, i.e., value paid out divided by the number of units²⁶. The subsidy per unit is calculated by reducing the average tariff rate from the average cost of supplying one unit of electricity for the corresponding year for the particular utility (taken from the utility data compiled by the Planning Commission of Government of India). Monthly subsidy provided to each household (i.e., the product of the number of units consumed by the household and the subsidy per unit) is added together to get the whole subsidy, and the percentage of that going to households belonging to each of the deciles has been worked out. The distribution of subsidy by considering both connected and unconnected households is given in Table 5 and that by taking only the connected households is given in Table 6.

²⁴ This sample survey covering all over India, provides information on household expenditure, consumption of different items including electricity, and the value paid out for each of these items. Thus information on the use of electricity (i.e., whether any particular household uses it, and if so, how many units) and the tariff that different households pay, are available from this survey.

²⁵ There are many limitations for this data set. The documentation of the electricity consumption in India is far from complete, clear and systematic due to high T&D losses including commercial losses, mainly due to illegal use or theft of electricity. Thus there are many consumers who use electricity but are neither recorded as consumers nor served bills to pay any tariff. There is also tampering with meters, and thus even if bills are served, these may not be for the actual consumption. Another section of consumers does not have meters in their premises to record consumption, and full metering is yet to achieve in many Indian states. Yet another section (farmers in many states) receive electricity free of cost, and thus there is neither metering nor billing. All these features mean that the recorded information of consumption and value paid in the NSS data set may not be very reliable. Though ideally enumerators should have seen the monthly or bimonthly bills and recorded the quantum of, and value paid out, for electricity, there might be some errors due to the complexities in billing and the not-so-systematic manner in which these are carried out India. All these discrepancies make the data on the cost of supply also problematic. The lack of complete metering and high T&D losses create errors in the estimation of average cost of supply. There has been no proper accounting of the costs to serve different types of consumers. The recorded cost is also not the efficient cost, since most of the utilities are known for many types of inefficiencies.

²⁶ NSS data on value includes not only the energy charges but also monthly rents, if any, and hence it is expected be slightly different from the tariff but without affecting the distribution pattern among different households. On an average, value recorded in NSS data is found to be 12 per cent higher than the one determined through tariff structure (implying the influence of fixed charges collected per month). However the differences between these two values show that NSS-based and tariff-based values differ between -20 and 20 percent for about 58 per cent of the households and more than that for others. However, the percentage distribution of subsidy analysed with these two values does not show much difference.

Table 5: Distribution (%) of Electricity Subsidy in Indian States among different MPCE groups (by considering connected and unconnected households)

State	NSSC Round	Deciles from lowest MPCE to highest									
		1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Andhra Pradesh	50	2.6	5.3	6.1	7.4	8.5	9.9	12.2	13.2	16.4	18.4
	57	4.3	6.1	7.3	8.3	9.3	9.7	10.7	13.5	15.1	15.7
Assam	50	0.6	2.7	2.4	4.0	7.6	11.7	6.5	14.4	20.2	30.0
	57	1.3	3.3	4.0	7.1	9.5	10.7	12.9	15.5	17.3	18.2
Bihar	50	0.6	1.9	1.1	2.1	4.2	5.4	11.3	14.6	21.2	37.6
	57	1.7	2.7	4.6	6.1	7.7	10.6	11.6	14.4	17.8	22.8
Delhi	57	4.7	5.9	7.4	7.5	8.3	8.1	7.7	12.5	16.0	21.7
Gujarat	50	3.4	5.0	6.2	6.8	8.1	9.8	11.4	13.6	13.4	22.4
	57	4.3	5.7	8.6	9.3	10.8	10.6	12.3	13.5	12.8	12.0
Haryana	50	4.3	7.2	6.8	9.9	9.9	10.8	12.5	11.6	13.3	13.8
	57	4.1	6.0	7.5	8.4	9.1	11.9	11.1	10.8	13.4	17.7
Himachal Pradesh	50	5.9	7.0	7.6	8.1	8.7	9.3	10.3	11.3	13.3	18.6
	57	5.4	7.1	8.0	8.5	11.5	10.6	11.5	10.1	14.2	13.2
Jammu & Kashmir	50	4.2	6.9	7.8	7.9	9.4	8.0	11.8	12.5	14.3	17.1
	57	7.4	8.4	9.2	10.2	10.4	11.2	10.9	10.2	10.9	11.1
Karnataka	50	3.6	5.7	6.8	7.2	7.9	12.8	14.0	14.5	15.6	11.9
	57	2.6	4.4	5.2	7.3	7.9	10.7	13.5	15.2	17.4	15.7
Kerala	50	3.1	4.5	5.8	6.8	9.0	9.4	11.7	13.4	16.3	19.8
	57	3.3	5.8	6.4	8.8	8.8	8.4	9.8	13.9	14.4	20.3
Madhya Pradesh	50	2.0	3.9	4.7	6.2	7.7	9.2	10.1	12.9	17.2	26.1
	57	3.0	5.1	6.7	9.3	9.6	10.4	12.2	12.8	13.9	17.0
Maharashtra	50	2.4	3.9	6.2	7.8	9.7	10.8	11.8	13.0	13.6	20.7
	57	3.4	5.4	6.8	8.7	9.6	10.0	10.4	10.9	13.8	21.0
Orissa	50	0.5	0.8	2.9	3.1	6.2	7.3	11.0	17.3	21.6	29.3
	57	.8	2.4	6.1	6.9	9.3	9.2	13.8	17.7	17.2	16.6
Punjab	50	4.9	6.3	7.2	6.9	8.3	10.1	11.2	11.5	14.8	18.8
	57	4.9	7.9	8.3	11.1	10.3	9.8	13.4	11.3	10.7	12.2
Rajasthan	50	3.4	6.1	7.2	7.1	9.5	10.8	9.7	11.6	16.7	17.9
	57	3.8	5.2	6.3	8.6	10.7	11.5	11.3	14.2	13.4	15.0
Tamil Nadu	50	3.2	4.5	5.9	6.6	8.6	9.2	12.2	13.7	16.5	19.7
	57	3.8	5.3	6.3	7.3	9.3	10.3	11.3	13.0	15.6	17.9
Uttar Pradesh	50	1.4	2.0	3.6	5.1	6.5	8.0	9.4	13.0	18.9	32.2
	57	2.7	4.4	5.1	7.2	8.1	9.4	11.1	13.0	16.0	23.2
West Bengal	50	0.8	1.1	3.2	4.1	5.5	8.5	11.1	14.4	18.6	32.6
	57	1.6	3.2	4.5	6.9	8.0	10.5	11.1	13.0	16.3	24.9

Source: Compiled by the Author using NSS 50th and 57th round data, and the cost of supply provided by Govt of India (2002)

When we consider the connected and unconnected households together, the subsidy distribution becomes very regressive in states such as Uttar Pradesh, Bihar, Assam, West Bengal, Orissa, probably due to that the connectivity is much

lower, and since a higher proportion of the unconnected households belong to the low MPCE (income) groups. There is a clear increase in the percentage of subsidy received by the higher income groups in all the states. Among the states with high connectivity, Kerala, Maharashtra and Delhi stand out with more than one-fifth of the subsidy going to the 10% of households having highest MPCE.

Table 6: Distribution (%) of Electricity Subsidy in Indian States among different MPCE groups (by considering only connected households)

State	NSSO Round	Deciles from lowest MPCE to highest									
		1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Andhra Pradesh	50	7.5	8.1	8.6	8.9	9.0	10.5	10.5	10.8	13.3	12.8
	57	6.8	7.5	8.2	8.6	9.2	9.7	10.6	12.7	12.9	13.9
Assam	50	9.3	10.2	10.9	5.1	8.7	9.6	8.0	10.3	11.7	16.2
	57	7.0	9.0	9.3	10.0	10.2	10.3	10.1	11.2	10.0	12.9
Bihar	50	6.2	6.6	11.6	11.3	9.5	9.7	11.4	12.8	11.3	9.7
	57	6.8	8.6	8.9	9.3	9.6	10.3	11.4	9.2	12.5	13.3
Delhi	57	5.1	6.0	7.1	7.6	8.3	7.8	7.9	12.5	16.9	20.8
Gujarat	50	6.0	7.0	6.8	7.6	8.8	10.0	10.3	12.5	11.9	19.1
	57	5.9	6.8	10.1	8.4	11.5	10.0	11.7	13.6	13.1	8.8
Haryana	50	6.9	7.9	8.8	9.1	9.5	10.6	11.5	11.6	11.8	12.4
	57	5.9	6.5	7.5	8.1	9.5	12.6	9.3	12.4	10.9	17.3
Himachal Pradesh	50	6.9	7.6	7.4	8.4	8.5	9.4	9.8	11.1	12.8	18.1
	57	6.0	6.7	7.7	8.4	10.6	9.8	10.2	10.9	16.0	13.8
Jammu & Kashmir	50	6.6	7.6	7.5	7.9	8.6	8.7	10.1	11.8	13.8	17.4
	57	7.2	8.4	8.9	9.7	9.7	11.4	10.2	10.7	11.1	12.7
Karnataka	50	7.8	7.9	8.3	7.5	12.4	12.4	11.4	12.9	10.0	9.5
	57	4.1	5.4	6.6	7.5	9.1	10.6	12.4	14.5	16.2	13.6
Kerala	50	6.1	7.7	8.4	9.2	9.5	10.2	9.9	11.3	11.8	16.0
	57	5.6	6.8	8.3	7.8	9.0	8.5	9.9	12.8	13.9	17.4
Madhya Pradesh	50	4.8	6.1	7.2	8.3	8.3	9.0	10.5	11.7	14.2	19.9
	57	4.9	6.4	8.3	9.5	8.9	10.7	11.1	11.9	12.9	15.3
Maharashtra	50	5.1	7.0	7.7	9.1	9.7	9.3	10.6	11.3	12.7	17.6
	57	4.8	6.2	7.4	8.4	9.5	10.0	9.8	10.7	13.7	19.5
Orissa	50	6.6	7.2	8.5	9.3	11.6	9.4	9.3	12.0	11.2	14.9
	57	7.0	8.6	9.8	8.0	11.7	11.5	11.5	12.2	8.8	10.9
Punjab	50	6.1	7.0	6.7	7.5	8.2	10.1	10.7	10.8	15.1	17.8
	57	5.4	8.6	8.4	11.4	9.3	10.5	13.8	9.6	11.0	11.9
Rajasthan	50	7.7	8.8	8.3	8.7	9.4	8.8	9.9	11.5	13.5	13.3
	57	7.4	7.2	8.4	9.8	9.7	11.6	10.3	12.2	10.8	12.6
Tamil Nadu	50	5.9	7.1	8.0	8.6	9.2	10.2	11.3	12.3	13.6	13.9
	57	5.1	6.3	7.1	8.0	9.6	10.0	11.1	12.6	13.9	16.2
Uttar Pradesh	50	5.7	6.1	7.0	7.8	8.0	8.6	10.7	12.2	12.9	21.0
	57	6.1	6.6	7.9	8.0	8.3	9.4	9.9	11.9	14.2	17.7
West Bengal	50	6.4	7.4	8.0	8.9	9.0	9.3	10.1	10.5	13.6	16.7
	57	6.0	7.7	8.2	8.6	9.2	9.2	9.2	10.6	13.3	18.2

Source: Compiled by the Author using NSS 50th and 57th round data, and the cost of supply provided by Govt of India (2002)

While considering only the connected households, the regressive nature of subsidy distribution gets slightly moderated in some states. However only less than 30% of the subsidy is given to the poor in most of the states (if we take the lowest four deciles as the poor households). In 13 states (out of the 18 listed in Table 6), the highest MPCE decile group gets the maximum percentage of the subsidy. While comparing with the similar distribution of subsidy six years ago (as evident from 50th round of NSS data), it can be seen that a few more states have moved towards slight progressiveness in subsidy distribution during this period. This may be an indication of tariff reform carried out during this period in these states namely Gujarat, Madhya Pradesh, Orissa along with Punjab and Rajasthan.

