Research Report - Final Draft (version 1)

IMPACT OF THE DISTRIBUTION OF THE COST OF REFORM ON SOCIAL SUPPORT FOR REFORMS

A STUDY OF POWER-SECTOR REFORMS IN INDIAN STATES

(The Study Carried out with the Outstanding Research Award (2003) of the Global Development Network)

V. Santhakumar[1]

Associate Researcher
India Development Foundation
Sector 18, Plot no. 249F Udyog Vihar, Phase IV,
Gurgaon, Haryana 122015, India
Website: www.idfresearch.org

[1] Santhakumar is permanently employed as a faculty at the Centre for Development Studies, Thiruvananthapuram in Kerala (India). His email address is: santhakumar@cds.ac.in

Acknowledgement

I acknowledge the valuable support and guidance provided by Prof. Shubhashis Gangopadhyay, Director, India Development Foundation (IDF) for the smooth conduct of this study. It would have been very difficult to carry out this research without his support. During the course of this study, I have benefited from discussions with a number of scholars including Professors Francois Bourguignon, Kirit Parikh, S.L. Rao, T. L Shankar, Sebastian Morris, Jyothi Parikh, Tushar Shah, Haribandhu Panda, Wilma Wadhwa, Dr. Santanu Gupta, Dr. Kristin Komives and Dr. Bhavana Bhatia. The comments received from the jury of the GDN research award including Dr. Shankar Acharya were very useful. I have also received very helpful comments from the participants of a seminar held at the Centre for Development Studies, Trivandrum to discuss the preliminary findings of this study. The comments received from Professors D. Narayana and Sunil Mani need special mention. Dr. U.S. Mishra provided advice on econometric exercises. Dr. Praveena Kodoth carried out an editing of this second draft. However, the author alone is responsible for the errors that remain.

Different versions of the paper were also presented at the Center for Economic and Social Research (CASE) Warsaw, the conference on Nordic Association of South Asian Studies held in Aarhus (Denmark) and also at the OECD Development Centre in Paris. Comments, received at these presentations especially from Ewa Balcerowicz, Artur Radziwill, and Jorgen Dige Pedersen were very valuable.

As mentioned in the cover page, this study was carried out with the funding from the Global Development Network as the Japanese Outstanding Research Award (2003). On behalf of GDN, Dr. Gary McMahon has always extended valuable support and suggestions. The comments received from two anonymous referees commissioned by GDN for evaluating the first draft report of this study were immensely helpful. One of them has also reviewed the second draft and provided extremely valuable comments.

K. A. Anil Kumar has provided excellent research assistance for the project. Abhilash G. L. carried out the data processing. Swapan Kumar Singh coordinated the field survey in four northern states, and Bikash Dash carried out this task in Orissa. Prof. G.K. Mitra and Dr. Keshab Das and Mr. Christopher Das have helped in identifying field surveyors in the states of Andhra Pradesh, Gujarat and Tamil Nadu respectively. The friendly staff members of IDF have made my periodical visits to Gurgaon comfortable. Jothi took strenuous efforts to coordinate the finances for the study. My thanks are due to the authorities of the Centre for Development Studies for providing me the leave to conduct the study, and to Professors Chandan Mukherjee and Narayanan Nair for their moral support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

The manner in which the distribution of the costs of economic reforms among different sections of society affects the social support for, and hence the political willingness to, reform in democratic societies has been the focus recently of a number of studies[2]. However, it has been noted that systematic empirical evidence on the determinants of social/interest-group support for (or opposition to) reform is scarce (Fidrmuc and Noury 2002). In this context, it is thought that the differential 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. This is the focus of this study, and hence it is a modest empirical contribution to the newly emerging literature on the new or neoclassical political economy of reforms.

A study of factors that facilitate/discourage power sector reforms, is very important also in the context of assessing 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). The subsidies in power sector account (in 1999-2000) for about 36 per cent of the gross fiscal deficits of the state governments, and around 1.7 per cent of the national GDP for the country (Government of India, 2001). Reducing fiscal deficits and reforming power sector are major items of the unfinished agenda of Indian economic reforms. Thus there is a need to analyse the reasons that make power sector reforms a politically intractable issue in the country.

There are disagreements on the usefulness or the need for specific strategies of power sector reforms, employed or advocated in India. For example, there are conflicting opinions on the desirability of privatisation. However there is hardly any disagreement on the need for certain `generic or basic' measures of reform in Indian

---

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

power sector such as improving the efficiency and the financial viability of the utilities so as to make them capable of investing for and providing the quantity and quality of electricity desired (or demanded) by the society. It is also a fact that many states could not make much progress even on these basic reform measures (even if one need not worry about whether an electric utility could be privatised or not). It is the slow progress of power sector reforms in terms of these basic measures in many states that has motivated this study.

The assessments conducted by me in the past in a number of Indian states[3] show that in general industrial and commercial consumers support and demand reforms (including privatisation). In most states, the average tariff paid by these industrial and commercial consumers are higher than the average cost of supply, and they see themselves as bearing the cost of inefficiency of the utilities and the burden of subsidy provided to domestic and agricultural consumers. Thus the real question requiring analysis is the following: why do power sector reforms progress slowly despite the support from industry and commerce. This take us to the perception that state governments in India are not ready to go ahead with power sector reforms due to opposition from significant sections of electorate. Households receiving electricity supply at subsidised rates for domestic and/or agricultural consumption and their opposition expressed (or likely to be expressed) through voting in elections, seem to be discouraging politicians from going ahead with power sector reforms. This is the motivation behind analysing the households' support/opposition to reforms in this study, and here the attempt is to see whether there is any discernible pattern in the response of different types of households and in the aggregate opposition/support to reforms by the households as a whole in different states.

The study attempts to analyse how does social support for reforms depend on the variables that have a bearing on the costs and benefits for different households due to power sector reforms. The costs and benefits of power sector reform include (a) The subsidy the households currently receive for the consumption of electricity, which may be reduced as part of the reform, and this is a likely cost of the reform

[3] I got opportunities to serve as a consultant of the Asian Development Bank for assessing the social impact of power sector reforms in the states of Kerala, Assam and Madhya Pradesh during the last five years.

and (b) The losses due to the poor quality of electricity supply, which can be improved as an outcome of reform, and hence it can be taken as a likely benefit of reform. In addition, households might also perceive the indirect losses on account of the non-viability and inefficiency of the power sector (due to their impact on industrial, economic and employment growth, and also the consequent fiscal problems of the state) in the pre-reform stage. Avoiding or reducing such indirect losses can also be reckoned as another benefit of power sector reforms for the households.

This study attempts to account for the impact of these likely losses and gains to households on their support for reforms. The methodology adopted for the study has the following steps.

(1) A primary survey of a sample of households (selected with a well defined approach) was conducted in each of the 14 states of India to assess the tariff paid, subsidy received, and the quality of electricity supply enjoyed by the households. In addition, the primary survey has also elicited information on the household's readiness to pay a higher tariff for a better quality of electricity supply and on whether it supports the efficiency reform of the utility. Since it is difficult for many households to understand what an efficiency reform would mean, this study elicited their response to privatisation (more as a means to get their response to an easily understandable efficiency reform, without reckoning privatisation as the ideal reform). The primary survey has also attempted to get their perception on the relationship between non-viability of power sector and economic or employment growth, or governments expenditure on in other areas (such as health and education).

(2) The next step is the statistical and econometric analysis of primary data, to assess the determinants of households' support (or opposition) to power sector reform strategies (for example, the privatisation of public sector utility). Some of the independent variables considered here include the connectivity of the household, whether the household receive electricity at a rate much lower than the average cost supply, the duration of power

interruptions, the number of units consumed per month, etc. It may be noted that these variables indirectly indicate losses and gains due to power sector reforms such as the subsidy to be lost, or quality to be improved. The analysis has also attempted to see whether there is any relationship between households' response to reform and their perceptions on the indirect (economy-wide) losses due to non-viable power sector.

(3) The final step is a qualitative analysis (with the help of some graphical patterns and descriptive arguments) of how the aggregation of households' choices in the states may depend on certain features of their respective electricity sector. For example if the household-level analysis mentioned in previous paragraph shows that unconnected consumers are more likely to support reforms and subsidised consumers are less likely to support reforms, the aggregate support in a state would then depends on how much of its population of households have electricity connection and how many of them receive subsidy. It is this aggregation carried out in this step as part of the graphical (or qualitative) analysis. An attempt is also made here to relate the stated support for reforms to their actual implementation. Econometric analysis is infeasible at this stage due to the limited number of observations (i.e., 14 states).

Some of the patterns observed in the response of the households to power sector reforms are the following: (a) households without electricity connections are less likely to oppose reforms; (2) households which pay an average tariff much lower than the average cost of supply for power consumption are less likely to support reforms; (3) households that encounter very poor quality of supply (in terms of the duration of power interruptions) are more likely to support reforms. Thus the aggregated response of the households is more against reforms in states where majority of households are connected and pay a subsidised tariff and enjoy not-so-poor quality of supply. On the other hand, the opposition to reform is not vehement under two situations. One is where majority of households do not have electricity connections. The opposition is not so vehement also in states with majority have

electricity connections, but where significant sections of connected households pay an average tariff near or more than the average cost of supply.

Thus there is a major political impediment to market-based reforms in power sector (such as privatisation or the use of competition) in states such as Kerala, Tamilnadu, and Andhra Pradesh where majority of households are connected and receiving not-so-poor quality of electricity at heavily subsidised rates. These states may have to continue with the `voice option' or political route to efficiency improvement in the near future, if measures are not taken to change the situation. The potential measures include the gradual removal of the better off sections from the subsidy set, which would gradually enhance the support base for reforms. There can also be political reforms that would take sectors such as electricity out of the general voting system of `one citizen one vote', and would entrust the governance of sector on a body elected by its stakeholders[4] with a voting power based on the amount of consumption and where non-citizens such as industrial firms can also vote (since they are also stakeholders and being affected by the performance of electricity sector).

Even though opposition to reform is not vehement in states such as Bihar, or Uttar Pradesh, where only a small minority of the households have electricity connections, one should not expect any smooth implementation of competition-based reforms in electricity sector there. This is due to the fact that the market for electricity there is very thin, and not many private players may be interested in entering such a situation, as evident from the privatisation experience in the state of Orissa. On the other hand, competition-based reforms are more likely to succeed and less contested in states such as Rajastan or Haryana where significant sections (if not majority) pay near or above the cost of tariff and where they encounter poorer quality of electricity supply. The opposition by the agricultural consumers who get subsidised tariff might be discouraging political leadership from going ahead with reforms in these states, but the electoral justification for that political unwillingness could not be seen in the analysis of this study, since such subsidy

[4] The water boards of the Netherlands which over see the management of floods, water supply and waste water treatment is one example.

receiving farmers tend to be small in number in terms of the overall population and are regionally concentrated.

The paper is organised in 8 sections. Chapter (2) discusses the structure of Indian power sector in the early nineties, the reforms carried out in the sector and the current structure. It also discusses the challenges faced by the sector and the need for a study analysing social support for reform. This section is written for an international audience and hence some information widely known in India is repeated. This is followed by a review of literature in Chapter 3 including the general literature on the political economy of reforms and the prevailing political-economy arguments related to Indian power-sector reforms. This leads to a discussion of questions, assumptions, hypotheses and the methodology of this study, followed by the description of the main data used here in Chapter 4. Descriptive statistics and econometric analysis of the determinants of households' support for reform is carried out in Chapter 5. State-level aggregation of household responses to reform and analysis of its relation to the actual implementation of reform are carried out in Chapter 6. The concluding argument and a few policy implications are given in Chapter 7, which also outlines the remaining part of the work in this GDN-sponsored study.

Chapter 2

THE CONTEXT OF ANALYSIS: INDIAN POWER SECTOR

2.1. The Structure of the Power Sector in the early Nineties

In the early nineties, i.e., before the initiation of power sector reforms in India, electricity distribution in most parts of India, barring a few metropolitan areas such as Mumbai (Bombay) and Calcutta, was done by public utilities namely the State Electricity Boards, which are owned fully by the respective state governments. These are not even corporations registered as companies, but function mostly under the direct control of the respective state governments. The major part of the generation (i.e., about two-third of total generation) and transmission of electricity was also carried out by these boards. However there exist public sector organisations fully owned by the federal government of India such as the National Thermal Power Corporation[5], which generates power (accounting for about 30% of total generation) and sells it to different state electricity boards for distribution. There is also a Power Grid Corporation owned by the Government of India, which mainly carries out inter-state transmission of electricity.

2.2. The Need for Reforms

Most of the electricity boards had become financially non-viable by the nineties (Government of India, 1996; Rao et al, 1998, Morris, 1996). The commercial losses of major state electricity boards along with some other key financial indicators are provided in Table 2.1. It is evident that out of the 17 state boards, seven were reporting net operating profits (after government compensation of subsidy provided to certain sections of society) in 1992-93 but that number declined to 2 in 1996-97. Financial difficulties owe mainly to the burden of providing power at subsidised rates to a few sections of consumers (mainly farmers and residential households) without adequate compensation from the government (and where

[5] There exist other public sector organisations owned by the federal government such as National Hydropower Corporation and Nuclear Power Corporation involved in electricity generation. These companies too sell power to the State Electricity Boards.

governments have attempted compensation it has lead to fiscal crises). In the mid-nineties, the average tariff per unit (KWh) paid by the domestic consumers in the country was 58% of the average cost per unit, where as that paid by the agricultural consumers (for electricity used to lift water for irrigation) was 12% of the average cost. The gross subsidy in the sale of electricity was about 1.1 per cent of the national GDP for the country.

Table 2.1: Some dimensions of the performance of electrcity utilities in India during the nineties

States	Transmission and distribution losses as percentage of availability		Commercial losses / profit (with subsidy) Rs. Crore		Number of Employees per MU of electricity sold	
	1992-93	1996-97	1992-93	1996-97	1992-93	1996-97
Andhra Pradesh	19.20	30.10	-4	-89	3.7	3.3
Bihar	20.50	25.3	-279.6	-370.2	7.6	5.5
Gujarat	21.10	18.20	100.0	-770.0	2.5	1.9
Haryana	25.40	31.70	-368.3	-275.6	5.2	5.3
Karnataka	18.70	18.50	32.2	60.7	4.1	2.9
Kerala	21.00	20.00	-65.3	-218.8	4.1	3.8
Madhya Pradesh	22.20	19.30	-112.9	-322.1	4.9	3.7
Maharastra	16.40	15.30	161.6	111.8	3.5	2.6
Orissa	23.50	45.10	26.0	-257.9	6.1	5.5
Punjab	18.70	18.00	-626.3	-1346.0	5.0	4.1
Rajasthan	24.50	25.30	22.1	-506.6	5.3	4.0
Tamil Nadu	17.50	17.00	92.4	-194.8	5.0	3.5
Uttar Pradesh	24.10	24.60	-807.5	-63.8	4.4	3.5
West Bengal	23.70	20.10	-257.5	-483.1	6.7	3.9

Source: Kannan and Pillai (2002); Government of India (1999)

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. Such inefficiencies manifest in avoidable technical losses and theft of electricity (which account for more than one-fifth of the electricity generated

in the country as per official estimates[6]), laxity in collection of electricity charges[7], time and cost overruns in the completion of investment projects caused by procedural delays and contractual failures[8], etc.

Thus the electricity boards became unable to pay on time the dues to the generating companies owned by the federal government[9] (which charge the boards on the basis of cost plus regulated rate of return), unable to buy adequate power from generating companies and became incapable to invest in generation on their own due to the lack of funds (and low credit worthiness). The electricity system in the country as a whole faced a shortage of 20 per cent during peak demand times in the late eighties and about 12 per cent in terms of the overall electricity requirement of the currently connected consumers. This has led to the deterioration of quality of supply and increased the effective cost of power for consumers. Moreover the system is incapable of enhancing the per-capita electricity consumption of the country, which is (around 370 KWh in 1997) not only far below that of the developed world but also much less than that of many developing countries including China, Argentina, Philippines, and so on (Kannan and Pillai, 2002). One can also note that about 45% of the households in India do not have electricity supply. Lack of funds for the electricity boards, and also the use of government finance for the provision of subsidy to the connected consumers are major factors that work against the extension of electricity supply to these households (Santhakumar, 2003a; EISP, 2000)

[6] It is widely recognised that this is an under-estimate of actual T&D losses. There is a tendency in Indian power sector which is well documented (for example, World Bank, 2002) to account some part of T&D losses under agricultural consumption, since such consumption is not metered in many parts of the country.