This nature of the subsidy distribution raises a number of issues. A much greater part of the subsidy given for the domestic consumption in almost all the states goes not only to non-poor but also to the well off sections of the society. The burden to provide subsidised electricity to poor can be met with less than one-fourth of the current expenditure by the governments for this purpose. There can be doubts on why the distribution of electricity subsidy in Indian states becomes so regressive. This is so since in almost all the states there is an increasing block tariff structure in which those who consume more have to pay a higher tariff. For example, in the tariff structure of one state namely Tamilnadu, the rate for consumption between 1 to 25 units is Rs. 0.75, that between 25-50 is Rs. 0.85, and so on and finally the rate for consumption beyond 301 units is Rs. 3.05. However, the operation of tariff structure is such that any person who consumes say 350 units will get first 25 units at Rs. 0.75, the second 25 units (or consumption between 25-50) at Rs. 0.85, and so on and only for the units above 300 that he/she has to pay Rs. 3.05 per unit. A simple calculation would show that a person consuming 350 units would be paying an average rate of 2.02 Rupees. Similarly the average price of consumption of 150 units is 1.69 Rupees. Thus the difference between those who consume say less than 25 units and those who take 350 units is not as big as that apparent from the telescopic tariff structure. A similar picture is there for per unit subsidy since it is obtained by deducting per unit tariff from the average cost of supply per unit, which is the same for all categories of residential consumers. However the estimates of average subsidies or average tariff rates calculated with NSS data do not show much

difference between different expenditure groups, as evident in the case of Kerala given in Table 7. The average rate per unit paid by the poorest 10% of the households is only Rupees 0.30 less than that paid by the richest 10%. Thus there is only this much difference between the average subsidy, received by these two groups. However the gap between the poorest and the richest (based on deciles) in terms of monthly consumption of electricity is much wider. Thus the monthly subsidy received by the richest 10% is much higher than that received by the poorest 10%.

Table 7: Average Tariff and Monthly Consumption among MPCE deciles in Kerala

Deciles	Average Tariff	Average Consumption
1-10	1.14	42.56
10-20	1.16	52.21
20-30	1.19	62.78
30-40	1.27	61.34
40-50	1.20	70.06
50-60	1.30	68.04
60-70	1.23	79.27
70-80	1.29	103.68
80-90	1.34	117.00
90-100	1.44	152.51

Source: as Table 6

Table 8: Distribution of monthly subsidy (Rupees) between MPCE deciles in Kerala

Deciles	All households (both connected and unconnected)	Only Connected Households
1-10	79	99
10-20	114	120
20-30	120	145
30-40	147	136
40-50	144	158
50-60	136	148
60-70	155	174
70-80	213	225
80-90	217	244
90-100	299	307

Source: as Table 6

The distribution of monthly subsidy among different deciles of connected consumers in Kerala show that the richest 10% households get an average of 307 rupees (in 2000-2001) where as the poorest get only 99 Rupees. This would mean that if electricity subsidy at the current level is limited to the poor (say bottom 50% of the households in terms of MPCE), then the saved amount is high enough to give about 220 Rupees per month as cash transfer to these poor households in addition to the electricity subsidy. For an unconnected poor household, this amount is adequate to provide a one-time expenditure of more than 20000²⁷ to provide electricity connection. This should reflect these poor households' opportunity cost of governmental expenditure to provide subsidy to the richer sections. The distribution of subsidy becomes regressive for the reason that it is given per unit consumed, and that the average rates for different levels of consumption are not that different. (This can only be corrected either by giving a lump-sum subsidy to those who deserve it or by making the average tariff rates for consumption level beyond the basic much higher than the prevailing ones. This basic consumption is the one to be provided by taking into affordability considerations.)

It would be interesting to see whether the nature of subsidy distribution per se had an impact on the likelihood of power sector reforms. Since the subsidy is distributed regressively in all Indian states, as evident from Table 5 and 6, since some them could reform their power sector reasonably well than others, one cannot argue that the distribution of subsidy per se had an effect on reforms. For example, if we take three states namely Orissa, Kerala and Delhi, the distribution of subsidy is similar in Kerala and Delhi (as in Table 6), where as Delhi and Orissa are similar in terms of the implementation of reforms. Thus we need to consider reasons beyond the distribution of subsidy per se, to see factors enabling/blocking reform. The following section analyses the level of connectivity and the distribution of subsidy.

10.3 Combined effect of the distributions of connectivity and electricity subsidy

This is analysed with the help of figures discussed in the section on hypothetical arguments, but here with the actual data from the primary survey. The state-wise sample households in the declining order of their average tariff rate (which

²⁷ At the interest rates prevailing in India for the loans to construct houses.

indirectly reflects their order of monthly electricity consumption) is marked on the X-axis, and the average tariff and cost per unit are marked on the Y-axis in the graphs given in figure 9. The X-axis also represents the connected and the unconnected households, as the connected consumers are marked only on a part of that axis, reflecting the connectivity of that state. Based on this figure one can categorise these six states into two broad categories. One category would include the states of Orissa, West Bengal and Uttar Pradesh with a connectivity of 20 to 35%. This gives an impression that there may not be much social opposition to reform in these states, if the unconnected consumers are indifferent to the changes in power sector. Moreover Orissa has a tariff structure in which about one-fifth of the connected consumers pay a tariff higher than the cost of supply and they can be a source of support for tariff reform in that state. In general the gap between the tariff and cost is narrow for the majority of connected consumers in these states of Orissa, Uttar Pradesh and West Bengal. Thus even if people expected a small percentage (of around 10 to 12) of inefficiency in the cost of supply of their utilities, majority of these consumers would demand efficiency reforms there. Thus it may not be surprising to see lesser opposition to explicit measures of efficiency reforms such as privatisation in Orissa, as indirectly evident from the re-election of the state government which implemented privatisation at a time when electoral setbacks occurred to a number of state governments in India ostensibly due to reforms including those in power sector. (There may be an argument that the situation as in figure 9 is of current one and how this can be related the situation before privatisation in Orissa, which was carried out 5 years ago. It is evident from figure 10 (based on 50th round NSS conducted in 1993-94) that the situation in Orissa in terms of the relative position of tariff and cost before privatisation is not very different from the current situation.) This can also be an indirect indication of why the government, which is currently riding on a number of electoral successes in Uttar Pradesh, has been going ahead with the steps to privatise its government-owned utilities in power sector. Of course, the state of West Bengal has not embarked on a reform of its SEB, which caters to areas other the metropolitan capital city of Kolkatta (where a private company distributes electricity). However it should be noted that not implementing these reforms in West Bengal is not due to any fear of an electoral set back, where a left coalition has been ruling for the last 25

years and where a strong and credible opposition party or coalition that expect to give a tough fight to the ruling coalition does not exist.

The other category of states described in figure 9 comprises of Kerala, Tamilnadu and Andhra Pradesh with a connectivity of about 80%²⁸. Out of these three, in Kerala and Tamilnadu almost every consumer pays an average tariff less than the cost of supply, where as in Andhra a small percentage of connected consumers pay a tariff rate higher than the cost of supply. Considering that almost everybody pays a tariff lesser than the cost and these connected and subsidised consumers constitute the majority of households in these states, one should not expect much support for tariff reform here. The gap between tariff rate and cost of supply in these states is so wide that even if people believe that 30 to 40% of the cost of supply is due to the inefficiencies of the corresponding utilities, majority can be indifferent to efficiency improvements (with the given quality) if they do not expect further reduction in tariff as efficiency improves. Thus it is unlikely to see the majority of consumers (and of all households because of the higher percentage of connected households) demanding or supporting any major efficiency measure (such as privatisation) in these states. Of course this pattern can change if connected consumers incur a significant loss due to the poor quality of electricity supply, which is analysed in the following section.

10.4 Distribution of Losses due to poor quality of electricity supply

Some insights on the quality of supply in these states can be obtained from Table 9. The duration of power cut is lower in Tamilnadu. Even if there is no declared power cut, a significant number of consumers do encounter power failure. For example, in Kerala where there is no declared power cut, about 55% of connected consumers face power interruptions. Most households in Orissa encounter a power cut for 1 to 1.5 hours. The power failure is probably worst in Uttar Pradesh (UP) with about

²⁸ According to Census 2001, about 22% of the households in Kerala do not have electricity connections. However it was argued that there were intensive efforts to give new connections during the last four years. In our survey, which is representative enough, it was seen that about 19% do not have connections. Probably there might have been some reduction of the percentage

70% households live without power for about 9 hours (probably during the day and a few hours in the evening).

The sources of energy (mainly for lighting) used by different households in these six states during power cuts are given in Table 10. In states where power failure is for longer durations such as UP, Andhra, Orissa, and West Bengal, the most used alternative source is kerosene lamp. However in states such as Tamil Nadu and Kerala, where power failure is for a shorter duration candles are also being used as frequently as kerosene lamps. One can also attempt a ranking of the states based on the quality of electricity supply. If we take the share of sample consumers who have not faced any power failure (during the last 24 hours) as an indicator, then these states follow a ranking of the order (a) Tamilnadu (b) Kerala (c) West Bengal (4) Orissa (5) Uttar Pradesh (6) Andhra Pradesh. However it is well known that the cost of power failure is more when it occurs at an unexpected time and also when power is in need (for example during the evening hours for homes). For example Andhra Pradesh has a managed power cut in which power is not provided to households during the daytime but given to agricultural consumers. That is why about half of the sample households 'do nothing' during such power failures (instead of using kerosene lamps, candles, etc.). If the percentage of households who have to incur some additional expenditure is considered, the ranking would follow a slightly different order as follows: (1) Tamilnadu (2) Kerala (3) Andhra Pradesh (4) West Bengal (5) Orissa (6) Uttar Pradesh. This ranking can also be related to the reform measures that have been taken in the states. Considering that Orissa could be privatised²⁹ and Uttar Pradesh is in an advanced stage of privatising the utilities and Tamilnadu and Kerala continue to have State Electricity Boards owned by the government, one can speculate that if the existing quality is very poor then reform is more likely. On the other hand if the prevailing quality is not so poor, then it is likely that such not-so-bad quality might have achieved through political pressure building and higher governmental expenditure, and under such a situation reform is less likely to happen since majority may have something to lose in the short-run.

of households without electricity connections in Kerala during the last four years, and it is likely to be around 20%.

²⁹ Poor quality of electricity supply in Orissa currently cannot be taken as the outcome of privatisation, since quality was worse earlier and has improved significantly of late as discussed in a later section.

Moreover, the reform in this situation is more likely to be driven by the need to reduce the governmental burden, which has built up to provide this not-so-poor quality, and hence it is more likely for people to oppose if they do not see the potential benefits of diverting the governmental expenditure from power sector.

Figure 9: Tariff Rate and Cost of Supply

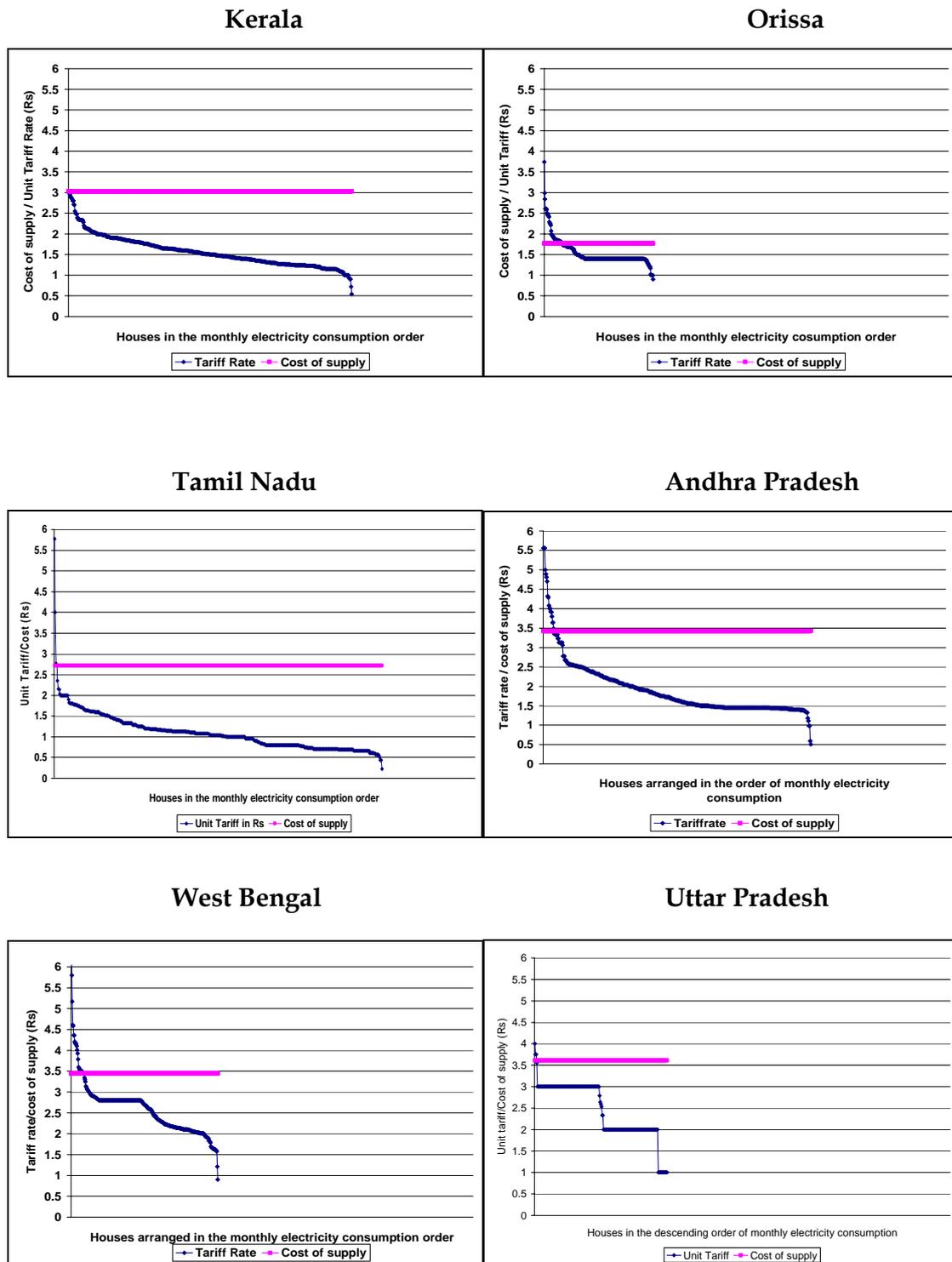


Figure 10: Unit cost and tariff of Orissa as per NSS 50th round (1993-94)

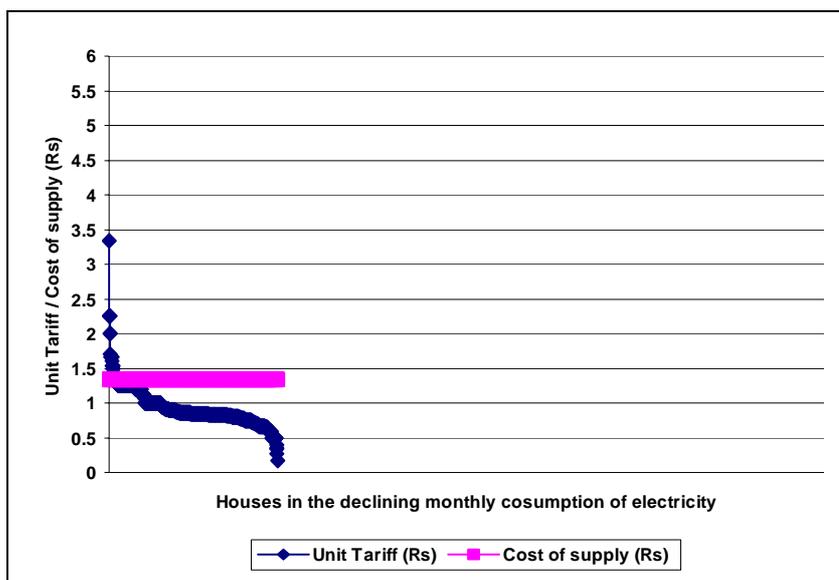


Table 9: Duration of power failure/ power cut encountered by connected consumers during the last 24 hours (on the date of survey)

Duration of power failure in minutes	Percentage of connected households					
	Kerala	Orissa	Tamil Nadu	West Bengal	Andhra Pradesh	Uttar Pradesh
No powercut	44.3	29.3	54.2	33.8	21.4	28.2
1-15	3.4	3.0	16.2	3.2		
15-30	13.1	4.9	9.8	9.4	2.4	
30-45	3.4	3.0	.9	2.9		0.3
45-60	8.3	18.1	6.6	18.5	2.8	1.2
60-90	4.9	9.9	5.5	8.8		
90-120	4.7	25.5	5.2	7.8		
120-180	6.1	3.6	1.4	14.3		0.3
180-240	4.5	2.2	.2	.6		
240-300	2.3	0.3		.3	20.9	
300-360	.6			.3	29.4	
360-420	1.3				4.1	0.6
420-480	.9				10.0	0.3
480-540	.4	0.3			6.3	
540+	1.7				2.6	69.1
Average duration of power failure in minutes	73.15	94.34	21.82	58.44	281.18	645.31

Table 10: Source of alternative energy used for lighting during power failure

Source of energy	Percentage of connected households					
	Kerala	Orissa	Tamil Nadu	West Bengal	Andhra Pradesh	Uttar Pradesh
No powercut	45.1	19.2	49.9	20.1	5.4	6.5
Cut was at Day time/Did nothing	29.0	8.2	30.3	15.6	53.2	17.1
Kerosene Lamp	9.3	48.8	7.7	34.7	28.1	60.6
Candle	7.0	1.1	8.4	2.3	11.3	1.2
Emergency Lamp	3.8	5.2	0.7	3.6	0.9	2.4
Inverter	1.5	0.3	0.2	1.0		3.2
Kerosene + Candle	2.7	9.6	2.5	5.2	0.9	8.5
Kerosene + Emergency	1.1	3.8	0.2	6.5		
Candle + Emergency	0.6	1.1		1.3		0.3
Kerosene + Other		1.9				
Inverter + Generator		0.5				
Kerosene + Candle + Emergency Lamp		0.3			0.2	
Kerosene + generator				0.6		
Emergency lamp + Inverter						0.3
Emergency + Generator				1.0		
Own Generator				8.1		
Total	100	100	100	100	100	1000

Those who use kerosene lamp or candles during power failure usually spend less than what they would have spent had there been no power cut. This can be demonstrated by an example given in the following box.

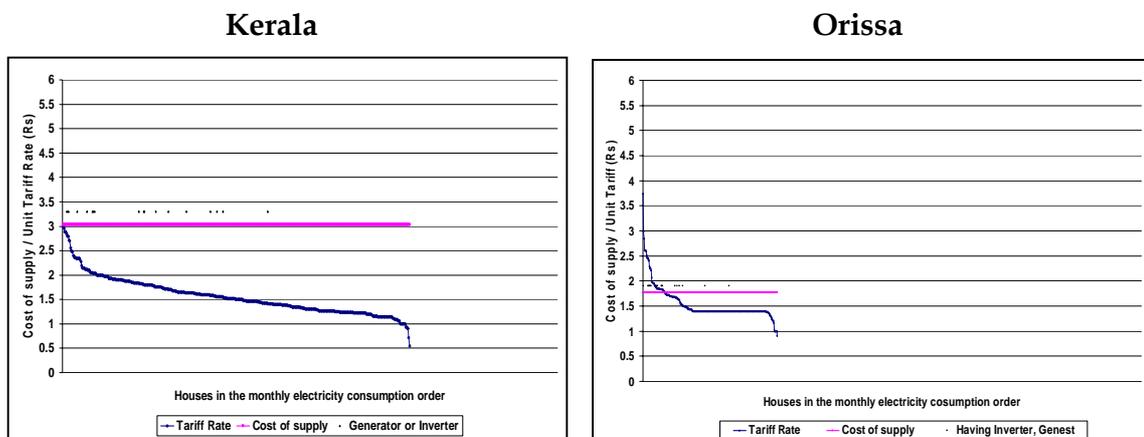
We can consider one household taking 100 units of electricity per month, paying 200 Rupees. Taking that about 60 units are used for lighting and fans in the evenings, this works out to about 2 units per day (for about 3 hours) costing 4 Rupees. If there is a power cut for one hour the expenditure on electricity tariff comes down by 1.3 Rupees. However in most cases, the expenditure on kerosene lamps for this one hour would be less than 1.3 Rupees, since they tend to use one or two such lamps, instead of three to four electricity bulbs and a couple of fans, if there were electricity supply. When the power failure is for shorter periods and not so frequent, people use candles, the expenditure in this regard too follow the same pattern as kerosene lamps.