[7] The amount to be collected from the consumers as electricity tariff in the mid-nineties comes to about 4 months' sales revenue, creating liquidity problems and enhanced credit requirement for the operation of these firms.

[8] See Kannan and Pillai, 2002, chapter 5 for a discussion of time and cost overruns of projects in Kerala partly created through procedural delays and contractual failure.

[9] All the state electricity boards together have outstanding dues to the tune of 104650 million Rupees to the generating stations owned by the federal (central) government.

It was in this context that the Government of India made efforts to allow private participation in electricity generation[10] with government guarantees of assured return on capital (World Bank, 1995:83). It also allowed foreign equity in generation companies, guaranteed a post-tax return on equity of 16%, additional returns for enhanced plant load factor, free repatriation of dividends and interests, five-year tax holidays, protection from exchange-rate fluctuations, allowed increased depreciation and reduction in customs duties. However, the experience during the one and half decade suggests that such private participation in generation was not very successful, as evident from that the private companies account for only less than ten per cent of total generation even 15 years after they entered. Even when electricity was not sufficiently available (as evident from the long spells of power cuts in many parts of India) and the public sector organisations could not enhance capacity to the required levels, generation by private companies was not catching up. The main reason for this is the financial non-viability of the electricity boards, which prevent them from entering into reliable contracts with private generators or from providing signals that they will be reliable buyers of electricity produced by the private parties (World Bank, 1996: 101). Potential power producers note that electricity boards are not allowed by the state governments to charge viable tariffs and allowed to cut supply from non-paying consumers, and the boards are institutionally weak to contain power theft. Thus the need to reform state electricity boards to make them financially viable and efficient is widely recognised.

2.3. The Objectives and Content of Reform Initiatives

There was a move in 1996 (through amendment in that year of the Electricity Supply Act of 1948) to institute independent regulators at the state-level to fix tariffs and to instil efficiency measures in the electricity boards. (This was amended in 1998 to appoint a regulator at the national level too). The expected functions of the state-level regulators are: (1) to determine and regulate tariff; (2) to determine the wheeling charge for transmission facility; (3) to regulate power purchase and procurement process of transmission and distribution utilities; and (4) to promote competition, efficiency and economy in the activities of electricity industry

[10] This was made through an amendment of Electricity Act in 1991 which permitted private companies to build, own and operate electricity generation stations.

(Government of India, 1998). A regulatory commission has been put in place at the national level (in 1998) and by 2001, 16 states have established (or have taken the steps to establish) state-level regulatory commissions.

The Government of India had advocated that the state governments un-bundle their electricity boards and make them corporations or privatise distribution utilities. A legislative framework facilitating independent regulation and competition came to exist when the Government of India passed the Electricity Act in 2003. An important part of this Act is the provision of open access for direct contracting between generators and bulk consumers in order to foster competition (Sinha, 2005). There was an expectation in the Act that the existing state electricity boards would be replaced with unbundled utilities or corporations within a short time-frame (which was envisaged as 6 months at the time of passing the act). A scheme to provide grants to the state governments by the central government in tune with certain reform (such as loss reduction) indicators namely the Accelerated Power Development and Reform Program (APDRP) came to exist. This scheme has provided incentives to the state governments to take certain tangible steps to strengthen the distribution network. It should be noted that it is the state governments, which have to implement most of the reform measures. (There are constraints for the Government of India to push state governments in this regard since the latter too have a major role in electricity supply as per the Indian constitution).

2.4. Taking Stock of the Reforms Actually Implemented

The reforms carried out so far by the state governments can only be reckoned as partial. Unbundling and privatisation have been attempted in two states namely Orissa and Delhi. The utilities have been unbundled and made government-owned corporations in some other states including Karnataka, Andhra Pradesh, Madhya Pradesh and Uttar Pradesh. However the remaining states are yet to take steps to un-bundle or to make corporations, in spite of the expectation arising from the Electricity Act passed by the Government of India. Some states such as Kerala and Maharashtra are currently seeking more time from the Government of India to restructure their electricity boards, probably as a delaying strategy.

Table 2.2: Summary of the status power sector reforms in major Indian states

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
Tamil Nadu	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 Kolkata
Karnataka	Zone wise distribution is carried out by state-owned companies
Bihar	No unbundling; SERC constitiuted
Madhya Pradesh	Unbundling of SEBs
Haryana	Unbundled; two state owned zone wise, distribution companies.
Gujarat	No unbundling; but private distribution companies operating in two cities; SERC constituted
Rajasthan	SEB unbundled

Source: Ministry of power, Government of India, http://powermin.nic.in/

There is also some progress on the regulatory front. 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. (This involves incentives to withdraw electricity when the grid frequency is more than the standard and penalties when it is lower.) State regulatory commissions have also been making earnest efforts to bring in considerations of efficiency and cost reduction in the fixation of tariffs. However they have not been successful in reducing subsidy much or in persuading the state governments to take on the full burden of subsidies provided to certain sections of the consumers. Though the 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 is a perception that the services of the regulatory commissions 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 government[11]. 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. There have also been difficulties in the implementation of orders of regulatory commissions. Judicial and sometimes legislative measures are sought to delay their implementation[12]. This intervention using the court is mainly driven by the interest to delay the process since court decisions in India are known to take very long[13].

However there is also an indirect, and probably unintended, consequence of the reform initiatives in power sector. The reform environment in general has 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. This is evident from that certain administrative measures such as the reduction of staff positions (as in Kerala) could be undertaken without much resistance from the employees.

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). The 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 far 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). The reduction in T&D losses achieved so far seems

---

[11] 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.

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

[13] The use of judiciary in India through public interest litigations to delay the process of decision-making in other contexts has been documented. For example, see Santhakumar (2003).

to be much less than what could have been done. Losses seem to continue at around 25 to 30% in many states. 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 or independent. 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'[14].

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 experience in India in this regard is comparable to that in many developing countries. A recent stocktaking of electricity reforms (Jamasb et al, 2005) in a large number of developing countries carried out for the World Bank, has noted that the success/failure of reforms depended to a great extent on country institutions and sector governance. It has also observed that the early reform advocates have underestimated the political difficulties in implementing reforms including the reduction of subsidies. This seems to be the case in India too. 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 entrenched political opposition is a great 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 Centre in 2004. Thus it is important to understand the factors that influence the political willingness or reluctance to reform power sector in the Indian states.

2.5. Stakeholders in Power Sector in Indian States

Analysing the politics of power sector reform would require an understanding of the major stakeholders in power sector. The major stakeholders are listed below: (1)

[14] The cases of Andhra, Tamil Nadu, and Maharashtra are examples in this regard.

Industry and trade; (2) employees of the electricity boards; (3) Households without electricity connections; (4) Households with electricity connections; (5) agricultural consumers (those who use electricity for lifting water for irrigation). We can treat these as the primary stakeholders, who influence the position of state governments or political parties in the state. However we can also treat the political parties as a separate stakeholder considering the possibility of an `ideology', which is beyond the influence of the stakeholders mentioned above. There are also other stakeholders such as multi-lateral funding institutions (like the World Bank) and their role too needs analysis. The following sections take up briefly the known positions of these stakeholders, and outline the issues that warrant further investigation.

2.5.1. Role of industry and trade

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 2.3. Thus they are in general subsidising consumers (though there are some specific industrial units getting subsidised electricity). In spite of paying more than the cost of supply, these industrial consumers often lose due to the poor quality of supply. Such losses arise from expected and unexpected power interruptions and voltage problems and the consequent damage to products and equipments and/or the need to keep plants and employees idle or to use costlier alternative sources such as in-house diesel generators[15]. Thus they are expected to gain from, and hence to be the supporters of, tariff and efficiency reform. (Tariff reform would aim at making tariffs closer to the cost of supply, and efficiency reform would lead to the reduction of cost of supply to the minimum required. Both these would be beneficial for some one who is currently paying more than the cost of supply, which itself may be high due to inefficiency). Available evidence in India too shows that the industry and trade are in general supportive of reforms in power sector. Public consultations carried by this author[16] in a number of Indian states such as Kerala, Assam and MP have shown that industrial associations and traders' groups are in fact vocal in their support for tariff and efficiency reforms (Santhakumar, 2003b; 2003c; 2004a). Hence the question for an

[15] This is evident from the studies analysing the social impact of the power sector performance in a number of Indian states (Santhakumar, 2003b,2003c,2004a; EISP,2002)

[16] These were conducted as a social consultant of the Asian Development Bank for its power sector financing programmes in these states.

analysis of the political unwillingness to reform in India is the following: why are reforms not occurring in some states despite the support of industry and trade?

Table 2.3: 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
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)

2.5.2. Role of utility employees

The employees per Million Units (MU) of electricity sold and the number of employees used for serving thousand consumers used in different state electricity boards in the mid-nineties are given in Table 2.1. The former indicator varies between 2.1 and 5.5 (except for small states[17] located in hilly or mountainous terrains in north and north-eastern parts of the country). The latter indicator for the major states varies between 5.5 and 23.5. It may be noted that the employees per MU of electricity sold is about 0.2 in Chile, Norway, and USA, about 0.6 in New Zealand, Argentina, and UK and less than 2.5 in China, Philippines and Indonesia (Kannan and Pillai, 2002; Rao et al 1998). There are problems in inter-country comparison since in some countries it may be cheaper to employ more people if that can lead to savings of the costly capital, but it is worth noting the difference between the states of India.

[17] These include Arunachal Pradesh, Assam, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. In addition to their mountainous terrain and sparsely located population, the tendency to give more government employment in these states affected by ethnic uprisings and violence might have contributed to this higher employment in their power sectors.

Reform programmes that have been planned 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. Similarly past practices of time-bound promotions and periodic increases in salary without much regard for individual performance may not be continued after reforms. That may be the reason why, in general employees' and officers' organisations of the electricity boards have opposed the reform programmes[18] (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 up. (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 states. However whether the difference in the number of employees in different electricity boards affects the social support for reform in states is an issue that requires further analysis. This issue is briefly addressed in Chapter 6.

2.5.3. Households with out electricity connections

The percentage of households without electricity in each state and the distribution of these households in deciles based on Monthly Per Capita Expenditure (as a proxy for income) are given in Table 2.4.

Based on connectivity, one can divide the states into three categories. There are some small states with very high level of connectivity either due to special support from the government or for 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 union territories such as Delhi, Pondichery, etc, where too there is a high-level of connectivity. The second category comprises major states, which have only about 20% or less of households without electricity. These are Tamil Nadu, Kerala, Gujarat, Punjab, Haryana, Andhra, Karnataka, Maharashtra, most of which are in the southern or western parts of the country. In the third category are the major states of Uttar Pradesh, Orissa, Bihar, Assam, West Bengal, etc., and these are

[18] 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 social consultant of ADB for its power sector programs.

located in the North and Eastern parts of the country with more than fifty percent of households without electricity connections.

Table 2.4: Percentage of un-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
Andaman & Nicobar	81.95	37.9	55.5	24.7	12.5	30.5	0.0	5.7	15.2	0.0	0.0
Andhra Pradesh	81.88	44.2	33.1	29.2	19.3	12.9	15.4	18.2	4.5	4.3	0.3
Arunachal Pradesh	54.61	28.4	47.8	45.5	64.0	43.8	45.6	56.7	53.7	48.6	19.6
Assam	29.21	98.5	89.4	72.8	81.9	81.4	75.1	72.1	55.7	55.0	25.9
Bihar	13.00	97.8	94.7	95.2	90.8	91.2	93.6	88.7	84.9	79.2	53.8
Chandigarh	98.63	2.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chattisgarh	58.11	60.0	61.5	58.3	65.5	41.2	49.0	40.5	26.3	13.5	2.4
Dadra Nagar	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daman	98.08	8.1	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	0.0
Delhi	97.89	1.6	0.9	1.3	9.2	0.3	1.9	3.9	0.0	0.8	1.4
Goa	91.85	16.5	2.1	25.4	43.4	0.0	0.0	0.0	0.0	0.0	0.0
Gujarat	86.34	40.0	22.5	24.5	16.3	12.2	8.8	4.9	4.1	2.6	0.8
Haryana	87.39	42.0	21.8	10.1	13.0	19.8	9.4	0.1	4.0	4.1	2.0
Himachal Pradesh	95.03	6.5	1.5	2.5	1.9	5.2	0.0	0.0	1.6	5.2	25.7
Jammu & Kashmir	96.21	13.8	2.3	0.0	3.6	5.5	3.9	0.0	0.4	4.9	3.5
Jharkand	33.52	94.7	93.7	81.4	80.2	55.2	71.5	70.4	54.5	43.3	20.1
Karnataka	81.31	41.9	23.9	31.9	13.9	22.4	12.6	17.6	10.6	4.4	7.6
Kerala	79.66	41.1	29.7	41.5	28.8	22.9	11.1	13.6	6.4	5.5	2.7
Lakshadweep	100.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Madhya Pradesh	69.41	53.2	53.8	41.2	37.0	30.1	24.7	16.0	21.4	16.6	11.7
Maharastra	82.14	47.9	31.5	22.5	21.9	17.7	13.6	9.7	8.5	4.0	1.2
Manipur	83.48	30.3	21.4	28.3	14.9	11.8	6.4	5.3	13.6	18.8	14.3
Meghalaya	61.89	57.3	62.7	36.6	35.6	42.2	40.9	40.4	25.5	21.8	18.2
Misoram	83.76	54.2	42.2	17.7	4.6	13.5	9.0	0.0	3.5	8.4	9.6
Nagaland	94.75	30.0	0.0	0.0	7.4	0.0	0.0	0.0	14.7	0.0	0.0
Orissa	35.11	98.8	92.4	93.5	75.4	77.4	64.4	54.4	43.9	29.7	19.0
Pondicherry	91.27	18.9	10.5	9.0	13.1	22.7	0.0	13.8	0.6	0.9	0.0
Punjab	95.94	16.3	4.7	7.3	3.1	2.9	0.3	2.9	1.4	1.2	0.4
Rajasthan	55.63	71.5	63.2	50.1	47.7	49.8	54.6	29.6	35.7	22.5	19.3
Sikkim	84.51	38.8	28.1	20.1	2.4	8.5	18.9	13.0	15.9	4.4	4.4
Tamil Nadu	84.34	32.7	22.9	27.2	14.3	16.1	18.0	13.9	8.2	3.2	0.3
Tripura	62.04	84.4	61.0	48.7	63.2	31.2	32.9	34.9	12.1	6.2	4.4
Uttar Pradesh	35.49	91.3	86.2	75.9	72.5	70.8	71.8	64.4	53.9	40.8	17.5
Uttaranchal	63.02	78.3	47.8	48.4	41.9	39.9	24.9	34.3	25.7	16.4	12.2
West Bengal	40.47	90.8	88.0	74.2	80.8	66.7	65.7	62.5	39.2	22.0	5.5
Total	61.86	62.3	53.6	48.6	44.1	40.4	38.9	34.7	27.5	20.5	11.0

Source: Compiled by the Author using National Sample Survey: 58th round (December 2003)

It is not surprising that upper MPCE deciles have only fewer unconnected households, and the percentage of unconnected among lower MPCE deciles is much

higher. Thus in Bihar with about 87% of households without electricity, only about 53% of the richest one-tenth of the households does not have electricity where as the corresponding figure for the poorest one-tenth of the households is 97%. This is true for states including Orissa, and Assam. The majority of unconnected households belong to the poorer sections, especially in states where overall connectivity is high. For example, about 78 per cent of the unconnected households belonged to the lower half of the income ladder.

The relationship between the percentage of households without electricity connection and the likelihood (or the ease) of reforming power sector is an issue that requires more investigation. 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 about 65% of the households without electricity connections, where as the corresponding figure for Delhi is only 2. How does an unconnected household respond to the initiatives to reform the power sector? This is an issue analysed in this study.