Thus the losses on account of the use of kerosene and candle are not estimated here. There are some important implications due to this fact that the expenditure on such coping strategies (i.e., use of kerosene lamps/candles) followed by most of the

connected consumers at times when power is required but not available, does not add much to their monthly expenditure that they would have incurred if there were uninterrupted power supply. This indicates that their willingness to pay for better quality supply, if we consider their expenditure on coping strategies as their revealed preference, is not significantly more than their current expenditure. This can also create a situation in which these consumers (using kerosene lamps/candles) are unlikely to support reforms just because of their spending due to poor quality of supply.

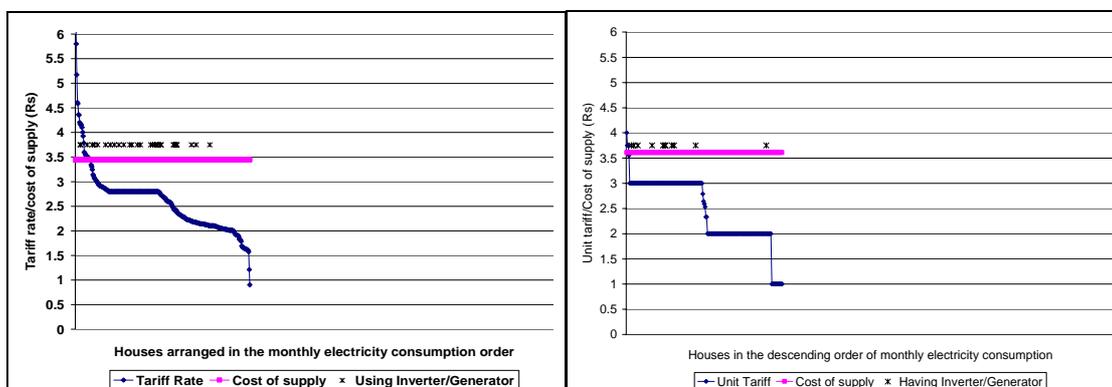
However there are some consumers who use generators or invertors. The annuity (or monthly equivalent charges) of the capital cost of these equipments plus their operating costs would be generally higher than the tariff rates for electricity prevailing in India. Taking note of this, we have marked those consumers using such instruments in Figure 11, as points above the costs of supply. It may be noted that almost no one in the sample use these equipments in Tamilnadu, probably due to the better quality of supply. Though the use of such equipments is not so widespread, it is more prevalent among those who use more electricity in these states. This can be reckoned as an added reason for a significant section of the connected consumers in Orissa/UP to support the reform. However in general, the number of consumers using inverter/generator is not large enough to induce majority of the consumers who are currently enjoying an average tariff much lower than the cost of supply to support tariff reforms in states such as Kerala.

Figure 11: Consumers using instruments like Inverter, Generator etc



West Bengal

Uttar Pradesh



Another dimension of the quality of supply is stability of the voltage. Significant sections of the sample households have reported (as evident from Table 11) low voltage problem. By and large, the ranking of the states in terms of voltage fluctuations follow the ranking based on other dimensions of quality such as the percentage of people using alternative sources during power failure. In spite of the low voltage problem, more than three-fourth of the households in three states and about half of the households in one state have not taken any measure (or bought any equipment) to avoid the repercussions of the voltage fluctuations. This too indicates indirectly the low willingness to pay for better quality for the majority of consumers. The relatively lower percentage of households facing low voltage problem and a larger share of households not using any equipment to control voltage fluctuations in Andhra Pradesh may be indicating the 'managed power cuts' in the state in which power cut is enforced during day time to provide supply to irrigators, and better quality power is provided during the rest of the day.

Table 11: Percentage of connected consumers experiencing low voltage and following different coping strategies

Method used	Kerala	Andhra Pradesh	Tamil Nadu	Orissa	West Bengal	Uttar Pradesh
Percentage of consumers who experience low voltage problem	24.2	31.8	27.3	35.9	54.9	42.6
No answer/Not doing anything	5.8	88.4	72.7	32.1	77.5	99.7
Bought a UPS	-	-	1.6		0.6	-
Low voltage Bulb/Tube	19.5	-	2.3	19.1	5.3	-
Stabilizer	3.9	9.6	23.4	26.7	16.6	0.3
Low voltage bulb/tube + Stabilizer	3.9	-	-	5.3	-	-
Low voltage bulb/Tube + Others	0.8	-	-	8.4	-	-
Stabilizer + Others	-	-	-	0.8	-	-
Others	21.1	2.1	-	7.6	-	-
Total	100	100	100	100	100	100

Summarising the discussion on the impact of the distribution of losses due to poor quality of supply, such losses per se is not changing the net gain/loss position of the majority of consumers. Though the section of consumers using costlier sources of alternative energy (such as generators) can be addition to the support base for reform that is not sufficient enough to change support pattern in states such as Kerala where majority are connected and getting the benefit of electricity supply.

10.4 Extent of support for reforms for reasons beyond subsidy and quality of supply

In order to know whether people support reforms (also due to reasons beyond tariff and losses in terms of domestic consumption) we have asked their stated preference on two issues. In all the states, there was a question in the survey whether they are willing to pay a higher tariff for an improved quality of supply³⁰. In addition, a

³⁰ There is an issue whether people would abide in reality by what they state as their preference. Sinha (2005) notes the case of Haryana where 69% of farmers favoured metering according to World Bank (2001), but in reality they prefer to take connections without meters. Lal (2005) too notes this apparent disconnection between the stated willingness to pay higher prices and the actual implementation of tariff reform. However the reasons for this disconnection needs further analysis. Several studies have noted that farmers will pay more if quality is improved. However it should be noted that the major objective of the reform is to make utilities financially viable by sustaining the present quality, and such studies have not said that people are willing to pay more to sustain the current quality. Moreover as noted by Ranganathan and Ramanyya (1998), people are not willing to pay more if the quality is already good.

question 'whether you support privatisation of the utility' was asked in states where privatisation have not been attempted so far, as an indirect way of knowing their stated position on efficiency reform. (This question was avoided in Orissa since privatisation was already attempted there.) We can analyse the response to these questions separately for those who pay near cost of supply or more as tariff (and/or have generators/invertors) and those who get heavily subsidised tariff (and/or do not use costlier alternative sources). This is for the reason that the support for reforms among the former set of consumers can be influenced by their tariff and losses, where as if any in the latter set support reforms it is likely due to reasons beyond tariff and expenditure on alternative sources (since their tariff and such expenditure do not encourage them to support reform). This is an indirect way of understanding how many consumers support reforms in spite of being beneficiaries of subsidised tariff (even after considering the additional expenditure due to poor quality), probably due to economy-wise losses or higher opportunity cost of governmental expenditure. The related statistics on these questions are summarised in Tables 12 and 13. In general, the willingness to pay is more among those who pay higher tariff or who use costlier alternative sources. This is also indicated indirectly in Table 14, which shows the average monthly electricity consumption of those who consider their electricity board not being managed efficiently is higher the average consumption of people who treat their SEB efficient. Table 12 shows that a higher percentage of consumers are willing to pay more tariff to improve the quality of supply in states such as Orissa, West Bengal and Uttar Pradesh, where the quality of power supply is poorer. Such higher willingness is there in these states even among those who do not use costlier alternative sources or who currently gets electricity at subsidised tariffs. It is notable to see the higher support for privatisation in Uttar Pradesh (which is currently undergoing that process) compared to other states across all groups (irrespective of the tariff paid or the use of costly alternative sources).

Another picture emerging from Tables 12 and 13 is that in states such as Kerala, Tamilnadu and Andhra Pradesh, where the majority of all households get the benefit of subsidy, only 10 to 15% of those who gets high subsidy (i.e., more than Rs. 50 per unit) or who do not use costlier alternative sources are willing to pay more

(and hence support tariff reform) or supporting privatisation (i.e., efficiency reform). This would mean that in these states only this small percentage of consumers is willing to support reform despite being beneficiaries of subsidy for whatever reasons. Thus the losses due to reasons beyond tariff and quality of supply are adequate to encourage only 10 to 15% of the beneficiaries of the net subsidy (total subsidy minus losses due to poor quality) to support reform in these states. This fact along with the distribution of subsidy and the not-so-high losses due to poor quality constitute a strong disincentive to support power sector reforms for the majority of households in these states.

Thus it may not be surprising to see both the previous left-led government and the current congress-led one in the state of Kerala, unwilling to take any substantial step to reform its power sector. The SEB in the Tamilnadu too continues bundled and government-owned. The limited tariff reform during the initial years of the present government in Tamil Nadu is considered a factor behind the electoral setback for the ruling party in the Parliament elections conducted in the state last year. Andhra Pradesh could not implement privatisation, and the partial reforms including the making of utilities into corporations were seen as a reason for the electoral debacle of the state government there.

Table 12: Percentage of consumers within a tariff rate group who are ready to pay more for better quality supply

		Willingness to pay for better quality					
		Kerala	Tamil Nadu	Orissa	Andra Pradesh	West Bengal	Uttar Pradesh
Those who use generator/inverter	Yes	38.89	-	70.59	40.00	36.36	33.33
	No	7.65	12.53	17.82	15.20	25.45	38.72
Those who pay nearer ³¹ or more than cost of supply	Yes	25.00	40.00	20.59	21.21	10.00	25.00
	No	8.33	12.21	18.64	15.02	29.10	38.69

³¹ The consumers who pay more than the cost of supply or with a subsidy of an amount less Rs.50 per unit are grouped under this category.

Table 13: Percentage of consumers within a tariff rate group who are ready to support privatisation

		Privatisation				
		Kerala	Tamil Nadu	Andhra Pradesh	West Bengal	Uttar Pradesh
Those who use generator/inverter	Yes	61.11	-	20.00	27.27	41.67
	No	12.94	10.38	13.44	13.09	42.68
Those who pay nearer or more than cost of supply	Yes	25.00	20.00	12.12	20.00	50.00
	No	14.34	10.28	13.62	13.81	42.56

Table 14: Average consumption of electricity for those who consider the electricity board efficient

State	Managing Efficiently	Not managing efficiently
Kerala	124.01	149.63
Andhra Pradesh	81.93	93.74
Tamil Nadu	136.10	189.42
West Bengal	213.00	203.50
Uttar Pradesh	113.85	171.44

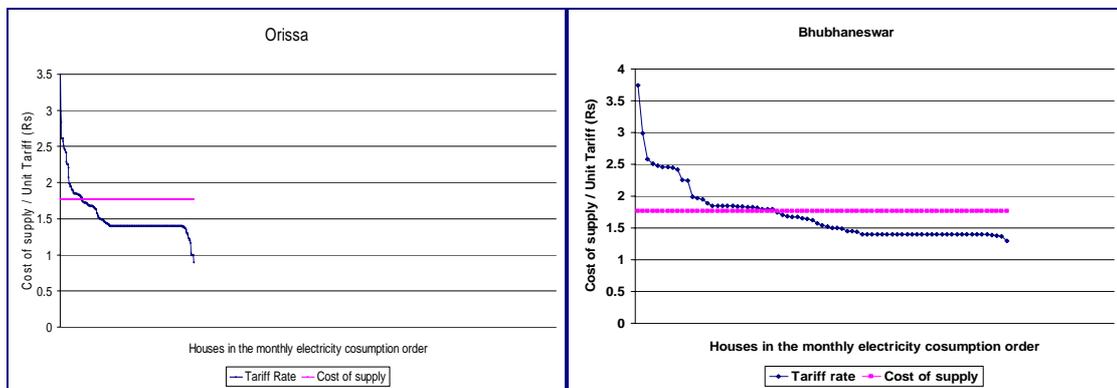
The discussion so far has shown that in states where connectivity is higher and where majority gets electricity with subsidy, either the losses due to poor quality or others factors (such as the economy-wide losses due to unviable power sector) may not be adequate to induce sufficient support for power sector reforms. Does this mean that this situation prevails through out the state or will there be a different situation in the cities of the same states? This question is also important while noting that a city-state like Delhi could go ahead with reform despite high connectivity and a significant section of the population getting electricity at subsidised rates. Thus the following section analyses the situation in the city vis-à-vis the state as a whole.

10.5 The extent of possible support for reforms in cities verses the states as a whole

Even in states with very low connectivity as a whole, cities have higher percentage of households with electricity connections. Moreover, the per-household consumption of electricity in cities tends to be higher than that of the state as a whole. In order to see how this difference manifests in terms of the average tariff and losses due to poor quality supply, the comparative situation of Orissa state as a whole vs. its capital city of Bhubaneswar is given in Figure 12. As evident from this

picture, the average tariff becomes greater than the cost of supply for a higher percentage of households in the city (than that of the state as a whole). This is due to the increase in the per-household consumption of electricity. Similarly more number of households in the city use invertors or generators. Out of the 17 users of generators in our sample from Orissa, 14 are from Bhubaneswar. The stated readiness to pay more as tariff and support for privatisation in cities is given Table 15. Except for two states namely West Bengal and UP, the willingness to pay more is in the cities, and except for Chennai in Tamilnadu, the support for privatisation is also more in the cities. This may indicate that there is likely to be more social support for reform in the cities. This can also be an indirect indication of why a city-state like Delhi could go ahead with full-scale privatisation, and the government, which carried out this reform, was re-elected in the subsequent election. The other insight that can be drawn from the situation of cities discussed here is that in states where reforms have not been attempted due to social opposition, it may be possible to generate adequate local support for reforming power sector in the cities, if their system can be unbundled reasonably³².

Figure 12: Average unit tariff and cost of supply in city vis-à-vis the state as a whole



³² It seems that such an attempt is being considered in the state of Karnataka.

Table 15: Readiness to pay more as tariff and support privatisation in city vis-à-vis the state as a whole

	Those who are ready to pay more for better quality of supply	Those who are supporting privatisation
Tamil Nadu	12.5	11.8
Chennai	17	7
Kerala	8.71	14.6
Ernakulam	10.38	18.87
Orissa	20.3	
Bhubaneswar	37.5	
West Bengal	26.6	14.6
Hoogly	23.2	22.2
Andhra Pradesh	15.5	13.5
Secondarabad	24.0	20.8
Uttar Pradesh	38.5	42.6
Lucknow	21.0	47.0

10.6 Impact of subsidised electricity connections to farmers: some preliminary observations

Some of the households surveyed get the benefit of highly subsidised electricity connections. The percentage of these households is not more than 15% even in states such as Andhra and Tamil Nadu (with the exception of Punjab with a figure of 18) where the share of agricultural consumption is considerable. Though 37% of households in the survey use pumps in Kerala, only 8.7% have separate connections for irrigation getting the benefits of subsidised electricity. Even though 21% of households in Orissa irrigate land, only 1% uses electricity. About 19% of those who irrigate use canal water. Small plots of land and lack of availability of water prevent majority from irrigation. Power subsidy to farmers may not be a major political issue in Kerala and Orissa. However the 12% of households who gets the benefits of electricity subsidy for irrigation in addition to that for home consumption in Tamil Nadu and Andhra Pradesh might be adding to the counter reform forces there. It should also be noted that such farm connections are concentrated in certain regions in states like Tamil Nadu, Andhra, and so on.

Though the cost of supply to agriculture can be considered lower than that of domestic consumers in general³³, agricultural consumers still get a larger subsidy due to their very low (sometimes zero) tariff³⁴. It would be interesting to know who are these subsidised farmers in terms of their income/asset position. Table 17 classifies these farm-power connections in terms of their monthly domestic consumption of electricity, which is taken as an indirect measure of their affluence (The validity of this indirect indicator is verified in a later section). This shows that very few from the poorest have farm connections, whereas the rest of the population have by and large an even representation. It is also quite likely that 40 to 50 per cent of these farm connections are held by the upper 30% of the population. However based on the study of these six states we cannot provide any definitive insight on the impact of power subsidy for irrigation on reforms, and it is expected that more issues in this regard will become clearer as the remaining parts of this study are completed.

Table 16: Percentage households with power connections for agriculture in major states of India

State	Percentage of households with power connections for agriculture
Kerala	5.9
Andhra Pradesh	11.5
Tamil Nadu	11.6
Uttar Pradesh	2.6
Orissa	0.5
West Bengal	0.6
Haryana	10.0
Maharashtra	11.7
Madhya Pradesh	12.2
Karnataka	12.5
Punjab	18.6
Bihar	2.0
Gujarat	6.0
Rajasthan	6.7

³³ Such an approach is taken by the Andhra Pradesh Electricity Regulatory Commission (APEREC), since power supply to agriculture is interruptible and is in non-peak hours. Thus it has fixed a cost of 1.61 Rupees per unit for agriculture whereas that of domestic consumption is 3.86 in 2004-05. However the subsidy per unit is higher for agriculture since the average recovery is only 0.36 Rupees per unit, whereas that of domestic consumption is 2.41 Rupees. (This data is taken from Tariff order, APERC, 2004-05).

³⁴ There is also an issue of the extent of electricity subsidy going to agriculture because of the tendency of electricity utilities to account a part of T&D losses to agricultural consumption (See, Gulati and Narayanan, 2003)

Table 17: Distribution of farm-power connections based on the deciles of monthly intake of electricity for domestic consumption

Deciles	Tamil Nadu	Andhra Pradesh
1	-	-
2	-	-
3	3.64	-
4	21.82	5.97
5	25.45	14.71
6	18.18	25.37
7	1.82	16.18
8	3.94	25.37
9	23.64	11.76
10	32.73	8.96

10.7 Perceived linkage between government expenditure in power sector and the provision of other governmental services

The data from the primary survey shows that the majority of households do not see the linkage between government expenditure in power sector and the provision of other public services (Tables 18 and 19). The situation in Andhra Pradesh, where about half of the connected consumers see such linkage, might need some explanation. One reason could be that majority of these domestic consumers see the subsidy given to the agricultural consumers costly (where as the former may not be seeing the subsidy given to their domestic consumption as costly). As a consequence of the neglect of the linkage between electricity subsidy and other governmental service by the majority, only a minority support the idea of improving the quality of other governmental services by charging more for electricity. (The case in West Bengal needs some explanation, but that cannot be given with the available information.)

Table 18: Percentage of those who think that provision of electricity at subsidised rates affect the provision of other governmental services

State	Percentage
Kerala	26.1
Orissa	14.8
Tamil Nadu	4.3
West Bengal	26.0
Andhra Pradesh	56.6
Uttar Pradesh	49.4

Table 19: Preference of electricity subsidy Vs other governmental services with better quality

State	% of those who prefer continuation of electricity subsidy	% of those who prefer improving governmental services by increasing electricity charges
Kerala	76.82	23.18
Orissa	56.14	28.07
Tamil Nadu	55.56	5.55
West Bengal	24.05	68.35
Andhra Pradesh	48.16	21.10
Uttar Pradesh	59.5	21.4

10.8 Some state-specific insights

10.8.1 Case of Orissa

The survey carried out as part of this study has also brought out some state-specific issues. Because of the implementation of privatisation in Orissa about five years ago, a few questions were included in the survey to know how consumers perceive the change in the performance of power sector during the last three years. It may be noted that privatisation could not be carried out completely in Orissa, since one private company, which had taken over a utility, had left the scene in between leaving it back to the public sector transmission company. Moreover there is hardly any competition because of the limited interest shown by the private companies. This may indicate that in a poorly connected state such as Orissa, even if there is no major opposition to privatisation, this need not take place fully leading to competition, because many private companies may not be interested in carrying out the task of electricity distribution under such a condition. (This can be reckoned probably as the manifestation of the 'thin market' visible in the early stages of electricity distribution in an area, discouraging the entry of private companies). However it would be insightful to analyse how consumers feel about the changes in power sector as an outcome of the limited privatisation carried out in Orissa. The descriptive statistics of the answers to these questions are summarised in Table 20. The data on the same questions from other states is also given here to get a comparative picture. The important insight is that the majority of the surveyed consumers see an improvement in the quality of the service in Orissa. They have noted that the tariff has increased during this period, but consider such increase

reasonable given the improvement in the quality of service. The improvement in Orissa seems to be faster than that in Tamil Nadu, probably due to the better situation already prevailed in the latter state.