2.5.4. Households with electricity connections

Table 2.4 would also give indirectly the picture of the connected households among different income groups in different states. How do these connected households respond to power sector reforms may depend on at least the following two issues: (a) how much subsidy (defined here as the average cost of supply per unit minus average tariff per unit that they pay) they receive, since this subsidy can be reduced as part of tariff reform; and (b) the current problems with the quality (including the availability) of electricity supply, which can be presumed to improve after the reforms. Thus these two issues based on available information are analysed in the following paragraphs.

There is a popular (and correct) impression that the major part of electricity subsidy in India is currently received by the middle-class and richer sections of the society. However, there have not been many attempts to develop quantitative evidence of this perception. 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) used primary survey data to analyse the situation in the state of Kerala. Tables 2.5 and 2.6 provide the distribution of electricity subsidy for

residential consumption among different income deciles (based on Monthly Per-Capita Consumer Expenditure –MPCE) in the major states of India. This is based on National Sample Survey[19] 50th and 57th rounds carried out in 1993-94 and 2001-2002 respectively, which has recorded the units of electricity consumed and value paid out for this purpose[20]. Based on this information, the average tariff rate is worked out, i.e., value paid out divided by the number of units[21]. 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 to get the entire subsidy, and the percentage of it 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 2.5 and that by taking only the connected households is given in Table 2.6.

[19] 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.

[20] 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.

[21] 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).

Table 2.5: Distribution (%) of electricity subsidy in Indian states among different MPCE quintiles (by considering connected and unconnected households)

State	Year	Quintiles from lowest MPCE to highest				
		1-20	20-40	40-60	60-80	80-100
Andhra Pradesh	1993-94	7.9	13.5	18.4	25.4	34.8
	2001-02	10.4	15.6	19	24.2	30.8
Bihar	1993-94	2.5	3.2	9.6	25.9	58.8
	2001-02	4.4	10.7	18.3	26	40.6
Gujarat	1993-94	8.4	13	17.9	25	35.8
	2001-02	10	17.9	21.4	25.8	24.8
Haryana	1993-94	11.5	16.7	20.7	24.1	27.1
	2001-02	10.1	15.9	21	21.9	31.1
Karnataka	1993-94	9.3	14	20.7	28.5	27.5
	2001-02	7	12.5	18.6	28.7	33.1
Kerala	1993-94	7.6	12.6	18.4	25.1	36.1
	2001-02	9.1	15.2	17.2	23.7	34.7
Madhya Pradesh	1993-94	5.9	10.9	16.9	23	43.3
	2001-02	8.1	16	20	25	30.9
Maharashtra	1993-94	6.3	14	20.5	24.8	34.3
	2001-02	8.8	15.5	19.6	21.3	34.8
Orissa	1993-94	1.3	6	13.5	28.3	50.9
	2001-02	3.2	13	18.5	31.5	33.8
Punjab	1993-94	11.2	14.1	18.4	22.7	33.6
	2001-02	12.8	19.4	20.1	24.7	22.9
Rajasthan	1993-94	9.5	14.3	20.3	21.3	34.6
	2001-02	9	14.9	22.2	25.5	28.4
Tamil Nadu	1993-94	7.7	12.5	17.8	25.9	36.2
	2001-02	9.1	13.6	19.6	24.3	33.5
Uttar Pradesh	1993-94	3.4	8.7	14.5	22.4	51.1
	2001-02	7.1	12.3	17.5	24.1	39.2
West Bengal	1993-94	1.9	7.3	14	25.5	51.2
	2001-02	4.8	11.4	18.5	24.1	41.2
Assam	1993-94	3.3	6.4	19.3	20.9	50.2
	2001-02	4.6	11.1	20.2	28.4	35.5
Delhi	2001-02	10.6	14.9	16.4	20.2	37.7
	2002-03	11.3	17.0	23.0	18.1	30.6
Himachal Pradesh	1993-94	12.9	15.7	18	21.6	31.9
	2001-02	12.5	16.5	22.1	21.6	27.4
Jammu & Kashmir	1993-94	11.1	15.7	17.4	24.3	31.4
	2001-02	15.8	19.4	21.6	21.1	22

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

Table 2.6: Distribution (%) of electricity subsidy in Indian states among different MPCE quintiles (by considering only connected households)

State	NSSO Round	Quintiles from lowest MPCE to highest				
		1-20	20-40	40-60	60-80	80-100
Andhra Pradesh	1993-94	15.6	17.5	19.5	21.3	26.1
	2001-02	14.3	16.8	18.9	23.3	26.8
Bihar	1993-94	12.8	22.9	19.2	24.2	21
	2001-02	15.4	18.2	19.9	20.6	25.8
Gujarat	1993-94	13	14.4	18.8	22.8	31
	2001-02	12.7	18.5	21.5	25.3	21.9
Haryana	1993-94	14.8	17.9	20.1	23.1	24.2
	2001-02	12.4	15.6	22.1	21.7	28.2
Karnataka	1993-94	15.7	15.8	24.8	24.3	19.5
	2001-02	9.5	14.1	19.7	26.9	29.8
Kerala	1993-94	13.8	17.6	19.7	21.2	27.8
	2001-02	12.4	16.1	17.5	22.7	31.3
	2002-03	15.0	16.8	17.4	23.0	28.0
Madhya Pradesh	1993-94	10.9	15.5	17.3	22.2	34.1
	2001-02	11.3	17.8	19.6	23	28.2
Maharashtra	1993-94	12.1	16.8	19	21.9	30.3
	2001-02	11	15.8	19.5	20.5	33.2
Orissa	1993-94	13.8	17.8	21	21.3	26.1
	2001-02	15.6	17.8	23.2	23.7	19.7
Punjab	1993-94	13.1	14.2	18.3	21.5	32.9
	2001-02	14	19.8	19.8	23.4	22.9
Rajasthan	1993-94	16.5	17	18.2	21.4	26.8
	2001-02	14.6	18.2	21.3	22.5	23.4
Tamil Nadu	1993-94	13	16.6	19.4	23.6	27.5
	2001-02	11.4	15.1	19.6	23.7	30.1
Uttar Pradesh	1993-94	11.8	14.8	16.6	22.9	33.9
	2001-02	12.7	15.9	17.7	21.8	31.9
West Bengal	1993-94	13.8	16.9	18.3	20.6	30.3
	2001-02	13.7	16.8	18.4	19.8	31.5
Assam	1993-94	19.5	16	18.3	18.3	27.9
	2001-02	16	19.3	20.5	21.3	22.9
Delhi	2001-02	11.1	14.7	16.1	20.4	37.7
Himachal Pradesh	1993-94	14.5	15.8	17.9	20.9	30.9
	2001-02	12.7	16.1	20.4	21.1	29.8
Jammu & Kashmir	1993-94	14.2	15.4	17.3	21.9	31.2
	2001-02	15.6	18.6	21.1	20.9	23.8

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, because of low connectivity as a higher proportion of the

unconnected households belong to the low MPCE (income) groups. 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). There is a clear increase in the percentage of subsidy received by the higher income groups in all the states. In 13 states (out of the 18 listed in Table 2.6), the highest MPCE decile group gets the highest percentage of the subsidy. Even among the states with high connectivity, Kerala, Maharashtra and Delhi stand out with more than 30% of the subsidy going to 10% of households with highest MPCE[22]. While comparing with similar distribution of subsidy eight 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. Anyhow, a much greater part of the subsidy given for the domestic consumption in almost all states goes not only to non-poor but also to the well off sections of the society. (The burden to provide subsidised electricity to the poor can be met with less than one-fourth of the current expenditure by the governments for this purpose.)

[22] There can be concern about the reasons that make the distribution of electricity subsidy in Indian states so regressive. 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 Tamil Nadu, 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 is 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 2.6. 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%.

A number of studies have noted that though connected households receive subsidy for electricity consumption, they suffer from the poor quality of supply (Santhakumar, 2003b; 2000c, 2004a). There are declared and unexpected power cuts, sometimes for six to seven hours during the daytime and one to two hours in the evening in some states. The low voltage, frequent line faults, and the long delays in getting these faults repaired etc., are common in the electricity system of the Indian states.

It would be interesting to see how the subsidy and the poor quality of supply together affect the response of the connected households to initiatives of reforms in power sector. This is an important issue analysed in this study.

2.5.5. Role of political parties

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 initiating reforms while they are in power, but are prone to criticise such reform while sitting in the opposition[23]. Major local parties such as the Telugu Desam (in Andhra) or Dravidian Parties in Tamil Nadu are also not against reforms while in the governments, but are not so firm when they encounter electoral setbacks[24]. Ruling and opposition parties compete with each other to air populist slogans of `free power' at the time of elections[25]. The same political party, which makes such populist offers at the time of elections, finds it difficult to implement them when in govt, and is forced to moderate the offer[26]. 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

[23] 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.

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

[25] 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.

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

changes in the West Bengal State Electricity Board, successive Left governments have a by and large co existed comfortably with a privately owned electric utility in their metropolitan capital city Kolkata 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 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 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 is difficult to say whether most parties are ideologically in favour of or against reforms.

2.5.6. Role of external agencies

The World Bank has provided financial and technical support to power sector reforms in Punjab, Orissa, Karnataka and Andhra Pradesh. The Asian Development Bank (ADB) has provided similar support to Kerala, Gujarat, Assam, and Madhya Pradesh. In addition the ADB is involved in power sector projects in a number of states and is willing to consider reform support, if there is interest from the respective governments. In addition, other international organisations such as DFID and CIDA have also been involved in similar programmes in the power sector. In general, these agencies support or advocate independent regulation, unbundling, and making electricity boards commercially oriented corporations and ask governments to take over social responsibilities such as providing subsidy to the poor. Though there is a broad support for privatisation, competition and institution of open access, there is a general realisation among these agencies currently that phases of institutional restructuring needs to be carried out at a pace determined by the internal factors of the states and the country, and these cannot be imposed merely as `conditionalities' by the financing organisations.

Having seen briefly the persisting difficulties in the Indian power sector, the slow progress of reforms in many states and the broad contours of the role of different stakeholders in the sector, this study raises the following questions: How could some states progress albeit partially in reforming power sector but not others? If we take the position that governments and political decision-makers respond to

public/social/voters' support for/opposition to policies, as is to be expected of them in democratic societies, then the question is: what factors encourage people to oppose or support reforms? This is the central question addressed in this study.

Similar questions such as `why do some chose to alter development policies in significant ways while others adhere to policies that are demonstrably inefficient' are being increasingly analysed in the literature on political economy of development policies (or reforms) starting from the nineties. The following section reviews this literature in the general context and also in the specific context of Indian power sector.

Chapter 3

INSIGHTS FROM LITERATURE

As noted by Grindle (2001) 'we know a great deal more about the political economy of development policy, particularly about when and why it is likely to change, than we did 20 years ago' as a result of substantial research. This chapter makes an attempt to review briefly this literature. It focuses firstly on the extant literature, which analyses theoretically or with international empirical experience on the larger question of political economy of economic reforms in developing countries. It is followed by an assessment of the limited literature that has attempted to answer political economy questions in Indian power sector.

3.1. Extant Literature on the Political Economy of Reform

It has been noted that there are two sets of studies analysing the political barriers against reforms (Rodrik, 1996): one set focuses on the myopia and irrationality of actors, and the other set explains how the interaction of rational actors itself could block reforms that are beneficial to society. In this study the focus is on those explanations within the rational choice framework[27]. This theoretical literature unravels the role of different factors influencing the political support for reform[28]. 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), Krueger (1993), Rodrik (1994), Drazen and Grilli (1993), Bruno and Easterly (1996), Grindle (1996) and Drazen and Easterly (2001) have analysed the role of crises in facilitating reform. Uncertainty of benefits at the aggregate and individual levels has been considered a constraint to get support for reforms in Fernandez and Rodrik (1991) and Dewatripont and Roland (1992a, 1992b). A number of studies deal with interest groups who resist reductions in the benefits they would receive through policy changes (Krueger, 1992; Bates and Krueger, 1993; Hellman (1998).

[27] As noted by Bardhan (1997), 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.

[28] See reviews such as Rodrik (1996) and Fidrmuc and Noury (2002).

They have noted the impact of lobbying and the problems associated with giving commitments on ex-post compensation ex-ante. Distributional consequences of reform have been analysed more systematically in the nineties (Tommasi and Velasco, 1996; Schamis, 1999). Fidrmuc (2000a, 2000b) notes that the 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.

There is also a debate on whether autocratic governments or democratic ones are better positioned to implement reforms, (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)[29].

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. However Bernard and Roland (1997) have analysed an issue of power sector reform. They use median voter preference in the context of Canada to explain why governments are reluctant to institute marginal cost pricing in the case of publicly owned electricity utilities.

[29] 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.

3.2. The Political Economy Studies on Reforms in Indian Power Sector

A number of studies[30] on Indian power sector 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. (Conflicts among these groups on the desirability of enhancing tariffs or privatisation have been recognised.) Some of these studies prescribe technical and managerial solutions for `non-controversial' reforms such as loss reduction[31]. There seems to be an assumption that there is no linkage between these two sets of reforms, i.e., controversial (eg. tariff reform) and non-controversial reforms (eg. T&D loss reduction). There are a number of `political economy' studies of Indian power sector reforms, which essentially analyse the groups or interests, which work against the reforms considered `ideal' by the authors (and/or which propagate 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 the middle class. (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 or the relevance of these classes in such contexts. Sagar (2004) makes an interesting argument that the reforms in Delhi were not driven by budgetary advantages of the state government, but due to its understanding that without a turnaround in power sector there was no prospect of improving the quality of service to the level expected by the electorate. 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 remains a question. A study by an NGO namely Prayas (reported by Katiyar,

[30] For example, see two recent articles by Lal (2005) and Ranganathan (2005).

[31] For example Ranganathan (2005).

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 costly through elections. It is often argued that as in Lal (2005: 651[32]) `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'. It is unclear how far this `herd voting behaviour' explains the political reality even in the south Indian states, marked by conflicts and political action between large and small farmers. 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 reform, 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 whose electoral power as influential swing voters, makes politicians unwilling to implement reform (Lal, 2005)[33]. However it is not clear in this argument why reform is viewed as costly 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 Delhi[34] without electoral setback. Yet another general explanation forwarded as in Lal (2005: 653) is that reform is less

[32] 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.

[33] 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.

[34] 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.

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. It is unlikely that such a distribution of costs and benefits will be seen 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 groups. Thus such generalised political explanations are unlikely to throw much insight 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 the 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). However such studies of this author carried out as a consultant of the Asian Development Bank, analysing the social/poverty impact of power sector performance are limited to a few states and also carried out with a descriptive case-study approach. They were not conducted systematically to analyse why reforms take place in some states but not in others. This present study is an attempt to overcome these limitations.

Chapter 4

FRAMEWORK AND METHOD OF ANALYSIS

There are two main stages in the analysis carried out here. Firstly, an assessment is carried out of the determinants of the households' response to power sector reforms. In doing so, we have taken into account the variables that reflect subsidy received or the quality of supply, which may influence the losses and gains of the households (due to reform), and their responses to reform proposals. This exercise is based on an econometric exercise by pooling together household data at the state and national levels.

The second stage of the analysis is an aggregation at the state level to see the overall support/opposition to reforms, given the nature of the households in the state and their response towards reform. For example, if the first stage demonstrates that unconnected households are less likely to oppose reforms, households receiving subsidy for electricity are more likely to oppose, or those who encounter very poor quality of electricity supply are more likely to support reforms then the net support at the state level - the main concern for the second stage of analysis - depends on how many households are there in a state under these categories. This would then help us to identify the majority response to reform in a state - whether it is one of anti-reform or pro-reform. This part of the analysis is based on descriptive statistics, categorisation and argumentation based on examples, since the number of states studied here (i.e., 14) does not permit reliable econometric exercises. The details of these two stages of analyses and the data used are given in different sections of this chapter. Before proceeding further, a clearer definition of what we mean by reform[35] and also a description of the methodological assumptions are necessary.

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

4.1. An Outline of a Few Broader Assumptions

The pre-reform situation of electricity sector, and the expectation of outcomes of reform are listed in Table 4.1. However there could be different `means' of achieving the reform outcomes. These means may include different combinations of the following strategies: independent regulation, unbundling, profit centres, formation of companies, privatisation, open access, competition and so on. There is extensive literature on the desirability one or other means or the combinations. However here the focus is more on the pre-reform problems and expected outcomes at the post-reform stage, and not on the means of reform.

Table 4.1: An Outline of the means and outcomes of Power Sector Reforms

Problems in pre-reform stage	Means of reform	Expected outcomes of reform
Actual average cost of supply less than efficient cost	Profit-centres/ unbundling/ Formation of Companies Privatisation Competition Open access	Actual average cost becoming efficient cost
Average tariff less than the average cost for significant sections	Tariff reform Independent Regulation	Average tariff becoming closer to average cost of supply for many sections
Total tariff recovery less than the total cost	-do-	Total tariff recovery to meet operation and investment costs
Quality/quantity of supply less than required	All the above	Utilities in a position to supply the quantity and quality of power demanded by the consumers

This study takes a position that improving the financial viability and efficiency of electricity boards is necessary. 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 compensate without encountering fiscal problems. Hence this study reckons 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 responds to these two components of reform (i.e., tariff rationalisation and efficiency improvement) is the main focus of this study.

However the study has focussed on households (and not industrial units or commercial establishments) mainly due to the following reasons: Since the industrial and commercial consumers in general support and demand reforms as they pay a tariff on an average more than the cost of supply. Hence the real question for this analysis is the following: why does power sector reforms progress slowly despite support from industry and trade. There is another reason for concentrating on households. 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 loses 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 responses of the households.

Broadly, this study follows the framework of political economy based on rational choice perspective[36]. 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 the 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 give net benefits to the society as a whole are considered as reforms 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

[36] For a description of this and other approaches of political economy, see Grindle (2001).

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).

Having seen the broader methodological parameters of the study, we can now turn to the specific aspects of the methodology followed in this study.

4.2. Determinants of Households' Response to Tariff and Efficiency Reform: A Framework

This section is to see whether some of the variables, such as subsidy or the quality of supply having implications for the losses or gains due to reforms to the households, have an effect on their response to reform strategies. The households' response to two strategies of reform, i.e., tariff reform and efficiency reform is analysed. Since the majority of households with electricity connection in most states, including those belonging to upper 10% of the income category, receive partial subsidy for the consumption of electricity, and the financial viability of utilities would require enhancement of tariff enjoyed by many of these households, households were asked `whether they are willing to pay a higher tariff'. Since another justification for tariff reform is that the existing levels of electricity subsidy affect governments' ability to provide other services, there was also a question of `whether you consider the provision of subsidised electricity to be affecting other governmental services'.

`Whether you consider the electricity board to be managing its affairs efficiently' and `whether you support privatisation of the electricity board' are the questions asked to capture attitude to efficiency reform in general and privatisation in particular. It may be noted that this study does not take a position on whether privatisation is the best way of enhancing efficiency, but only analyses how people respond to the suggestion that electricity boards be privatised. However privatisation is the most visible, clearly articulated and comprehensible attempt to enhance efficiency, where as it is difficult for many people to understand the merits and demerits of other approaches of enhancing efficiency such as profit centres, unbundling, or even the formation of companies.

In the analysis carried out here, the determinants of the households' responses to the questions on `willingness to pay' and `support for privatisation' (i.e., yes, no, indifferent, etc.,) are analysed. Or the responses to these questions are the dependent variables (analysed separately) in the econometric exercise carried out here. The independent variables considered for the analysis, the rational for their selection and the expected direction of their influence on dependent variables are given in Table 4.2. (How do we measure each of these variable is mentioned in the next chapter, while discussing the results of the regression exercises.)

Table 4.2: Variables considered as likely determinants of households' response to reform

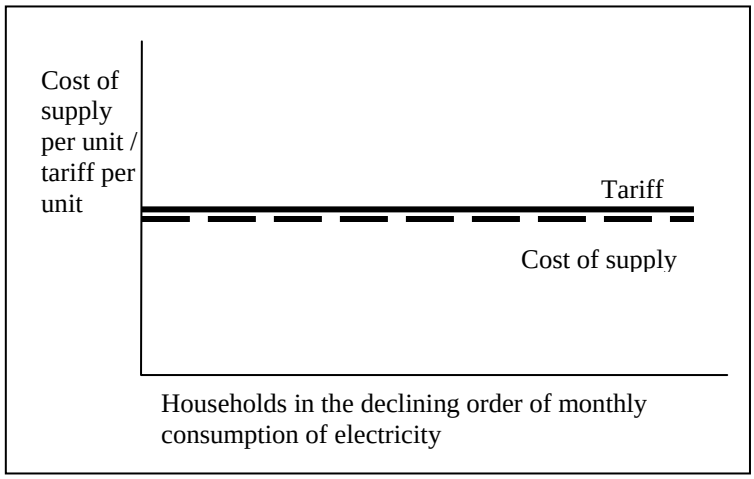
Independent Variable	Rationale of inclusion	Expected direction of influence
Whether the household has electricity or not	Household's response to reform may depend on whether it has electricity connection	Unconnected household more likely to be indifferent to reform
Units of consumption	Extent of consumption can influence the level of subsidy, the cost of poor quality supply, which in turn can determine the loss/gain due to reform	Those who consume more electricity are more likely to support reform
Tariff range	Those who pay a tariff closer or higher than cost do not get subsidy and are less likely to be affected by tariff reform	Those who pay higher tariff are more likely to support reform
The use of costly electric equipments	Loss due to poor quality of supply is more for those who use such equipments	Those who use such equipments more likely to support reform
The duration of power cut	Higher the power cut, more costly is the status quo	Higher the power cut, more the support for reform
The level of voltage problem	Higher this problem, more costly is the status quo	Higher the voltage problem, more support for reforms
Having separate connection for irrigation	Irrigation connections are more subsidised, and such households are greater beneficiaries of subsidies	Those who have such irrigation connections are less likely to support reform
Owning a shop/trade establishment	Tariff for electricity for such establishments are higher than the cost of supply	Such owners more likely to support reform

The results of the econometric exercise analysing the impact of these independent variables on households' response to reforms are discussed in chapter 5.

4.3. Aggregating Households' Response at the State Level: A Framework

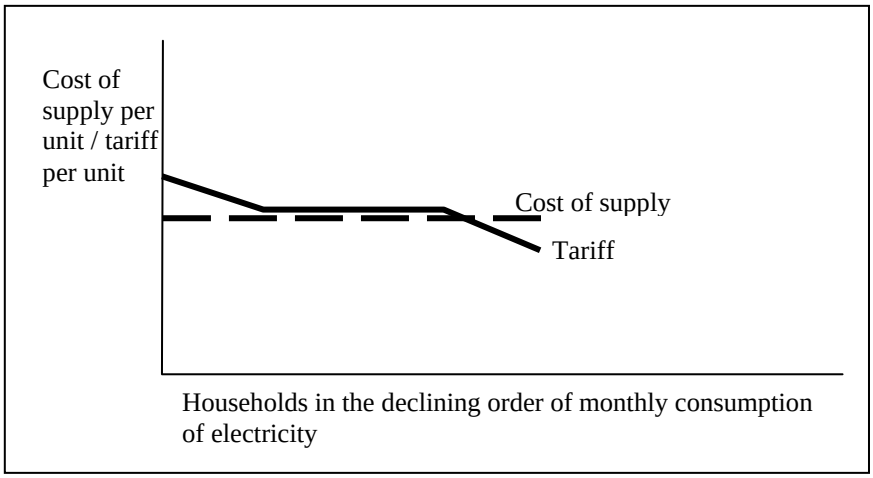
If the attitude of each household to reform is influenced by whether they have electricity connection, whether they get subsidy, how much electricity they consume, how poor is the quality of supply, and so on, then the aggregate response in a state would be determined by the number of households under each of these categories (i.e., connected versus unconnected, subsidised verses subsidising, those using more electricity versus those using less electricity) and how the majority of households respond to reform for all these reasons taken together. This is demonstrated below with the help of a few figures. In all these figures (Figures 4.1-4.4), households in a society are represented as different points on X-axis in a decreasing order of their monthly consumption of electricity, which would mean that unconnected households are represented by the points on x-axis on the right-hand side. Both the cost of supplying one unit of electricity (C) and average 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 4.1 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 4.1: Cost and tariff distribution (hypothetical case I)



Under this situation, even if a minority (say a small group of consumers who take fewer units of electricity) are subsidised and paying a tariff less than the cost, majority will be indifferent to 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 4.2 (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 either indifferent or do not oppose reforms[37]. (On the other hand if the unconnected consumers support reform that will only further enhance the support base of reform.) However if the situation is one as in Figure 4.3, 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.

Figure 4.2: Cost and tariff distribution (hypothetical case II)



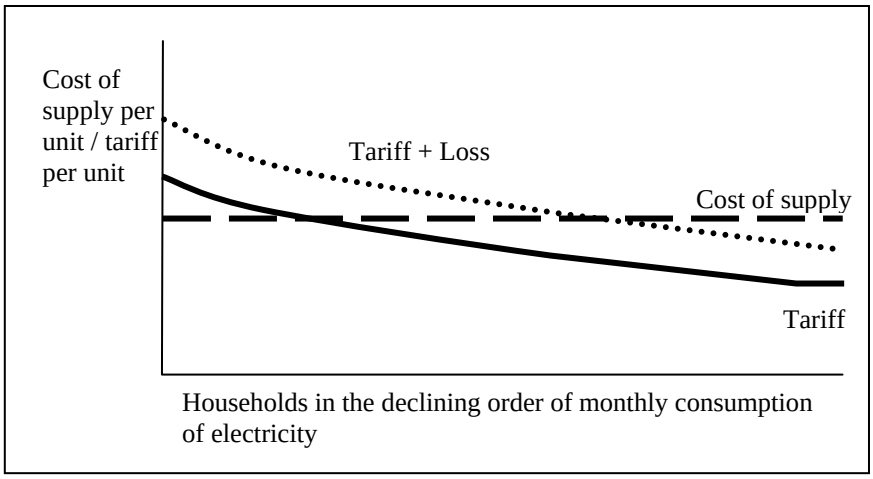
Here the majority get electricity at rates lower than the cost of supply. But all the consumers incur a loss (L) due to poor quality supply (for example, their expenditure on generators, invertors, voltage stabilisers, candles, kerosene lamps etc., to be used when there is no power supply), which when added to the tariff makes it (T+L) higher than the cost of supply[38] for the majority of consumers. Under

[37] 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

[38] Consumers need not always compare with the cost of supply given by the utility but can do it with a perceived efficient cost of supply.

such a condition, the majority is likely to support tariff reform (and efficiency reform).

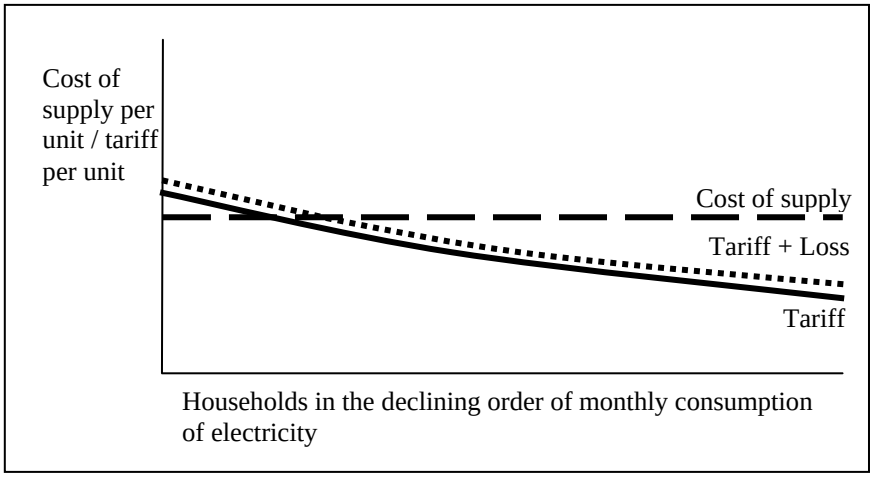
Figure 4.3: Cost and tariff distribution (hypothetical case III)



There can also be a situation where T+L is less than C for the majority of consumers (as in Figure 4.4) when T is much lower than C and/or when quality of supply is not so poor. Whether there will be adequate social support for tariff and efficiency reforms under such a condition needs further investigation. This may depend on the number of people who perceive that they lose in spite of the subsidy they receive for electricity and its reasonable quality. 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 the 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 s/he can perceive the status quo of power sector as 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 of 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 costly, 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 4.4: Cost and tariff distribution (hypothetical case IV)



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 as costly, then it is unlikely to that there will be adequate social support for tariff reform in a situation depicted in figure 4.4. The support for efficiency reforms under such a situation can reduced if people perceive that the reduction in cost through efficiency measure is not going to reduce their tariff any further. However if only a minority have electricity connections, then their opposition/indifference need not be decisive politically.

Under what conditions would people currently in a situation as in figure 4.4, 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 situation could be similar to the one in Figure 4.3.

The discussion so far has analysed hypothetically 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 here.

4.4. Data and the Sources

This section describes the data collected for carrying out the two stages of analysis mentioned before. Secondary data provides some related information described below:

(1) Ratio of households with electricity connections out of the total households in each state;

Ratio of the households with electricity connections out of the total households in each state in the year 2001 is available in the census. An estimate of this information can be had 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 (on the assumption that every connected household would use electricity for lighting).

(2) The average cost incurred by the utility to supply electricity to households[39];

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.

[39] There is an issue of what is the real cost. It is quite possible that the real cost of supply to households can be different from that of industry and other 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 to this information that people respond as voters, and not to any technically correct actual estimates of cost of supply known only to experts and insiders.

However the following information is not available from secondary sources: (1) The average tariff paid per unit by households consuming different amounts of electricity[40]; (4) The quality of power supply (power interruptions, voltage problems, etc.) and the losses to households, if any, due to the poor quality of supply; (5) How people feel about the opportunity cost of resources spent by the government to meet the gap between the cost of supply and tariff; and (6) household's support or opposition to reform (This can also be for reasons beyond subsidy and quality of supply, such as the general losses arising from the unviable power sector and its impact on economy).

In order to collect 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 electricity[41], a primary survey was carried out in each state. The survey has also elicited information on how people feel about the opportunity cost of resources spent by the government to provide electricity subsidy and whether they are willing to support strategies of tariff and efficiency reforms. We asked whether the household is willing to pay a

[40] 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.

[41] 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.

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 1.) To some 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, this can be due to a perception of higher losses due to other reasons. These can be the economic impact of unviable power sector or fiscal problems created through power subsidy and so on.

The sample of the primary survey was 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 Tamil Nadu), 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 village (rural) divisions and Municipal/Corporation (urban) divisions, given in Table 4.3. The divisions 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 (for example, EISP, 2000). A systematic random sampling was used within each division to select the households to be surveyed.

Table 4.3: Villages and city divisions where primary survey was carried out 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 Tamil Nadu, 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.

The primary survey was conducted in 14 Indian states, including all major states excluding only the small or less populated states located near the northern or northeast mountainous areas. The states surveyed are the following: Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Gujarat, Uttar Pradesh, Bihar, West Bengal, Punjab, Haryana, Rajasthan, Karnataka and Maharashtra. 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, and World Bank (India), which have been involved in a number of Indian states providing program loans to reform power sector, have also been carried out.

Chapter 5

RESPONSE OF THE HOUSEHOLDS TO REFORM

This section starts with descriptive statistics of the nature of households surveyed and the independent variables taken up for econometric exercises (described in the next section.) The descriptive statistics provide insights on the connectivity, quality of supply, etc., based on household surveys in different states.