Table 20: Improvement in performance during the last three years

	Response	Orissa (%)	Tamil Nadu (%)	West Bengal (%)	Andhra Pradesh (%)	Uttar Pradesh (%)
Compared to the situation three years ago, the frequency and duration of power cut has	No response	3.0	11.2	2.3	0.7	30.6
	Came down	77.5	57.9	89.0	39.7	47.4
	Increased	11.8	7.5	2.3	5.7	13.8
	No change	7.7	23.5	6.5	54.0	8.2
Compared to the situation three years ago, the voltage problem has	No response	2.2	11.4	1.9	0.9	29.1
	Improved	73.7	45.1	78.9	24.4	27.9
	Worsened	12.3	4.3	3.6	2.6	32.6
	No change	11.8	39.2	15.6	72.1	10.3
Given the changes in quality, do you consider the change in tariff	No response	3.0	22.3	9.1	19.8	22.6
	Reasonable	52.3	44.4	35.7	9.2	14.7
	Unreasonable	32.6	19.1	32.8	66.2	53.2
	Can't say	12.1	14.1	22.4	4.8	9.4
How is the situation related to billing /bill payment today, compared to three years ago?	No response	7.7	12.1	4.5	1.3	23.2
	Better	68.8	37.8	48.1	37.0	25.6
	Worse	10.4	2.7	6.2	3.1	34.1
	No change	13.2	47.4	41.2	58.6	17.1
How is the line staff's response compared to three years ago	No response	6.85	11.8	6.8	1.3	16.5
	Better	64.11	32.6	46.1	30.1	27.9
	Worse	12.33	5.5	1.0	3.1	28.8
	No change	16.71	50.1	46.1	65.6	26.8
How is the customer satisfaction compared to three years ago?	No response	9.86	14.6	24.4	5.2	14.1
	Better	55.07	27.1	34.7	22.2	25.3
	Worse	9.86	3.9	2.9	1.1	30.0
	No change	25.21	54.4	38.0	71.5	30.6

10.8.2 Case of Kerala

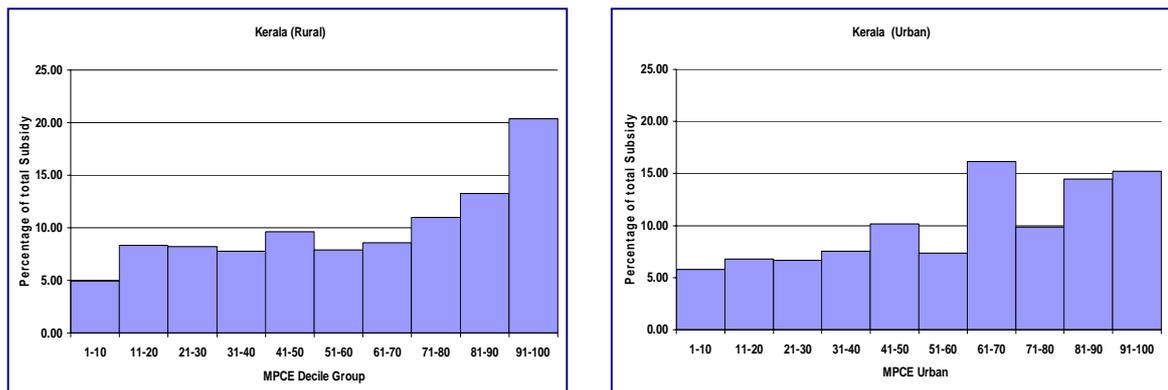
The study has also brought out some salient features of the power sector of Kerala. No restructuring (such as unbundling, corporatisation, privatisation) has been carried out as part of efficiency reform in the state, even though certain austerity measures such as the reduction in the number of staff positions have been taken by the current administration to reduce the cost of the utility. Almost all residential consumers receive electricity at rates lesser than the cost of supply. Even though those who consume more units pay an average rate higher than that paid by those who consume less, the distribution of the total quantum of subsidy is highly

regressive in the state³⁵. This is evident from the figure 13. Though no major steps have been taken to reform power sector (other than the establishment of regulator and some austerity measures within KSEB), the general economic reforms carried out in the country as a whole have been somewhat helpful for the power sector of the state. The reduction of interest rate in the country, as part of the macroeconomic reforms, has reduced the cost of capital and borrowings for KSEB and it could carry out swapping of high-interest loans with low-cost ones to some extent. The implementation of Availability Based Tariff in the exchange of power in the national power grid between State Electricity Boards and centrally owned power generation companies has reduced the cost of imported power for KSEB because it could use its hydroelectric capacity at times when the national-grid power is costlier. The fear of privatisation generated as part of the discussions on power sector reforms have also made electricity employees' unions reluctant to oppose milder organisational changes within KSEB such as the abolition of a number of positions. All these have reduced the gap between the revenue and the expenditure of the KSEB significantly, even though there still exists a shortage of about 6500 Million Rupees. The quality of supply is not poor, and there is not any declared power cut currently. Yet about 55% of households encounter power interruptions possibly due to faults or repairs in lines, transformers, substations, transmission lines, etc. This shows that buying adequate amount of power is not sufficient enough to provide uninterrupted power supply in Kerala, and it might require large investments to avoid interruptions of all kind. Though 80% of the households think that 24-hours power supply is important, only 8% of the consumers are ready to pay a higher tariff for better quality supply. Thus consumers are not willing to pay more for such a high-quality supply even though they wish to have 24 hours uninterrupted electricity. This may indicate that the current quality (though it is not good) is probably the one economically demanded by the majority of the consumers of the state. Kerala's power sector is in a state, where everybody (except 20% who do not have electricity) gets electricity at subsidised rates at a level of quality not so poor. That may be the reason why only 15% of sample households in Kerala prefer privatisation (even though a slightly higher proportion of 27% in the city of Cochin prefers privatisation). Thus drastic

³⁵ This is true for most of the states of India, as discussed in Santhakumar (2004)

reforms are not liked in Kerala but small reforms are brought about through the ‘voice³⁶’ options available before the society, which include frequent newspaper articles on the inefficiency and corruption in the electricity board. However the situation cannot be considered equitable. This is not only due to the retrogressive distribution of the subsidy. There are about 20% households without electricity. Considering that only about 12% of people live below poverty line within the state, it may be safer to assume that majority of the unconnected consumers are poor and that the majority of the poor are unconnected. There is also a regional bias in the quality of supply and connectivity in Kerala as evident from Table 21. It can be seen that North Kerala has relatively poorer quality of supply and this region and highlands in general have more unconnected households. The situation is also not sustainable at this level. As per capita residential consumption increases, the financial burden can increase due to two reasons (1) the subsidy burden goes up as those who consume more gets more subsidy in total (2) the increased demand for electricity may have to be met through the costlier imported power. The lack of any structural improvements in the efficiency of KSEB would also mean that the changes made so far can be ad-hoc and reversible, and the organisation as a whole is not tuned to take up the future challenges in power sector.

Figure 13: Distribution of Electricity Subsidy among different MPCE deciles in Kerala



³⁶ Here ‘voice’ is seen as in Hirschman (1970)

Table21: Regional picture of quality of supply and unconnected households in Kerala

District	Average powercut in minutes	Percentage of unconnected households
Alappuzha	55.77	14.29
Thrissur	39.18	3.96
Pathanamthitta	74.02	18.81
Ernakulam	53.80	0.94
Kasargode	108.03	31.91
Malappuram	119.64	3.03
Total	73.15	11.85

10.9 *The relationship between the quantum of consumption of electricity and the income/assets of the households*

The discussions in previous sections (10.3 to 10.7) were based on a ranking of households in the (descending) order of their consumption of electricity, in order to analyse their response to reforms. Does this order indirectly reflect the income ordering that exist in the society? Though this may seem to be the case based on common sense, we have carried out some exercise to verify this issue. Different rounds of NSS data provide per capita expenditure (which can be taken as proxy for income) and the units of electricity consumed. Previously carried out regression exercises with different rounds of NSS data, with per capita income as independent variable and units of electricity consumed as dependent variable has shown a positive relationship. Our primary survey has not collected information on income or expenditure of the household. However it has information on the features of a major asset of the household, i.e., house. The type of the roofing material (such as concrete, tiles, or thatch) and flooring material (such as marble, mosaic, cement, clay) of the households are known from the survey. Tables 22 shows the average monthly electricity consumption of the households having each of these roofing and flooring materials. These results indirectly show that it is not reasonable to assume that those who consume more electricity are in general those who have higher incomes. Thus the insights based on per household consumption of electricity can be generalised on the basis of income groups. Thus the implications of the research results of the study are discussed in the final section by considering different income groups.

Table 22: Average monthly consumption of electricity by floor and roof type

		Kerala	Orissa	Tamil Nadu	West Bengal*	Andhra Pradesh	Uttar Pradesh
Roof	Concrete	186	197	186	212.40	158.04	167.67
	Tiles	104	154	100	43.17	86.65	66.67
	Coconut Leaf	77	91	85	3.80	68.62	8.33
	Others	94	198	89	72.60	65.01	1000
Floor	Mosaics	200	228	287	376.16	110.26	394.43
	Marble	220	264	272	213.20	243.63	485.71
	Red/Black Oxides	135	115	83	186.73	94.82	110.04
	Cement	98		142		63.55	315.00
	Mud	54	177	117	29.31	64.68	60.98

10.10 Some insights on unconnected households

The primary survey has also brought out some information on the unconnected households. Of course the survey sample was not designed to reflect the share of the unconnected households in the population, mainly due to the fact that unconnected villages were by and large excluded from this survey (though we have carried a few case studies to know the problems in such villages). Thus the unconnected households in the sample are those located in connected villages, but the particular household is not connected. Table 23 shows the reason for being unconnected. About 15 to 30% of these unconnected households have applied and waiting for connections, showing the delays on the part of the utility in this regard. The others have cited reasons of affordability. Table 24 shows the percentage of connected and unconnected households with specific materials used for roofing and flooring their houses. These materials indirectly reflect the income/assets of the households. These show that more of the unconnected households are in general use materials reflecting lower levels of income/assets.