5.1. Descriptive Statistics

5.1.1. Response of the connected verses unconnected households

The percentage of the households connected with electricity supply in each state was mentioned earlier (Table 2.4) in Chapter 2. Our survey sample was not meant to reflect reliably the connected and unconnected households in every state. This was because there are states where only 20% households have electricity connection, and in those cases if we want to have an adequate number of connected households in the sample (which is necessary to analyse many dimensions of the response to power sector reform), then a sample representing connected verses unconnected households would have to be very large. Moreover many issues such as the cost of poor quality supply and the willingness to pay a higher tariff are not relevant to unconnected households. Thus our sample survey was intended to have only a reasonable number of unconnected households (around 20%) in all states.

It would be interesting to see the income-status of unconnected households. However we have not collected information on income, as it is almost impossible to get reliable figures of income from households in contexts such as India where around 90% of people work in informal sector (of industry and trade) or in agriculture and are likely to be involved in diverse income-earning occupations, and where people are very reluctant to disclose that information. That is why all official statistics in India depend on consumer expenditure rather than income, and a survey to collect information on all expenditure items has to be an elaborate one designed for that purpose. Thus the primary survey conducted here has not attempted to collect information on either income or per-capita expenditure. However it provides crucial information on household assets including the type of house (for example the type of roof, wall, floor, etc.), which are reasonable indicators of the wealth status of the households in India.

This information may be used to see the relative status of unconnected vis-à-vis connected households and is given in Table 5.1. The materials used for roofing or flooring the house reflects indirectly the income/wealth of the households. The Table 5.1 shows that more of the unconnected households in general use materials reflecting lower levels of income/wealth. This is an indication of the relative poverty of unconnected households.

Table 5.1: Roofing & flooring materials of the unconnected versus connected households (percentage of households)

	Elect-rification	Roof				Floor			
		Conc-rete	Tiles	Thatch	Other	Mosaic/ Marble	Red/Black Oxide	Cement	Sand+ Others
Kerala	C	43.94	50.19	1.33	4.55	19.47	45.23	27.86	7.44
	U	10.14	52.17	18.84	18.84	0.00	11.76	41.18	47.06
Tamil Nadu	C	56.04	38.04	5.47	0.46	18.04	14.61	23.29	44.06
	U	14.52	41.94	41.94	1.61	0.00	24.19	46.77	29.03
Andhra Pradesh	C	49.24	4.36	21.79	24.62	22.66	32.24	12.85	32.24
	U	16.67	0.00	69.05	14.29	7.14	11.90	61.90	19.05
Orissa	C	43.01	28.77	27.67	0.55	32.70	66.54	0.76	0.00
	U	10.81	19.59	68.92	0.68	1.57	98.43	0.00	0.00
West Bengal	C	70.78	17.21	0.97	11.04	10.71	70.13	19.16	0.00
	U	15.63	57.29	11.46	15.63	1.57	17.80	79.58	1.05
Uttar Pradesh	C	88.53	0.88	7.06	3.53	22.65	27.06	49.71	0.59
	U	26.25	1.88	57.50	14.38	0.00	5.00	94.38	0.63
Madhya Pradesh	C	23.81	16.43	56.90	2.86	11.22	21.46	67.32	0.00
	U	1.27	18.99	79.75	0.00	1.25	3.75	95.00	0.00
Bihar	C	74.83	10.26	14.90	0.00	20.79	39.78	37.28	2.15
	U	52.63	22.22	23.98	1.17	0.58	21.39	71.68	6.36
Haryana	C	57.17	30.65	8.91	3.26	58.04	14.35	21.74	5.87
	U	30.77	25.64	41.03	2.56	10.26	20.51	61.54	7.69
Rajasthan	C	42.36	40.92	15.27	1.44	45.24	2.88	40.63	11.24
	U	3.25	17.53	76.62	2.60	0.00	2.60	87.01	10.39
Gujarat	C	68.48	0.68	29.71	1.13	82.54	4.31	10.88	2.27
	U	22.41	1.72	72.41	3.45	48.28	1.72	48.28	1.72
Karnataka	C	40.69	40.89	10.32	8.10	31.58	47.17	14.57	6.68
	U	0.00	28.57	71.43	0.00	0.00	42.86	57.14	0.00
Punjab	C	54.46	41.45	3.86	0.24	70.84	6.65	6.39	16.11
	U	26.67	35.00	38.33	0.00	21.57	15.69	17.65	45.10
Maharastra	C	45.43	46.63	3.13	4.81	36.32	37.82	25.64	0.21
	U	0.00	51.22	48.78	0.00	0.00	39.02	60.98	0.00
Total	C	52.91	27.33	14.79	4.97	35.15	29.56	25.31	9.98
	U	19.34	26.44	47.74	6.47	4.23	21.95	64.64	9.18

U – Unconnected
C - Connected

The primary survey has also elicited information on the reasons for these households remaining unconnected. This is summarised in Table 5.2. Less than 25% of these unconnected households in most states have applied and are waiting for connections, showing the delays on the part of the utility in this regard. The others have cited reasons of affordability. That about three-fourth of these households could not afford electricity connection for different reasons too denote their poverty.

Table 5.2: Reason for not having electricity connections

	Applied and waiting	House not good for electrif-ication	More expense for bringing line to house	Cant afford wiring expense	Cant afford monthly bill	Other financial reasons	Other reasons	Total
Kerala	29.58	9.86	19.72	7.04	1.41	16.90	15.49	100
Tamil Nadu	8.06	4.84	-	-	-	75.81	11.29	100
Andhra Pradesh	11.90	7.14	33.33	4.76	33.33	7.14	2.38	100
Orissa	46.91	5.56	20.37	2.47	9.26	14.20	1.23	100
West Bengal	40.63	3.65	16.67	3.13	9.38	26.56	-	100
Uttar Pradesh	4.38	23.75	8.75	17.50	21.88	23.75	-	100
Madhya Pradesh	15.00	27.50	11.25	-	7.50	38.75	-	100
Bihar	17.55	2.13	15.96	-	9.57	54.79	-	100
Haryana	35.90	12.82	33.33	2.56	10.26	5.13	-	100
Rajasthan	2.60	42.21	41.56	-	0.65	12.99	-	100
Gujarat	18.97	27.59	3.45	-	3.45	46.55	-	100
Karnataka	42.86	-	-	-	28.57	28.57	-	100
Punjab	65.00	-	11.67	3.33	1.67	15.00	3.33	100
Maharastra	40.48	19.05	7.14	9.52	4.76	19.05	-	100
Total	24.68	14.20	17.84	3.95	9.04	28.55	1.75	100

How do unconnected households respond to power sector reforms? Their response to tariff reform or their willingness to pay a higher tariff is irrelevant. However the primary survey has elicited their response to the proposal of privatisation. A summary picture of their response to privatisation (under categories of 'yes' to privatisation, 'no to privatisation', 'indifferent' and 'don't know') in comparison with that of the connected households in each state[42] is provided in Table 5.3. More than two-third of unconnected households in six states (and more than four-fifth in 5 states) have expressed 'don't know' as their response to privatisation. It may be

[42] This information was not collected in two states. This question was omitted in Orissa as the electricity utility was already privatised there. It was not included in Kerala, as the question came up only after conducting the survey in Kerala, where it was carried out first on a pilot basis.

wrong to consider this as due to the lack of general awareness since in all these states only a much smaller proportion of connected households have expressed such ignorance. Thus the 'don't know' response of the unconnected households can be interpreted as their disinterest in knowing or gaining information about privatisation of something in which most of them do not have an immediate stake. While analysing the response 'no' to privatisation, one can see that the percentage of unconnected households providing such a response is much lower than that among the connected ones. A couple of outlier cases are also interesting. In Bihar and Uttar Pradesh, two backward states with very low level of electricity connections, a much higher proportion of unconnected households support privatisation than in other states.

Table 5.3: Opinion on Privatisation by the connected and unconnected households

State	Electrification	Sample size	Opinion about privatisation				
			Yes	No	Indifferent	Don't know	Total
Kerala	Connected	528	16.22	52.29	11.83	19.66	100.00
	Unconnected	71	-	-	-	-	-
Tamil Nadu	Connected	439	11.85	44.42	5.01	38.72	100.00
	Unconnected	62	1.61	14.52	3.23	80.65	100.00
Andhra Pradesh	Connected	459	13.57	71.55	4.38	10.50	100.00
	Unconnected	42	2.38	9.52	2.38	85.71	100.00
West Bengal	Connected	308	14.61	52.60	12.99	19.81	100.00
	Unconnected	192	15.29	36.47	22.35	25.88	100.00
Uttar Pradesh	Connected	340	43.54	31.53	15.62	9.31	100.00
	Unconnected	160	68.97	10.34	13.79	6.90	100.00
Madhya Pradesh	Connected	420	8.33	18.10	3.57	70.00	100.00
	Unconnected	80	1.27	13.92	3.80	81.01	100.00
Bihar	Connected	302	45.36	11.26	10.26	33.11	100.00
	Unconnected	188	26.11	10.56	13.33	50.00	100.00
Haryana	Connected	460	7.02	30.04	12.50	50.44	100.00
	Unconnected	39	4.17	4.17	12.50	79.17	100.00
Rajasthan	Connected	347	1.17	2.63	71.35	24.85	100.00
	Unconnected	154	0.00	0.00	17.69	82.31	100.00
Gujarat	Connected	441	15.12	18.14	38.14	28.60	100.00
	Unconnected	58	0.00	5.00	30.00	65.00	100.00
Karnataka	Connected	494	42.31	28.34	1.01	28.34	100.00
	Unconnected	7	0.00	0.00	0.00	100.00	100.00
Punjab	Connected	415	4.13	20.87	51.46	23.54	100.00
	Unconnected	60	3.57	3.57	62.50	30.36	100.00
Maharastra	Connected	478	14.85	41.63	13.81	29.71	100.00
	Unconnected	42	5.71	28.57	31.43	34.29	100.00
Total	Connected	5796	17.78	33.77	18.35	30.10	100.00
	Unconnected	1317	15.25	11.58	17.61	55.56	100.00

In West Bengal where the left parties are in power and have a dominant presence, about one-third of the unconnected households are against privatisation[43].

In general, around 85% are either indifferent to or uninterested in (or otherwise support) privatisation. Thus it seems reasonably justifiable to go ahead with further analysis on the assumption that the opposition to (and hence political reluctance to implement) power sector reforms in Indian states mainly arises from the households with electricity connection rather than those without. Thus the following sections focus on the response of the connected households of different types - those who consume more or less electricity, those who pay a higher or lower tariff, those who have irrigation connections, those who run a shop or a commercial establishment, and so on.

5.1.2. Description of the connected households

In the following section the connected households are described according to their level of consumption, tariff paid, quality of supply, dependence on additional energy sources during power interruptions, and so on. The response of different types of connected households to proposals of power sector reforms is taken up with the help of econometric exercises towards the end of the section.

5.1.2.1. Level of electricity consumption by the households

Table 5.4 summarises the percentage domestic consumers who take different amounts of electricity units for 2 months based on primary survey.

There are only three states with more than 10% of the domestic consumers belonging to the higher end category (350 units and above). The very high proportion of low-amount consumers in Bihar is probably a reflection of its low economic development and the poor quality of electricity supply. Otherwise, one cannot see much difference in the consumption pattern of the electricity in most other states, with 60 to 70% consuming less than 150 units in two months. An indirect way of assessing the consumption of electricity is to take the presence of electricity-consuming white goods such as fridge, mixer, etc.) Such an account is

[43] Probably a similar picture would have emerged in Kerala had the survey there had incorporated such a question to the unconnected households. Here too left parties have significant influence.

also given in Table 5.5. Here four states (Bihar, Andhra Pradesh, Kerala and Madhya Pradesh) show a marked difference from others.

Table 5.4: Percentage of domestic consumers under different consumption (bi-monthly) categories in each state

	1-50	51-100	101-150	151-200	201-250	251-300	301-350	351 +
Kerala	9.54	31.01	20.48	16.10	9.94	6.96	1.59	4.37
Tamil Nadu	18.88	30.54	16.32	13.99	4.66	3.50	3.26	8.86
Andhra Pradesh	29.40	42.76	14.92	7.57	2.45	1.11	0.67	1.11
Orissa	6.81	28.79	30.34	11.15	5.26	9.60	0.62	7.43
West Bengal	1.99	17.88	28.15	12.25	9.93	7.95	6.62	15.23
Uttar Pradesh	10.81	38.74	15.77	15.32	13.51	5.41	0.00	0.45
Madhya Pradesh	NA	NA	NA	NA	NA	NA	NA	NA
Bihar	1.59	70.63	2.38	1.98	1.59	1.19	2.78	17.86
Haryana	19.07	42.13	11.31	12.64	5.76	1.33	3.33	4.43
Rajasthan	43.93	53.18	2.89	0.00	0.00	0.00	0.00	0.00
Gujarat	15.85	29.14	14.45	6.76	5.13	2.33	0.93	25.41
Karnataka	65.11	18.26	8.72	3.85	1.22	1.83	0.20	0.81
Punjab	0.00	51.25	23.84	5.34	8.19	2.85	3.20	5.34
Maharastra	9.21	24.27	28.03	14.02	6.90	4.18	5.02	8.37
Total	19.93	35.07	16.76	9.56	5.49	3.59	2.16	7.44

Table 5.5: Percentage of households owning High value electric items (any one or more of these items: Fridge, Mixer, washing machine, computer, electric heater)

States	No	Yes
Kerala	54.73	45.27
Tamil Nadu	40.77	59.23
Andhra Pradesh	88.89	11.11
Orissa	13.42	86.58
West Bengal	70.78	29.22
Uttar Pradesh	70.00	30.00
Madhya Pradesh	90.24	9.76
Bihar	81.13	18.87
Haryana	46.96	53.04
Rajasthan	67.72	32.28
Gujarat	61.68	38.32
Karnataka	88.46	11.54
Punjab	24.58	75.42
Maharastra	59.21	40.79
Total	61.25	38.75

The level of electricity consumption can be taken also as an indicator of income of the household. This can be assessed in a number of ways with the available data. As mentioned earlier, we have not collected information on income or expenditure of

the household. However 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. Table5.6 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 unreasonable 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.)

Table 5.6: Average monthly consumption of electricity (KWh) by floor and roof type of the house

State	Roof				Floor			
	Concrete	Tiles	Thatch	Other	Mosaic	Red/ Black Oxide	Cement	Other
Kerala	184.79	104.35	77.14	94.08	210.04	134.25	97.76	132.26
Tamil Nadu	186.44	101.84	84.58	89.00	279.49	82.64	142.01	116.72
Andhra Pradesh	113.31	86.65	68.62	51.02	105.66	92.07	63.83	63.55
Orissa	196.98	139.85	90.66	198.00	245.95	114.65	177.00	-
West Bengal	241.63	132.77	31.67	136.66	330.21	216.12	104.84	-
Uttar Pradesh	102.73	66.67	8.33	100.00	220.75	77.85	55.56	182.50
Madhya Pradesh	-	-	-	-	-	-	-	-
Bihar	171.07	83.29	66.76	-	458.15	129.08	75.04	247.67
Haryana	144.70	121.70	56.66	89.27	128.29	122.50	130.26	87.56
Rajasthan	63.80	53.06	41.53	56.80	73.41	50.40	49.38	44.18
Gujarat	346.65	93.33	88.30	66.67	271.84	76.16	53.73	180.60
Karnataka	86.82	40.30	49.14	21.75	92.17	42.08	24.50	43.70
Punjab	156.47	106.66	138.50	-	140.64	139.33	129.25	98.47
Maharastra	276.05	119.77	138.69	210.10	225.04	124.89	237.83	150.00
Total	172.97	92.23	51.25	83.33	190.30	110.95	78.50	93.42

5.1.2.2. Tariff paid by the households

Households categorised by the tariff per unit (KWh) of electricity is given in Table 5.7. Here we can see marked difference between states. In one group of states comprising Kerala, Tamil Nadu, Andhra, Orissa and Bihar, more than 70% of the households pay less than 2.50 Rupees per unit, where as in the other group (including Gujarat, Haryana, Rajasthan, Uttar Pradesh, Maharastra, Punjab and West Bengal) around or more than 60% of the consumers pay greater than 2.50 Rupees.

Table 5.7: Percentage distribution of consumers based on tariff (per KwH) in each state

	Less than Rs. 1.00	Rs. 1.00-1.50	Rs. 1.50 - 2.00	Rs. 2.00 - 2.50	Rs. 2.50 - 3.00	Rs. 3.00 - 3.50	Rs. 3.50 - 4.00	Rs. 4.00 +
Kerala	0.00	7.16	70.78	16.30	4.77	0.60	0.00	0.40
Tamil Nadu	47.55	35.43	14.69	0.93	0.70	0.00	0.23	0.47
Andhra Pradesh	0.00	0.22	28.06	38.53	19.15	3.79	2.90	7.35
Orissa	0.00	17.19	47.81	27.19	6.25	0.63	0.31	0.63
West Bengal	0.00	0.33	1.66	32.78	15.23	39.40	4.30	6.29
Uttar Pradesh	0.00	6.33	0.00	47.51	1.36	26.24	14.03	4.52
Madhya Pradesh	NA	NA	NA	NA	NA	NA	NA	NA
Bihar	0.00	0.00	68.92	31.08	0.00	0.00	0.00	0.00
Haryana	0.00	0.22	1.11	4.88	12.20	53.44	18.18	9.98
Rajasthan	0.00	0.00	0.00	0.00	0.00	0.58	10.40	89.02
Gujarat	23.89	0.47	0.94	2.34	11.71	39.34	11.48	9.84
Karnataka	0.22	0.00	0.65	2.83	29.35	21.96	15.87	29.13
Punjab	0.50	0.25	1.75	37.66	35.66	11.22	10.22	2.74
Maharastra	0.42	0.21	1.05	9.62	15.27	58.37	9.21	5.86
Total	6.17	5.24	17.86	17.27	12.66	20.54	7.62	12.62

5.1.2.3. Quality of supply encountered by the households

There are multiple dimensions of quality of supply. This study has considered a few of them. The duration of power interruption encountered during the last 24 hours preceding the date of survey is one way of capturing the level of power failure, and this information is summarised in Table 5.8. It may be noted that here the quality of electricity supply is the one encountered by the households. This can be different from the data available with the utility. For example, the utility may have information on the duration of power interruptions, where as the information on interruption provided by the household would include both the declared interruptions and those caused by any faults in transmission and distribution system up to the end of the consumption point. Moreover households report only those interruptions noted by them, i.e., when they needed electricity. It is this experience of quality of supply that is likely to affect the households' response to the strategies of reform.

Table 5.8: Duration of power failure/ power cut encountered by connected consumers during the last 24 hours (on the date of survey)

State	No power cut	Duration of power failure in minutes					Average duration of power failure in minutes
		1-30	30-60	60-120	120-240	240+	
Kerala	41.48	29.59	21.09	17.35	19.05	12.93	131.12
Tamil Nadu	49.43	57.26	17.95	21.37	2.99	0.43	46.04
Andhra Pradesh	20.26	3.05	3.60	0.00	0.00	93.35	357.51
Orissa	26.58	11.58	29.73	49.81	8.11	0.77	93.98
West Bengal	33.44	19.12	32.35	25.00	22.55	0.98	88.24
Uttar Pradesh	26.47	0.00	2.05	0.00	0.41	97.54	899.20
Madhya Pradesh	6.80	0.00	0.00	0.25	0.25	99.50	785.87
Bihar	2.00	0.00	3.72	0.00	11.15	85.14	1033.73
Haryana	8.40	0.00	0.88	20.57	28.88	49.67	421.51
Rajasthan	0.60	0.00	5.22	43.19	40.00	11.59	184.96
Gujarat	56.52	0.00	0.00	19.51	4.07	76.42	507.32
Karnataka	3.00	4.42	8.21	20.42	5.26	61.68	256.71
Punjab	2.68	0.00	0.00	0.24	40.53	59.22	345.87
Maharastra	1.67	0.00	0.85	19.57	35.32	44.26	315.00
Total	18.86	7.04	7.45	16.15	17.44	51.92	391.91

Based on the information in Table 5.8, the states may be grouped into three. Kerala, Tamil Nadu, West Bengal and Orissa have fairly good quality supply. The duration of power cut is lowest in Tamil Nadu. Even if there is no declared power cut, a significant number of consumers do encounter power failure. For example, in Kerala where there is currently no declared power cut, about 55% of connected consumers face power interruptions. Bihar, Madhya Pradesh and Uttar Pradesh have the worst quality with reported average duration of power interruptions of more than 750 minutes per day. We have collected information of power interruptions during the last seven days on the date of survey. This also provide a similar picture on the quality of electricity supply in different states.

However it is well known that the cost of power failure is higher when it occurs at an unexpected time and also when power is needed (for example during the evening hours for households). For example Andhra Pradesh has a regulated 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.) (Table 5.9.)

Table 5.9: Source of alternative energy used for lighting during power failure (Percentage of connected households who faced power cut problem yesterday)

	Did Nothing/ Powercut was at day time	Kerosene Lamp	Candle	Emergency Lamp	Inverter/ Generator	Kerosene and/or Candle and/or Emergency Lamp
Kerala	46.25	19.17	13.75	10.83	2.92	7.08
Tamil Nadu	56.56	22.17	15.84	1.81	0.45	3.17
Andhra Pradesh	49.43	36.86	11.43	1.14	0.00	1.14
Orissa	6.90	65.13	1.53	12.26	0.77	13.41
West Bengal	6.35	55.03	2.65	17.99	8.47	9.52
Uttar Pradesh	0.40	82.73	1.61	2.41	0.80	12.05
Madhya Pradesh	1.39	71.13	9.24	2.08	0.92	15.24
Bihar	4.39	75.00	0.34	14.86	3.04	2.36
Haryana	44.52	18.42	15.79	2.41	6.14	12.72
Rajasthan	32.75	26.09	12.75	11.01	8.41	8.99
Gujarat	6.08	60.22	13.81	19.34	0.00	0.55
Karnataka	38.56	16.34	21.13	6.97	0.00	16.99
Punjab	5.81	25.18	25.18	6.54	12.83	24.46
Maharastra	45.92	40.77	7.94	1.72	0.64	3.00
Total	26.34	41.37	11.87	6.80	3.38	10.24

The sources of energy (mainly for lighting) used by different households in these states during power cuts are given in Table 5.9. In most states, the most used alternative source is the kerosene lamp (and in Tamil Nadu and Kerala, where power failure is for a shorter duration candles are also being used as frequently as kerosene lamps). Those who use kerosene lamps during power failure usually spend less than what they would have spent had there been no power cut, which is demonstrated in the example in following box.

> Let us consider one household taking 100 units of electricity per month, paying 200 Rupees. If 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 daily expenditure on electricity 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 electric bulbs and a couple of fans, if there was electricity supply.

This has some important implications. The expenditure on this coping strategy (i.e., use of kerosene lamps/candles) followed by most of the connected consumers at times when power is not available, does not add more to their monthly expenditure that they would have incurred if there were uninterrupted power supply. Thus their willingness to pay for better quality supply, if we consider their expenditure on

coping strategy as their revealed preference, is not significantly more than their current expenditure. 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 higher generally than the tariff rates for electricity prevailing in India. Table 5.10 provides evidence of whether those who use kerosene as alternative source are less willing to pay more for electricity than those using inverters/generators. It can be seen that though this is the case in general, a greater proportion of people using kerosene in poor (electricity) quality states such as Bihar, UP and MP are also willing to pay more for better quality supply.

Table 5.10: Willingness to pay Vs source of lighting during power cut (state wise percentage)

State	Kerosene Lamp		Inverter or Generator	
	WTP more for better quality		WTP more for better quality	
	Yes	No	Yes	No
Kerala	7.31	92.69	38.89	61.11
Tamil Nadu	13.04	86.96	0.00	100.00
Andhra Pradesh	12.75	87.25	40.00	60.00
Orissa	13.10	86.90	70.59	29.41
West Bengal	28.02	71.98	32.81	67.19
Uttar Pradesh	48.21	51.79	22.64	77.36
Madhya Pradesh	76.82	23.18	90.91	9.09
Bihar	86.61	13.39	50.00	50.00
Haryana	41.72	58.28	54.35	45.65
Rajasthan	17.24	82.76	74.07	25.93
Gujarat	64.90	35.10	100.00	0.00
Karnataka	69.50	30.50	100.00	0.00
Punjab	12.90	87.10	53.57	46.43
Maharastra	30.70	69.30	20.00	80.00
Total	38.76	61.24	46.42	53.58

Another dimension of the quality of supply is the stability of the voltage. Significant sections of the sample households have reported (as evident from Table 5.11) a problem of low voltage. Among the better quality states Kerala, Orissa and Tamil Nadu also have low voltage fluctuations. 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 among 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 5.11: Percentage of connected consumers experiencing low voltage and following different coping strategies

States	Percentage of consumers who experience low voltage problem	Method used					
		No answer/ Not doing anything	Bought a UPS	Low voltage bulb/tube	Stabilizer	Others	Total
Kerala	24.24	50.78	0.00	24.22	3.91	21.09	100
Andhra Pradesh	32.10	71.07	1.65	1.65	25.62	0.00	100
Tamil Nadu	31.81	88.36	0.00	0.00	9.59	2.05	100
Orissa	38.79	31.11	0.00	32.59	28.89	7.41	100
West Bengal	57.77	76.61	0.58	5.26	17.54	0.00	100
Uttar Pradesh	42.65	99.31	0.00	0.00	0.69	0.00	100
Bihar	68.24	98.18	0.00	1.82	0.00	0.00	100
Haryana	90.24	44.40	0.00	26.64	28.96	0.00	100
Madhya Pradesh	65.50	72.67	0.33	3.67	23.33	0.00	100
Rajasthan	42.98	69.39	0.00	3.40	27.21	0.00	100
Gujarat	27.05	86.61	0.00	8.93	0.89	3.57	100
Karnataka	55.94	55.31	1.47	31.50	11.72	0.00	100
Punjab	79.12	55.28	0.00	10.56	34.16	0.00	100
Maharastra	43.31	93.63	0.00	2.45	3.92	0.00	100
Total	48.74	70.09	0.29	11.36	16.65	1.61	100

The survey carried out as part of this study has also brought out some perceptions of the change in quality of electricity supply, not only in terms of power interruptions and voltage problems, but also with regard to other dimensions such as behaviour of line staff, billing/bill payment etc. There was also a question on how consumers feel (whether it is reasonable or not) about the increase in tariff during the last three years in relation to the change in quality supply. The descriptive statistics of the answers to these questions are summarised in Table 5.12. Four states (UP, Bihar, Maharastra and MP) stand out with majority reporting a worsening or no improvement in quality of supply in all its dimensions. The quality seems to have improved in all dimensions in five states (West Bengal, Gujarat, Tamil Nadu, Karnataka and Orissa), but with a reasonable increase in tariff in three of them (except in Gujarat and Karnataka) according to the perception of the majority of surveyed households. Majority report little change in quality in four states (Haryana, Andhra Pradesh, Punjab and Rajasthan) but see unreasonable increase in tariff in three of them (except Haryana). This is summarised in Figure 5.1.

Table 5.12: Perceived improvement in performance during the last three years

	Tamil Nadu	Andhra Pradesh	Orissa	West Bengal	Uttar Pradesh	Madhya Pradesh	Bihar	Haryana	Rajasthan	Gujarat	Karnataka	Punjab	Maharastra	Total
Compared to the situation three years ago, the frequency and duration of power cut has														
NA	11.16	0.65	3.01	2.27	30.59	4.29	2.65	0.43	2.59	5.44	0.20	0.96	0.84	4.63
Coming down	57.86	39.65	77.53	88.96	47.35	6.43	25.83	37.17	41.50	70.75	66.19	35.18	2.09	44.97
Increased	7.52	5.66	11.78	2.27	13.82	81.67	31.79	9.57	4.32	2.49	8.10	13.01	88.08	22.40
No change	23.46	54.03	7.67	6.49	8.24	7.62	39.74	52.83	51.59	21.32	25.51	50.84	9.00	28.00
Compared to the situation three years ago, the voltage problem has														
NA	11.39	0.87	2.19	1.95	29.12	6.90	2.65	0.65	2.31	5.45	0.40	1.20	1.67	4.82
Improved	45.10	24.40	73.70	78.90	27.94	8.10	14.24	34.57	40.06	75.23	58.70	28.92	5.86	39.13
Worsened	4.33	2.61	12.33	3.57	32.65	75.48	46.36	16.74	7.78	3.86	21.05	14.22	42.26	21.66
No change	39.18	72.11	11.78	15.58	10.29	9.52	36.75	48.04	49.86	15.45	19.84	55.66	50.21	34.38
Given the changes in quality, do you consider the change in tariff														
NA	22.32	19.83	3.01	9.09	22.65	10.00	27.15	11.09	2.31	5.22	1.01	2.17	1.46	10.10
Reasonable	44.42	9.15	52.33	35.71	14.71	2.62	25.83	35.43	0.86	27.89	47.17	10.60	42.68	27.47
Unreasonable	19.13	66.23	32.60	32.79	53.24	70.00	24.83	15.22	77.23	48.53	48.99	55.42	14.23	42.71
Can't say	14.12	4.79	12.05	22.40	9.41	17.38	22.19	38.26	19.60	18.37	2.83	31.81	41.63	19.72
How is the situation (related to billing /bill payment) today, compared to three years ago?														
NA	12.07	1.31	7.67	4.55	23.24	16.67	6.62	0.87	0.86	5.44	0.61	1.69	19.25	7.65
Better	37.81	37.04	68.77	48.05	25.59	4.05	14.90	24.13	2.31	75.74	78.95	6.27	16.95	34.81
Worse	2.73	3.05	10.41	6.17	34.12	69.52	12.91	13.91	29.39	5.90	10.12	16.63	19.25	17.71
No change	47.38	58.61	13.15	41.23	17.06	9.76	65.56	61.09	67.44	12.93	10.32	75.42	44.56	39.83
How has the line staff's response compared to that of three years ago?														
NA	11.85	1.31	6.85	6.82	16.47	12.86	3.97	0.65	1.15	2.72	0.40	1.45	1.05	4.90
Better	32.57	30.07	64.11	46.10	27.94	4.05	15.23	24.57	0.58	75.28	72.67	6.99	60.67	36.83
Worse	5.47	3.05	12.33	0.97	28.82	65.71	9.27	19.13	10.66	7.48	4.05	10.84	27.20	15.96
No change	50.11	65.58	16.71	46.10	26.76	17.38	71.52	55.65	87.61	14.51	22.87	80.72	11.09	42.31

Among the three states where majority see an improvement in quality with a reasonable increase in tariff, privatisation was attempted in one. In the other two, such improvements have taken place within the state-owned utilities. The situation in Orissa where privatisation has taken place[44] is particularly notable since the majority in that state have expressed satisfaction also over the performance of line staff and procedures of billing.

Figure 5.1: Categorisation of states with regard to perceived improvement in quality of electricity supply and increase in tariff

	Reasonable Increase in tariff	Unreasonable Increase in tariff
Improvement in Quality	Orissa, West Bengal, Tamil Nadu	Gujarat, Karnataka
No Change in Quality	Haryana	AP, Rajasthan, Punjab
Worsening of Quality	Bihar, Maharastra	UP, MP

5.1.2.4. Households owning trade/commercial establishments

We have seen in section 2.5.1 that trade/commercial (and industrial) establishments pay an electricity tariff generally much higher than the average cost of supply in most states. Thus a household owning such an establishment is likely to respond to proposals of tariff and efficiency reforms differently from that of others (in spite of the fact that the household too benefits from the subsidised provision of electricity for domestic consumption). Thus the survey attempted to capture the extent of such households in the sample and also their 'awareness' regarding the higher tariff for commercial establishments. This is summarised in Table 5.13.

[44] 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, lack of competition may be a constraint 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.