Table 23: Reason for not having electricity

Reason for not having electricity	Kerala	Andhra Pradesh	Tamil Nadu	Orissa	West Bengal	Uttar Pradesh
Applied and Waiting	23.9	13.2	8.3	29.0	33.3	4.4
House Not Good For Electrification	8.5	7.9	5.0	8.1	8.5	23.7
More Expense for bringing Line to house	15.5	31.6	-	25.8	24.8	3.7
Wiring Expense cant afford	5.6	5.3	1.7	3.2	.9	17.5
Monthly Bill cant Afford	1.4	31.6	-	8.1	14.5	21.9
Financial Reasons	29.6	7.9	73.3	22.6	17.9	14.4
Other reasons	15.5	2.6	11.7	3.2		14.4
Total	100	100	1000	100	1000	100

Table 24: Household features of unconnected households

Roof

Roof type	Kerala		Andhra Pradesh		Tamil Nadu		Orissa		West Bengal		Uttar Pradesh	
	U	C	U	C	U	C	U	C	U	C	U	C
Concrete	10.1	43.9	16.7	49.2	14.5	56.2	10.8	47.0	15.6	70.8	87.8	12.2
Tiles	52.2	50.2		4.4	41.9	37.9	19.6	22.2	57.3	17.2	50.0	50.0
Thatch	18.8	1.3	69.0	21.8	41.9	5.5	68.9	30.2	11.5	1.0	20.7	79.3
Others	18.8	4.5	14.3	24.6	1.6	0.5	0.7	0.6	15.6	11.0	34.3	65.7

Floor

Floor type	Kerala		Andhra Pradesh		Tamil Nadu		Orissa		West Bengal		Uttar Pradesh	
	U	C	U	C	U	C	U	C	U	C	U	C
Mosaics	-	10.5	-	1.5	-	14.8	0.8	30.0	-	7.8	100	0.0
Marble	-	9.0	7.1	21.1	-	3.2	0.8	2.7	1.6	2.9	100	0.0
Red/Black Oxides	38.2	45.2	11.9	32.2	24.2	14.6	98.4	66.5	17.8	70.1	92.0	8.0
Cement	11.8	27.9	19.0	32.2	29.0	44.1	-	-	1.0	-	66.7	33.3
Sand	48.5	2.9	61.9	12.9	46.8	23.3	-	0.8	79.6	19.2	52.8	47.2
Others	1.5	4.6	-	-	-	-	-	-	-	-	-	-

11. Implications

No attempt is made to summarise the findings in this last section. However some issues that emerge out of the analysis of this study are highlighted here.

1. *The losses to the 'rich' is not sufficient enough to encourage political decision-makers to go ahead with reforms:* If we define the households coming within the upper two deciles in an income scale as the richer sections in India, probably substantial sections of this group lose due to the absence of power sector reforms, since they need to use costlier supplementary sources in spite of paying a tariff rate closer (if not higher) to the cost of supply. However their losses could not induce reforms in many states, as evident from a number of cases. In cases such as Orissa, where most of the losses are for this group, the implementation of reform might be facilitated by the presence of about 70% of households who are likely to be indifferent to the reforms due to lack of connections.

2. *The losses or gains for the poor due to reform are unlikely to influence the pace of power sector reform in Indian states.* Available evidence indicates that major sections of poor, who belong to the lower four deciles of households based on an income ordering, are by and large outside the coverage of power sector. This is due to the low connectivity of power supply among the poor in almost all states. Only a small section of the poor is connected to the grid, and hence only this minority among the poor receive the benefit of subsidised power supply provided to domestic consumers. (The poor are more likely to be employed in less power consuming industry and in agriculture and their level of employment is likely to be inversely related to power consumption³⁷). Even in states, where the government uses a significant part of its public finance to sustain the power sector, such spending does not benefit the poor for they are not connected. Moreover, high spending and consequent fiscal incapacity of the state government affects the poor negatively in two ways, first by reducing state's ability to extend connections to them and secondly by reducing resources for other public services that benefit them. Thus non-reform is likely to be more costly for most of the poor. However it is evident from the distribution of losses and the likelihood of reform that their losses/gains are unlikely to affect the political decision-making significantly.

3. *If middle class is the net gainer of the status quo, reform is likely to be delayed.* Here we can define the middle class as those households belonging to 3 to 6th deciles in a descending income scale. In cases where they are the gainers of the status quo (non-reform), the rate of tariff that they pay would be much lower than the cost of supply and their expenditure on alternative sources may not be high (probably due to not so poor quality of supply). This is indicated by the situation in Kerala, Tamil Nadu and Andhra Pradesh. The rural middle class would be receiving subsidised electricity not only for home consumption but also for irrigation in some regions of certain states. In

³⁷ There is also counter evidence indicating more employment in situations of green revolution where crop productivity is enhanced by the increased use of inputs including power.

such cases even if this middle class is not numerically powerful, their position in voting spectrum can make them decisive politically.

4. *Higher the level of consumption of majority of domestic consumers, easier to implement reforms* If people consume or need more electricity, they are likely to become net losers. This is for two reasons. As the monthly consumption increases, the rate of tariff increases and hence the gap between the tariff and cost of supply is reduced. Secondly, for those consumers, losses due to poor supply can also be high. For these two reasons T+L is more likely to be higher than the cost of supply. This can be an incentive to support (or not to oppose) reforms. Under such a situation, even a substantial section of the middle class becomes the net losers of reform, and hence they along with the richer section who are much more likely to be losers, constitute majority inducing political decision-makers to go ahead with the reform. The case of Delhi can be an example in this regard. This also indicates the possibility that power sector reforms can be initiated in major cities if the electricity distribution system can be adequately separated.
5. Though there are substantial problems of power failure and voltage fluctuations (even in states such as Kerala where there is no power cut or load-shedding officially today), majority of the consumers are not willing to pay much more for improving the quality. This is evident from their revealed preference in terms of the expenditure on alternative equipments and also from their stated preference in the survey. Those who are willing to pay more for better quality, on an average be around 15%. Probably almost no one are willing to pay more to sustain the current quality. This has important implications. If reducing governmental expenditure is the driving force for reform (which seems to be the case in a number of states), then either some involuntary tariff increase or some downward quality adjustment is likely to be unavoidable. (If reform causes establishment of a tariff close to the cost of supply, it may lead to the reduction in the quantum of electricity consumed by the subsidised consumers.) Otherwise, government transfer may continue to be necessary to sustain the current quality for majority of the consumers.

6. The research for this paper indicates that in many states, substantial part of the government expenditure in power sector goes to the upper middle class and richer sections of the society. This shows that it is possible to reduce the financial problem in this regard without affecting the lower income groups.
7. Power sectors reforms are probably easier in two situations in India. First is Orissa like situation where connectivity is very low, as in UP, Bihar, Assam, and so on. Of course we should not expect any enthusiastic participation of private players in this case, and probably only one party would show interest leading to a monopolist situation. The reforms may lead to an improvement in the quality of service of connected consumers who are willing to pay the cost of supply, but may not lead to any significant improvement in the level of connectivity. There may be a need for creative state interventions to enhance connectivity without creating efficiency problems for the utility. Such state interventions may include charging every connected consumers a surcharge to meet the cost of further electrification as attempted in the Philippines power sector (Asian Development Bank, 2003; Sinha, 2005) and something similar to the Access Deficit Charge used in Indian Telecom sector³⁸, and providing this money to public and private utilities on a competitive basis to carry out rural electrification efficiently.
8. Another situation where reform is more likely is in the cities. This can be a replication of Delhi or Ahmedabad pattern within other states. In Cities such as Bangalore or Hyderabad, there is likely to have more local social support for reform. Thus it seems politically viable to implement the strategy of first reforming commercially viable segments of the distribution network, as envisaged in World Bank (2004). The systems in these cities can be isolated to provide better quality service at near cost tariff structure. On the other hand, it may not be easier to have reforms in states (especially in the rural areas) where connectivity is significantly higher and where substantial sections of the population receive electricity at subsidised rates for residential and

³⁸ Such a surcharge may create minimum distortions and competitively neutral (Cremer et al, 1998).

agricultural consumption. Even if formal mechanisms such as regulators are put in place, and utilities are made corporations, substantial reforms may not take place in near future in terms of power supply to these areas.

9. The research in the paper indicates that the majority of households do not see the relationship between government expenditure in power sector and the provision of other public services. The reasons for such a state of affairs need further investigation, but one can make certain speculative observations here. If the provision of services other than power are not carried out efficiently (and also not in tune with the requirements of people), it is likely that people will not be willing to trade off the subsidy in power sector for other governmental services³⁹. There is also an issue of the impact of the distribution of tax burden in India that makes the opportunity cost of governmental resources invisible to many sections in society. The reforms in taxes, provision of other governmental services and that of a specific service such as power supply may have to go hand in hand so that citizens are in a position to internalise the opportunity cost of alternative distributions of public resources. This is especially important to have reforms in contexts and sectors, where the middle class or majority currently see themselves as net gainers of the status quo. (It may not be as important in contexts such as Orissa, where the direct costs and benefits themselves create a situation of lesser opposition to reforms). It may be noted that reforms may be needed even when the majority of citizens see the status quo as beneficial for the fiscal balance considerations of the government or to make the sector capable to deliver a service to take economy to a higher equilibrium. (It is quite likely that majority of citizens may not see the dispersed and uncertain benefits clearly as the direct benefits of the status quo, and this can discourage them

³⁹There are impressionistic observations of many that given the overall weak accountability of public spending in India few would believe that a financially viable power sector would help the government free up funds for health, education and other social sectors. See Lal, 2005: 650. However his use of data from Delhi in which only poor says that the quality of power has worsened since 1998, as an evidence of the perceived low opportunity cost of governmental expenditure in power sector can be a problem. Since connectivity is much higher in Delhi, even a significant section of poor is connected, and hence their perception of power situation can be influenced by the direct costs of reform such as the need to pay a higher tariff.

from being the supporters of reforms driven by the needs to take economy to a higher equilibrium).

The research has also generated a part of the much-needed data to facilitate public discussion and decisions on power sector reforms. Currently, compiled data is not available in many Indian states to indicate how the benefits of governmental expenditure or cross subsidy in power sector are distributed among different sections of people. This information is useful for targeting the subsidy or for designing a lifeline tariff for poorer consumers. Similarly the general public and politicians have little information on the losses that different income groups including poor sustain on account of the poor performance of the power sector. The data generated and analysed in this study, though not comprehensive, has provided reliable indications in this regard.

12. Remaining part of the GDN study

Following activities proposed in this GDN study have not been carried out so far, and it is expected that these will be completed in the next three months before the submission of the second draft report.

1. There is a plan to conduct primary survey in 14 states. So far only 9 states have been covered (and the data from only 6 states have been analysed). The survey and data analysis in the remaining states will be completed in the next three months.
2. The subsidy received, and the alternative sources used by the agricultural consumers, and their impact on the likelihood of reform need to be analysed. The issues in this regard will become clearer as survey takes place in agriculturally intensive states such as Punjab, Haryana, Gujrat, etc.
3. As envisaged in the original proposal of this study, a ranking of the states in terms of pace of reform will be attempted, and efforts will be made to see whether this rank is related statistically to some of the key distribution variables.

4. Econometric exercises will be carried out by pooling together data from different states to see whether the stated preference of the households are related to the tariff or the use of costlier alternative sources or to some state-specific variables.
5. More qualitative information on the process of reform in each state will be collected to strengthen the discussions in the report, and also to see the relationship between substantial reforms (such as tariff reform) and measures that are considered non-controversial like T&D loss reduction.
6. More thinking and discussion is necessary as part of this study on the probable ways of getting out of the difficult-to-reform situations evident in many Indian states.