Table 5.13: Percentage of households with commercial connections and those who among them are aware of the higher tariff for such connections

State	Shop		Shop Charge	
	No	Yes	Yes	No
Kerala	90.34	9.66	82.69	17.31
Tamil Nadu	93.85	6.15	78.57	21.43
Andhra Pradesh	92.59	7.41	84.85	15.15
Orissa	63.56	36.44	96.27	3.73
West Bengal	84.09	15.91	66.67	33.33
Uttar Pradesh	92.06	7.94	100.00	0.00
Madhya Pradesh	98.57	1.43	66.67	33.33
Bihar	96.69	3.31	90.00	10.00
Haryana	96.30	3.70	94.12	5.88
Rajasthan	82.13	17.87	100.00	0.00
Gujarat	83.45	16.55	76.39	23.61
Karnataka	96.96	3.04	69.23	30.77
Punjab	84.82	15.18	95.16	4.84
Maharastra	97.91	2.09	66.67	33.33
Total	90.04	9.96	87.52	12.48

Orissa stands out with a large percentage of households holding commercial connections and almost everybody being aware of the higher charges for such connections. (It is to be seen whether this situation has emerged after the privatisation there, especially after the stricter implementation of billing and revenue collection.) Gujarat, WB, Punjab and Rajasthan too have about 15 per cent households with such connections. In the remaining states, the figure is much lower. How do these households with commercial connections respond to the proposals of reform? This question will be taken up in a later section.

5.1.2.5. Households with electricity connection for irrigation

Though the cost of supply to agriculture is considered to be lower than to domestic consumers in general[45], agricultural consumers receive a larger subsidy built into

[45] Such an approach is taken by the Andhra Pradesh Electricity Regulatory Commission (APERC), 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 where as 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, where as that of domestic consumption is 2.41 Rupees. (This data is taken from Tariff order, APERC, 2004-05).

their very low (sometimes zero) tariff[46]. Some of the households surveyed receive the benefit of such highly subsidised electricity connections for irrigation. In seven states, more than 10% of the households have such irrigation connections. However the percentage of these households is not more than 13% in six states (with the exception of Punjab with a figure of 18) where the share of agricultural consumption is considerable. For other states, the percentage of households with irrigation connections is only 5 to 6 at the most. Even when a higher percentage of households[47] irrigate land, only a small group of them uses electricity (for irrigation) and other irrigators use canal water or other surface sources. Power subsidy to farmers may not be a major political issue in these states. The influence of having an irrigation connection on the households' response to reform is an issue we will analyse as part of the econometric exercise.

What is the income/asset position of subsidised farmers? Table 5.14 classifies farm-power connections in terms of monthly domestic consumption of electricity, which is taken as an indirect measure of affluence. This shows that very few from the poor have farm connections in most states, except Punjab, Maharastra and Haryana.

Table 5.14: Percentage households with power connections for agriculture

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

[46] 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 in agricultural consumption (See, Gulati and Narayanan, 2003)

[47] Small plots of land and lack of availability of water prevent the remaining from using irrigation.

Table 5.15: Distribution of farm-power connections based on the deciles of monthly intake of electricity for domestic consumption

Deciles	Tamil	Andhra	Haryana	Rajasthan	Gujarat	Punjab	Maharastra
1	-	-	-	-	-	17.0	-
2	-	-	3.7	-	-	3.2	2.0
3	3.64	-	5.6	-	-	13.0	2.0
4	21.82	5.97	3.7	-	-	4.4	6.7
5	25.45	14.71	9.3	-	3.6	5.7	-
6	18.18	25.37	9.3	1.5	1.8	14.6	-
7	1.82	16.18	22.2	10.4	3.6	20.0	-
8	3.94	25.37	27.8	6.1	3.6	5.6	4.4
9	23.64	11.76	22.2	11.9	0.0	12.2	2.1
10	32.73	8.96	7.4	3.0	7.3	4.9	4.3

5.2. Analysing the Households' Response to the Proposals of Reform

We have examined descriptively the variables that are likely to influence the household' response to power sector reforms. Households were asked whether they support privatisation of the utility, in states where privatisation has 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.) Privatisation is taken here as a most visible strategy of efficiency reform, and is used here to examine whether people are willing to support such as clear step. (This is so since many households in India may not be able to differentiate between formation of boards, corporations, profit centres, and unbundling as strategies being carried out to improve the efficiency within the framework of state ownership.) In all the states, there was a question in the survey whether respondents were willing to pay a higher tariff for improved quality of supply[48]. This section analyses the response to these questions and the likely

[48] 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.

influence of variables such as tariff range, units of consumption, quality of supply, etc., on responses through econometric exercises. The definition and measurement of dependent and independent variables for these exercises are summarised in Table 5.16 & 5.17.

Table 5.16: Variables reflecting households' response to reforms (Dependent Variables)

Variable	Definition	Categories of Response
Willing to pay higher tariff	Will you ask for better quality power supply, if providing such quality requires an increase in tariff	Not ready to pay more – 0; Ready to pay more - 1
Support Privatisation	What is your opinion on privatisation?	1- Yes to privatisation; 2- No to privatisation; 3- Indifferent; 4 – Don't know

Table 5.17: Likely determinants of households' response (independent variables)

Variable	Definition	Categories
House electrification	Whether the household is electrified or not	Not electrified- 0; Electrified -1
Unit consumption	Bimonthly electricity consumption of the household in comparison with the median consumption within the state	Below 100 Units- 0; Above 100 units - 1
Tariff Range	Whether the tariff per unit range paid by the household is below or above the cost of supply for the respective state	Below cost of supply – Rs. 0.50; Above cost of supply-Rs 0.50 - 1
Generator/Inverter	Does the Household have either generator or inverter as an alternative source of lighting during power cut	Not Having Generator/Inverter – 0; Having Generator/Inverter - 1
High value electric items	Does the Household have any one or more of the high value electric items such as Fridge, washing machine, computer, water heater	Not having – 0; Having - 1
Power cut	Does the Households face a power cut for a duration of 30 minutes or more per day	0 – No; 1- Yes
Low voltage	Household facing low voltage problem	0 – No; 1 – Yes
Irrigation connection	Households having separate electricity connection for irrigation	0 – No; 1- Yes
Shop	Household owning business shop	0 – No; 1 – Yes
Affecting other services	Those who believe that subsidy to electricity is affecting other governmental services	0 – No, 1- Yes
Problems in workplace	Those who are experiencing problems in workplace (Affecting production, lead to lock out of factory, wastage of materials…) due to power cut	No – 0; Yes – 1
Other problems	Those who are experiencing problems in their locality due to power cut	No – 0; Yes – 1

5.2.1. Households' response to the proposal of privatisation

An association analysis of the opinion on privatisation against all presumed correlates of it is provided in the Table 5.18. It shows that 'whether the household is electrified' significantly influences the response to privatisation. Far more of the electrified houses say 'no' to privatisation. This broadly confirms the initial assumption of the study that unconnected households do not, by and large, oppose power sector reforms, and that opposition prevails mainly among the connected households. Notably this particular association is not statistically significant in two states, namely Bihar and MP where quality of electricity supply is very poor. In these two states only a small minority of both the connected and unconnected consumers argue against privatisation. Thus in these two states too, unconnected households are by and large unopposed to privatisation. Thus we retain the assumption that unconnected households do not form part of the anti-reform groups (even if they do not form part of the pro-reform groups) in further analysis. (If at all some of the unconnected households provide support for reforms, it will not affect the basic validity of our framework.) However we have not taken up this issue in the econometric exercise since most of the independent variables considered here (such as tariff range, units of consumption, etc.) are relevant only for connected households. But we will consider the general `no-opposition to reform' position of the unconnected households in Chapter 6 while discussing the state-level aggregate response.

Tariff range is another variable that is associated with opinion on privatization. While the range of tariff paid by the consumer bears a significant association with the opinion on privatization on the whole (i.e. taking all surveyed states together), it does not hold good in many states considered individually. It would seem that those who are in the high tariff range are much less among the opponents of privatization - a pattern expected in this study. The results of the multinomial logistic regression exercise are given in Table 5.20. Here the reference category is `no to privatization'. The values of Exp (β) gives the odds ratio or the likelihood of

giving another response to privatization (say `yes') than saying `no' (the reference category). The results suggest that those who are in the higher range of tariff for electricity are around 50% more likely to say `yes' (and about 2.8 times more likely to be indifferent) than saying 'no' to privatization.

Unit of consumption is significantly related to the response of 'No to privatisation' in a number of states but with an unexpected result in which the opposition to privatization is more among those who consume more electricity. The `all states' picture shows that those who consume more than 100 units are 50% less likely to be indifferent and 25% more likely to say `yes' than taking a position against privatization. The ownership of inverter or generator (as an indirect indicator of high cost borne due to the poor quality of supply) also follows a pattern similar to that of unit of consumption. (except in Haryana, where the direction of influence is the same as that of the range of units of consumption).

The presence of high value electrical items significantly influences the response to privatization in a number of states and when all states are taken together. However, more people with high value electric items are against privatization (than those without such items). This may indicate that a number of such items are widely used including by those receiving subsidy and by beneficiaries of the status quo. The econometric exercise shows that those with high value items are 1% less likely to say `yes' to privatization, but also 25% more likely to be indifferent (compared to the likelihood of expressing 'no' to privatization). Altogether the use of high value items too does not serve as an adequate incentive to support privatization.

The duration of power cut, though significant in `all states together', is not much significant when the states are considered separately. Here too, those with higher duration of power cut are slightly more likely to say no to privatization (than those having lesser duration of power cut). This too may be the reflection of the widespread prevalence of power cut, or the little difference among the households within a state in terms of the duration of power cut encountered by them. On the other hand those who face problems due to power cut (such as reduction in production, loss of job) are less likely to oppose privatization. This is also evident

from the results of the econometric exercise. Presence of low voltage too seems to have a similar impact.

Table 5.18: Characteristic association of `no to privatisation'

	House Electrified		Unit Consumption		Tariff Range		High Value Electric Items		Power Cut		Households with inverter/ generator	
	No	Yes	Lower	Higher	Below	Above	No	Yes	No	Yes	No	Yes
Kerala	0.00	52.29	52.82	51.98	51.38	60.38	52.08	52.54	50.19	54.51	53.1	29.4**
Tamil Nadu	14.52	44.42*	51.61	39.13**	45.73	11.76*	45.25	43.85	46.34	43.67	44.2	60.0
Andhra Pradesh	9.52	71.55*	73.97	66.20***	73.23	63.16**	72.41	64.71	69.92	77.55	71.5	80.0
West Bengal	36.47	52.60**	58.82	51.36	53.38	51.88	53.67	50.00	51.81	53.91	54.7	44.6
Uttar Pradesh	10.34	31.53*	35.71	31.15	23.77	36.02**	23.40	51.02*	24.90	48.91*	28.0	51.0*
Madhya Pradesh	13.92	18.10	NA	NA	NA	NA	16.36	34.15*	18.37	14.29	17.8	27.3
Bihar	10.56	11.26	7.14	17.50**	12.35	5.88	7.76	26.32*	11.26	11.11	11.1	15.4
Haryana	4.17	30.04**	23.33	39.78*	34.23	18.33**	13.02	45.23*	30.02	33.33	26.1	65.2*
Rajasthan	0.00	2.63**	2.45	6.67	0.00	2.63	1.73	4.50	2.64	0.00	1.9	10.0**
Gujarat	5.00	18.14**	19.05	17.56	17.06	18.85**	20.22	14.72	22.13	16.56	17.9	100.0**
Karnataka	0.00	28.34***	26.65	36.47***	42.86	26.48	28.15	29.82	26.95	63.16*	28.0	100.0**
Punjab	3.57	20.87**	12.45	36.05*	33.33	18.50***	14.71	22.90***	20.49	100.00**	18.7	33.9**
Maharastra	28.57	41.63	39.16	42.69	34.12	43.26***	45.58	35.90**	41.28	62.50	41.6	40.0
Total	11.58	33.77*	30.96	36.27*	42.74	25.98*	32.45	36.18**	31.06	42.74*	33.3	41.9**

	Low voltage problem		Separate Connection for Irrigation		Shop		Affecting Other Service		Workplace problems		Other problems due to power cut	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Kerala	52.38	52.00	52.11	54.00	51.90	56.00	51.87	64.71	52.00	53.23	52.19	52.53
Tamil Nadu	44.92	53.72	41.67	59.70**	43.93	51.85	43.78	57.14	44.67	41.67	45.69	43.39
Andhra Pradesh	72.44	69.66	72.89	64.94	72.17	63.64	60.91	79.62*	71.19	75.68	72.16	70.79
West Bengal	62.40	46.78**	52.77	0.00	52.51	53.06	50.00	59.76	52.65	52.00	52.22	52.75
Uttar Pradesh	38.95	21.68**	31.82	0.00	29.64	53.85**	24.55	38.55**	24.02	43.41*	25.74	34.05
Madhya Pradesh	20.31	17.09	17.18	21.28	18.12	16.67	17.54	28.57	18.04	18.75	7.69	18.78
Bihar	17.86	10.42	11.33	0.00	10.54	37.50**	7.53	17.24**	11.42	10.42	8.96	11.91
Haryana	55.77	16.78*	31.31	21.67	29.55	43.75	22.10	60.64*	26.93	52.73*	57.14	21.94*
Rajasthan	1.04	4.79**	2.80	0.00	2.85	1.64	2.65	0.00	0.95	5.30**	5.71	2.28
Gujarat	15.82	23.36***	17.03	53.85*	20.05	6.56**	17.80	20.83	17.66	20.25	18.20	14.29
Karnataka	27.44	29.67	30.52	18.68**	27.97	40.00	26.60	31.32	25.78	42.67*	12.38	32.65*
Punjab	5.88	24.38*	19.02	36.36**	22.73	10.00**	16.17	63.41*	20.42	21.88	34.62	19.95***
Maharastra	32.21	53.92*	41.88	30.00	41.79	33.33	41.27	50.00	42.12	35.29	33.33	45.43*
Total	38.44	29.65	33.50	36.21	33.94	31.83	29.90	49.44*	33.83	33.51	38.90	30.88*

Unit consumption : 0 – Below 100 units, 1 – Above 100 units

Power cut ; 0 – Below 30 minutes, 1 – Above 30 minutes
Tariff Range : 0 – Below cost of supply-0.50, 1 – Above cost of supply-0.50
* p = 0.000
** p <=0.05
*** P (0.05 – 0.1)

The presence of an irrigation connection influence the response to privatization significantly only in five states, out of which in Maharastra and Kerala, a greater number of those with irrigation connections, as expected, oppose privatization. The econometric exercise shows that the ownership of a shop leads to 50% more likely to get a positive response to privatization (and 50% more likely to be indifferent).

5.2.2. Households' response to tariff reform

This section analyses the influence of the above-mentioned independent variables on the willingness to pay more for electricity supply (as an indirect indication of the support for tariff reform). The correlates of association are given Table 5.19, and the results of the binary logistic exercise in this regard are provided in Table 5.21. Units of consumption influence the readiness to pay more, with those consuming more electricity being more willing to pay (than those consuming lesser units), except in states with very poor quality supply (like Bihar). The econometric exercise shows that those who consume more are 50 % more likely to be ready to pay a higher tariff. Current tariff paid positively influences the willingness to pay, though statistical significance is attained only in a few states. Those who are currently in the higher tariff range are also 50 % more likely to be ready to pay a higher tariff. The presence of inverter/generator in poor quality states does not encourage consumers to pay more.