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Appendix I

PERFORMANCE OF POWER SECTOR IN ANDHRA PRADESH SURVEY ON THE IMPACT ON HOUSEHOLDS

Principal Investigator: V. Santhakumar, Ph.D

India Development Foundation

249-F, Sector – 18

Udyog Vihar Phase IV

Gurgaon 122 015, Haryana, India

Sample Number

1. House Number	:	_____
2. Name of Village/City / Ward	:	_____
3. Zone	:	_____
3a. Distribution Management: Utility/Cooperative/Franchisee		

4. Details of the members of household (✓ against the person who gave information)

Sl. No.	Age	Sex	Work ⁴⁰	Education ⁴¹	Does he/she own house?	Does he/she own land?

5. Religion: 1. Hindu (SC | ST | OBC | General) 2. Christian 3. Muslim

⁴⁰ For those who report unemployed, note down their activity during the last working day or the last seven working days

⁴¹ Write actual education degree, diploma or years of schooling

6. Do you own this house?	Yes	No
---------------------------	-----	----

7. Type of house (Through observation)

Roof:	Concrete	Tiles	Thatch	_____	
Wall:	Brick	Mud	Thatch	_____	
Floor:	Mosaic	Marble	Red/Black oxide	Mud	_____

Number of rooms:

8. Is this Village Electrified?	Yes	No
---------------------------------	-----	----

9. Is this house electrified?	Yes	No
-------------------------------	-----	----

If No, Go to Q. 55

10. Appliances the household has which use electricity

Lights (Bulbs) No.			Mixie	Yes	No
Fans No.			Washing Machine	Yes	No
Iron	Yes	No	Computer	Yes	No
Refrigerator	Yes	No	Water Heater (Bathroom)	Yes	No
Television	Yes	No	Electric stove	Yes	No
Radio	Yes	No	Others (mention)		
VCD Player	Yes	No			

11. Details of just paid electricity bill

Consumption	Bimonthly	Monthly
Units (kWh)		
Charge (Rupees)		
Duty (Rupees)		
Rent (Rupees)		
Total amount (Rupees)		

12. Was there power-cut during the last 24 hours?	Yes	No
---	-----	----

12a. If Yes, details of power cut (during the last 24 hours)

Time between		and	
		and	
		and	
Total duration			hours

12b. Was this due to declared power cut or local line faults?

Yes	No
-----	----

12c. Was the situation similar during the last week?

Yes	No
-----	----

12d. If No (to Q. 12b), total duration of power cut during the last seven days:

_____ hours

13. What did you do during power cut during the last 24 hours?

a. Did nothing	b. Kerosene lamp No. _____ Hours: _____	c. Candles No. _____ Hours: _____
d. Used an emergency lamp	e. used an inverter	f. used a generator _____

14. What do you usually do during power cut at night?

a. Did nothing	b. Kerosene lamp No. _____ Hours: _____	c. Candles No. _____ Hours: _____
d. Used an emergency lamp	e. used an inverter	f. used a generator _____

15. Do you depend on a common generator?

Yes	No
-----	----

16. (Why don't you use _____ [this space should be filled with the option immediately following the one chosen for the question no. 13 or 14.] during power cut?)

Financial reasons	Other reasons (specify) : _____
-------------------	---------------------------------

17. If answer to 13 or 14 is b, c, or f, how much do you spend monthly for candle/kerosene/diesel approximately for this purpose (avoid the expenditure on kerosene for cooking, if the household does not use electricity for cooking)

	Quantity	Amount
Candle		
Kerosene		
Diesel		

18. If answer to 13 or 14 is d, e or f, the year at which you bought this equipment and how much did you pay to buy it.

	Year	Amount
Emergency Lamp		
Inverter		
Generator		

19. Are you experiencing low voltage very frequently?

Yes	No
-----	----

20. If Yes, did you do any of the following to reduce the impact of low voltage?

	Bought a UPS	Changed to low voltage bulbs	Using stabilizer	_____
21. If you own UPS or stabilizer	Year of purchase			_____
	Amount			_____

22. Compared to the situation three years ago, the frequency and duration of power cut has

	Come down	Increased	Not changed
--	-----------	-----------	-------------

23. Compared to the situation three years ago, the voltage problem has

	Improved	Worsened	Not changed
--	----------	----------	-------------

24. Is the tariff higher than three years ago?

	Yes	No
--	-----	----

25. If yes, Given the changes in quality, do you consider the change in tariff

	Reasonable	Unreasonable	Can't say
--	------------	--------------	-----------

26. Do you face how many of these problems related to billing and bill payment?

	Incorrect bills	Infrequent bills	More time and effort required to pay bills
--	-----------------	------------------	--

27. If so, how is the situation (billing /bill payment) today, compared to three years ago?

	Better	Worse	No change
--	--------	-------	-----------

28. How quickly line staff respond to complaints of line faults today?

	Same day	Next day	Two days or more
--	----------	----------	------------------

29. How is this situation compared to three years ago?

	Better	Worse	No change
--	--------	-------	-----------

30. Are you happy with the consumer service (for example, client friendliness) of the distribution agency?

	Yes	No
--	-----	----

30. 1 If No, problems

Long queues	Rude behaviour
Inadequate hours of public contact	_____

31. How is this situation compared to three years ago?

	Better	Worse	No change
--	--------	-------	-----------

32. Total area of land cultivated by the household:

	Acres
--	-------

33. Do you irrigate land?

	Yes	No
--	-----	----

34. If No (to Qn. 33), what is the reason for not irrigating land:?

Small plot of land	Water not available easily	Lack of electricity
Financial difficulty in buying a pump/or digging well	Cannot afford electricity bills	Others

Go to Qn. No. 49

35. If Yes (to Qn. 33), what is the mode of irrigation?

canal	tube well with hand pump	well and pump
tube well with pump	well without pump	_____

36. Do you use pump for irrigating land?	Yes	No
If No, go to Qn. No. 49		

36a. If yes, is the pump electrified	Yes	No
If No, go to Q. 39		

36b. If yes, do you have a separate electricity-connection for pump	Yes	No
(If No, enter electric driven pump (with capacity as an item in Q. No. 10)		

If Yes,

36c. Capacity of the pump	
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36d. Details of last paid electricity bill for agricultural connection

Consumption	Monthly	Bimonthly
Units (kWh)		
Amount (Rupees)		
Other charges (Rupees)		
Total amount (Rupees)		

36e. Total bill for electricity for pumping in a year		Rupees
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37. Do you get adequate electricity for pumping?	Yes	No
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38. If No, what do you do when electricity is not available for pumping water

Diesel pump	Kerosene pump	Nothing	_____
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If answer is (a) go to Qn. No. 40a, Otherwise go Q. 41

39. Why don't you use an electric pump?

Getting Electricity connection difficult	Electricity lines not available in the village	Cost of electricity unaffordable
Not enough electricity available as and when needed	_____	

40. Do you have only	Kerosene pump	Yes	No
	Diesel pump	Yes	No

If Yes to any of these

40a. Total amount of diesel / kerosene bought during last year	Kerosene	
	Diesel	
40b. Amount of diesel/ kerosene required for one hour of working of your diesel/kerosene pump	Kerosene	
	Diesel	
40c. Capacity of your pump		

If the household does not use an electric pump at all, go to Qn. No. 49.

41. Were there motor burn-outs in your farm (due to voltage problems) during last farming season?	Yes	No	
42. How is the situation in terms of motor burn-outs, compared to that three years ago?	Better	Worse	No change
43. Were there transformer failures in your area during the last season?	Very frequently	Frequently	Rarely
44. How is the situation in terms of transformer failures, compared to that three years ago?	Better	Worse	No change
45. How has the electricity supply for irrigation changed during the last 3 years?	Improved	Worsened	No change
46. How has the electricity tariff for irrigation changed during the last three years?	Improved	Worsened	No change
47. Do you think that power supply for agriculture needs to be improved further?	Yes	No	
48. Which of the following you would prefer?	a. Better quality power supply (i.e., available adequately as and when it is required) with higher tariffs		
	b. Current quality with current tariff		

(Ask the following two questions, only if it is reported in the occupation that one household member is owning a shop)

49. If you are owning shop / trade establishment, how much is the electricity bill you are paying?	Units			
	Rupees			
50. Do you know that the electricity charge for shop is higher than the cost of supply?	Yes	No		
51. Do you think that it is important to have 24 hours of uninterrupted power supply?	Yes	No		
52. Will you ask for better quality power supply, if providing such quality requires an increase in tariff	Yes	No		
53. What are the avenues on which you get the direct benefits of governmental finance?				
	Ration shop	Govt schools	Govt hospitals	Govt college
	Govt job	Govt pension	_____	

54. Do you think that provision of electricity to you at subsidized rates, affect the provision of any other governmental service?

Yes	No	Can't say
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If Yes, Which of the following you prefer?

(a) Provision of electricity subsidy at current rates
(b) Improving other governmental services, by increasing electricity charge
(c) Increasing subsidy in electricity by reducing that in other services

Give Reasons

1.
2.
3.

55. Do power-cuts or power interruptions affect your workplace (office | factory | shop, etc)?

Yes	No
-----	----

If Yes, how does it affect

Affecting production	Lead to lock out of factory	Factory shops cannot work full time
Wastage of materials	Discomfort (No fan) at the time of work	_____

56. How is this situation compared to that three years ago?

Better	Worse	No change
--------	-------	-----------

57. Do power cuts or power interruptions affect you in any other way?

Yes	No
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Lack of street light	Water supply problem	Increasing theft
Problems in health centre	_____	_____

58. How is this situation compared to that three years ago?

Better	Worse	No change
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59. Do you think that the electricity board is managing its affairs efficiently ?

Yes	No
-----	----

If No, what are the reasons, according to you, for inefficiency

1.
2.
3.

60. What can be done, according to you, to improve the efficiency of the electricity board

1.
2.
3.

61. You may have heard about the debate on privatising the electricity board. What is your opinion on this issue?

Yes to Privatisation	No to privatisation	Indifferent	Don't know
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If No, why do you oppose privatisation ?

1.
2.
3.

If Yes, why do you support privatisation?

1.
2.
3.

For non-electrified houses

62. Why don't you have electricity?

a. Applied and waiting	b. House not in good condition	c. Very costly to bring line to the house
d. Very costly to do wiring in house	e. Cannot afford to pay monthly electricity bills	_____

If reason is (c), give the approximate amount required to bring line to your house (Rupees)

63. What do you use for lighting?

1. Kerosene

Number

Approximate duration per day (minutes)

2. Others

Equipment Name

Fixed Cost

Operating cost

Number

Equipment Name

Fixed Cost

Operating cost

Number