Table 5.19: The characteristic association of willingness to pay more for better quality (WTP)

	Unit consumption		Tariff Range		Having Inverter/ Generator		High Value Electric Items		Power cut	
	Below	Above	Below	Above	No	Yes	No	Yes	Yes	No
Kerala	7.65	9.34	8.21	13.21	7.65	38.89*	6.57	11.30**	7.33	10.20
Tamil Nadu	5.42	20.63*	14.13	14.29	14.29	0.00	16.05	12.78	20.00	11.68**
Andhra Pradesh	11.99	23.24*	15.40	15.79	15.20	40.00***	11.27	49.02*	11.63	29.59*
Orissa	12.39	23.81**	100.00	20.05**	17.82	70.59*	6.12	22.47**	18.29	24.37
West Bengal	19.61	28.02	27.03	26.25	25.10	32.31*	26.61	26.67	26.42	26.96
Uttar Pradesh	10.71	41.03*	50.40	31.63*	41.46	22.64**	44.96	23.53*	45.08	21.88*
Madhya Pradesh	NA	NA	NA	NA	78.17	90.91	77.26	90.00**	78.89	73.08
Bihar	87.36	72.50*	81.27	82.35	82.70	53.85	86.94	57.89*	82.59	44.44*
Haryana	40.44	47.34	48.51	29.03*	42.03	54.35**	37.50	48.36**	43.33	33.33

Rajasthan	32.01	85.71*	0.00	34.21	30.79	74.07*	31.47	40.00	34.21	0.00
Gujarat	67.28	72.37	71.43	69.65	70.18	100.00	65.76	78.95**	64.10	72.89**
Karnataka	71.64	90.59*	76.79	74.66	74.80	100.00	72.31	94.74*	75.16	68.42**
Punjab	19.59	44.14*	52.00	23.20*	22.33	53.57*	27.85	27.08	27.04	100.00
Maharastra	18.44	31.72*	24.10	28.53	27.84	20.00	26.95	28.95	28.11	0.00
Total	35.98	42.40*	33.36	43.99*	38.98	46.44*	42.88	33.76*	41.84	31.30*

Contd…

	Low voltage		Irrigation connection		Shop		Affecting other services		Problems in work place		Other problems	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Kerala	8.00	10.94	7.74	18.00**	8.81	7.84	8.61	11.76	8.44	9.60	9.46	6.96
Tamil Nadu	15.32	14.05	14.55	12.12	14.88	3.85	14.40	9.52	14.33	12.12	13.10	14.93
Andhra Pradesh	14.70	17.12	17.54	5.19**	10.35	79.41*	20.81	11.45**	14.49	26.32**	15.18	15.84
Orissa	17.84	23.70	20.39	0.00	15.09	29.32*	15.84	41.94*	17.61	32.81*	17.52	25.19**
West Bengal	25.60	26.32	26.71	0.00	23.55	42.86**	24.78	31.71	26.50	28.00	10.00	33.49*
Uttar Pradesh	27.18	53.79*	38.28	66.67	40.26	18.52**	38.01	39.05	44.76	28.46	40.78	37.55**
Madhya Pradesh	81.89	77.19	77.14	83.33	78.45	83.33	77.86	90.48	78.55	78.13	100.00	77.46**
Bihar	53.57	86.87*	81.33	100.00	81.97	62.50	78.49	86.21***	79.13	93.75	73.13	83.83
Haryana	52.53	38.33*	45.75	26.67**	41.67	87.50*	36.99	67.37*	39.75	69.09*	66.36	36.26*
Rajasthan	11.79	65.28*	36.14	4.76*	39.64	9.68*	34.12	50.00	24.88	49.61	0.00	38.24*
Gujarat	80.92	38.68*	70.29	69.23	67.38	85.48*	68.60	82.61**	69.23	74.36**	69.90	87.50
Karnataka	71.63	77.66	74.44	76.92	74.53	86.67	68.91	85.16*	72.55	88.00*	55.24	80.21*
Punjab	15.66	30.77**	27.38	25.81	27.80	24.59	25.15	53.85*	27.27	27.20*	22.22	27.38
Maharastra	22.26	35.50*	26.84	70.00*	27.65	33.33	27.43	35.00	27.56	30.30	17.33	32.61*
Total	31.91	47.15*	39.27	40.81	39.60	37.75	37.00	49.06*	38.53	43.54*	32.43	43.58*

The use of high value electric items or power-cut or the ownership of a shop does not encourage people to pay a higher tariff as evident from the econometric results. This is not surprising in the case of shop owners as they are already paying an average tariff higher than the cost of supply. Own the other hand, those who face voltage problem and who thinks that the power interruptions affect other services are nearly 80% more like to be ready to pay a higher tariff. Irrigation connection does not influence the willingness of the people to pay a higher tariff.

Table 5.20: Determinants of opinion on privatization across states (estimated odd ratios from a multinomial logistic regression model with reference 0 if no to privatization)

	Don't know		Indifferent		Yes to privatization	
	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)
Affecting Other Services	.123	.164	.139	.198	.088	1.629
Business shop	.167	.877	.152	1.476	.147	1.470
Consumption	.076	.860	.089	.497	.088	1.255
Electric Items	.087	.710	.094	1.764	.094	.990
Generator/Inverter	.233	.386	.180	1.031	.166	.894
Irrigation Connection	.120	.966	.157	.623	.133	1.009

Powercut	.099	.586	.111	.791	.104	.848
Problems due to powercut	.081	1.143	.097	1.059	.091	1.250
Problems in Work place	.109	.721	.110	1.229	.107	1.152
Tariff Range	.077	1.708	.091	2.870	.085	1.489
Voltage	.076	1.185	.089	1.061	.086	1.507

Reference category: No to privatisation

Table 5.21: Determinants of willingness to pay across states (estimated odd ratios from a binomial logistic regression model; 1 if positive willingness to pay, 0 otherwise)

Variables	S.E.	Exp(B)	
Affecting other services	0.072	1.883	2 Log likely-hood ratio
Business shop	0.102	0.980	
Consumption	0.060	1.528	
Electric Items	0.066	0.618	6944.379
Generator/Inverter	0.129	1.322	
Irrigation connection	0.100	1.001	
Powercut	0.077	0.815	Prediction percentage
Problems due to powercut	0.063	1.346	
Problems in workplace	0.077	1.184	
Tariff range	0.060	1.541	65.0
Voltage	0.060	1.832	

Chapter 6

AGGREGATE RESPONSE OF HOUSEHOLDS IN STATES AND THE LINKAGE WITH REFORMS

We have analysed the variables influencing household's response to power sector reforms in the previous chapter. There we have noticed how different variables such as lack of electricity connection or the amount of electricity consumed by a household affected household response to reform proposals, and how this influence varies between states. However the aggregate response in each state to a reform strategy (say, privatisation) depends on the number of households with specific characteristics, for example `without electricity connection'. Thus this chapter makes an attempt (a) to aggregate the households' response at the state level, and to examine how this aggregate response varies between states; (b) to explore the relationship between the aggregate response of households to characteristics of electricity sector in each state, and including the steps already taken, if any, to reform the sector; and (c) to explain the differences in the aggregate responses between the states by considering the influence of different independent variables and the share of different types of households in each state based on each of this variable. For example, if lack of electricity connection is found to be a variable that make consumers indifferent to privatisation (in chapter 5), this chapter analyses how this can affect the aggregate response to privatisation in a state where about 70% of the households do not have electricity connection.

6.1. Aggregate Response to Reforms in Different States

The categorisation of total households in terms of their response to privatisation and tariff reform in each state based on the primary survey is given in Table 6.1. This table takes only the connected consumers, and the assumption (supported by analysis in the previous chapter) is that the unconnected consumers are by and large less likely to oppose reforms. For the connected consumers, the table provides information on the percentage of households who have said `no' to privatisation and expressed willingness to pay (WTP) more for electricity. It may be noted the most opposition to privatisation is when about 70% of the respondents are against it in Andhra Pradesh. On the other hand, there is much variation between states in

terms of the Willingness To Pay more. At one level, one can see that the states can be grouped into two categories, (a) High opposition to privatisation with low WTP, and (b) low opposition to privatisation and higher WTP. But a more disaggregated categorisation as attempted in figure 6.1 would put states into three categories.

Table 6.1: State-wide opposition to privatisation and willingness to pay more for better quality (Percentage of households)

States	No to privatisation	WTP
Kerala	52.29	8.71
Tamil Nadu	44.42	14.14
Andhra Pradesh	71.55	15.47
Orissa	0.00	20.27
West Bengal	52.60	26.62
Uttar Pradesh	31.53	38.53
Madhya Pradesh	18.10	78.52
Bihar	11.26	81.46
Haryana	30.04	43.26
Rajasthan	2.63	34.21
Gujarat	18.14	70.26
Karnataka	28.34	74.90
Punjab	20.87	27.25
Maharastra	41.63	27.75
Total	33.77	39.41

Figure 6.1: Categorisation of states based on opposition to privatisation and willingness to pay more

	High opposition to privatisation	Medium opposition to privatization	Low Opposition to Privatisation
High WTP			Karnataka, Gujarat, Bihar, UP, MP
Medium WTP	West Bengal	Maharastra	Rajasthan, Haryana, Punjab
Low WTP	Kerala, Tamil Nadu, AP		

Thus based on this categorisation, we can refer Kerala, TN, AP and WB as `anti-reform' states. Among the pro-reform states, Haryana and Rajasthan have only moderate support for tariff reform. As we can see from Figure 6.1, there are no states with high opposition to privatisation but with high `WTP more', which implies that the majority of consumers are not willing to pay more to support the electric utilities under the state ownership. (Thus most people are not ready to

sacrifice to keep the utilities under state ownership, and on the other hand they opt for state ownership with the benefit of subsidised supply of electricity.)

6.2. Linkage Between Aggregate Response to Reforms and Features of Electricity Sector in Each State

The aggregate response to privatisation and WTP (based on the categories discussed in the previous section) for the connected consumers is given along with certain important features of electricity sector including connectivity (the percentage of connected households) in each state in Table 6.2.

The question on the impact of employees

Table: 6.2: Linkage between aggregate reform response in states and certain features of their electricity sector

States	Opposition to privatisation	Willingness to pay more for electricity	Connectivity	Households consuming more than 150 units	Households paying tariff more than Rs. 2.50/ unit	Average duration of power cut (min.) per day	Improvement during last three years	Perception of change in tariff change in relation to quality	Shop	Percentage of households with Irrigation connection
Bihar	Low	High	17	17.2	2.8	1013	Worsened	Fair	2.6	0.7
Madhya Pradesh	Low	High	74	NA	NA	738	Worsened	Unfair	1.4	22.9
Karnataka	Low	High	85	1.2	96.3	247	Improved	Unfair	3.0	18.4
Gujarat	Low	High	86	41.5	73.1	8.3	Improved	Unfair	14.7	2.9
Uttar Pradesh	Low	Medium	43	28.2	56.3	645	Worsened	Unfair	7.9	0.9
Rajasthan	Low	Medium	47	0.0	100.0	183	No change	Unfair	17.9	6.3
Haryana	Low	Medium	94	28.0	93.8	418	No change	Fair	3.5	13.0
Tamil Nadu	High	Low	83	34.9	1.4	21	Improved	Fair	6.2	18.0
West Bengal	High	Low	49	51.6	68.5	38	Improved	Fair	15.9	0.3
Kerala	High	Low	80	38.6	6.0	73	-	Fair	9.7	9.7
Andhra Pradesh	High	Low	84	13.5	33.9	281	No change	Unfair	7.4	16.8
Orissa	-	20.3		31.0	8.1	94	Improved	Fair	36.4	0.5

Since econometric exercise is infeasible (due to the lack of adequate data points) to link the aggregate reform response of the states with their features of electricity sector, a descriptive analysis is followed here. (It may be noted that we will not consider Orissa for a discussion here, since Orissa has already undergone privatisation five years ago, and hence the current support to privatisation is not relevant here today. However we will consider Orissa while discussing the relationship between aggregate response to reform and the actual implementation

of reform in section 6.3.) One notable feature is that the extent of irrigation connections does not seem to explain the divergent reform positions of the state. There are couple of states with about 15 to 20% of irrigation connections in all the three categories. The ownership of shops/commercial establishments too seem to have little influence on the aggregate reform response.

In general anti-reform states have better quality of electricity supply (as evident from the average duration of power cut) than the pro-reform states. Moreover quality of supply has improved with an increase in tariff perceived to be reasonable in most of the anti-reform states, whereas either quality has got worsened or has improved with `unreasonable' tariff increase in the pro-reform states during the last three years. The three pro-reform states (Bihar, UP and MP) have the worst quality. Other pro-reform states, which have relatively better quality, have in general more than 50% (and above 70% except one) of households paying more than 2.5 Rupees per unit of electricity where as 3 out 4 anti-reform states have only less than one-third of the households paying more than this amount. AP (anti-reform) has more or less similar quality as Karnataka (pro-reform), but in Karnataka 96% pay more than 2.5 Rupees per unit for electricity where as only 34% do so in AP. Thus higher cost paid (or the less subsidy derived) by Karnataka households may explain their different response to reform, despite similar quality. A similar argument can be used to explain the anti-reform position in AP as against states with better quality (than AP) such as Gujarat and Rajasthan, which are pro-reform. There can be a question whether the aggregate anti-reform position of the state is due to the dominance of left wing political parties. Though this ideology may explain in the case of Kerala and West Bengal (where left parties have significant influence) it is inadequate to explain the situation in Andhra Pradesh and Tamil Nadu.

So far we have considered only the connected consumers in explaining the aggregate reform response. While incorporating the previously discussed evidence that unconnected consumers by and large do not oppose (if not supporting) reforms, one can see that this will add on to the pro-reform basis of states such as Bihar, UP and Rajasthan, where more than 50% of the households do not have electricity. However, if unconnected households in West Bengal take a position

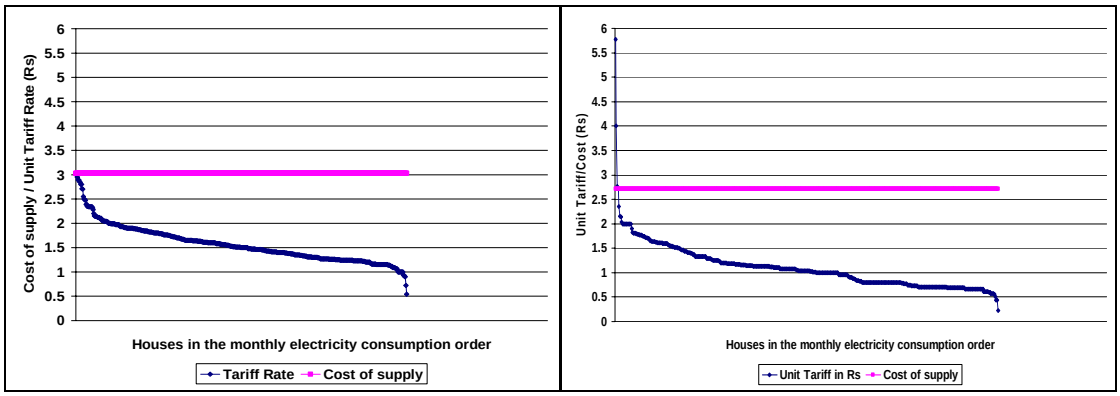
similar to that of such households in other states, the anti-reform basis in that state will be weakened.

This combined effect of different variables (connectivity and tariff paid) on the aggregate response to reform in the states can be demonstrated through figures discussed hypothetically in Chapter 4, but here with actual data from the primary survey. The state-wise sample households in the declining order of their average tariff rate is marked on the X-axis, and the average tariff paid per unit by the household and average cost for the utility to supply one unit are marked on the Y-axis in the graphs given in figure 6.2. 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. (For example, if connectivity in a state is only one-third, then the sample of connected households is marked in the left one-third of the x-axis, and the remaining is left vacant.) Some patterns can be observed from these graphs representing states. One category would include states like Bihar with very low connectivity. There may not be much social opposition to reform in these states, if the unconnected consumers are indifferent. There is another category including Gujarat, Haryana, Karnataka and Rajasthan where connectivity is not low, but majority of the connected consumers pay a tariff close to (if not greater than) the average cost of supply. The gap between the tariff and cost is narrow for the majority of connected consumers in these states. Here too one can expect less opposition to (both efficiency and tariff) reforms. This hypothetical argument is validated by the aggregate response of the households in these states to the proposals of reform in the primary survey. The other category of states described in figure 6.2 comprises Kerala, Tamil Nadu and Andhra Pradesh with a connectivity of about 80%. In Kerala and Tamil Nadu almost every consumer, and in AP the majority pays an average tariff less than the cost of supply, and the gap between tariff and cost of supply (here subsidy) is very high, with more than 80% of the connected consumers paying less than two-third of the cost of supply. Considering that almost everybody pays a tariff less than the cost and connected and (heavily) subsidised consumers constitute the majority of households in these states, one may not expect much support for tariff reform. 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, the majority may be indifferent to efficiency improvements, if they do not expect

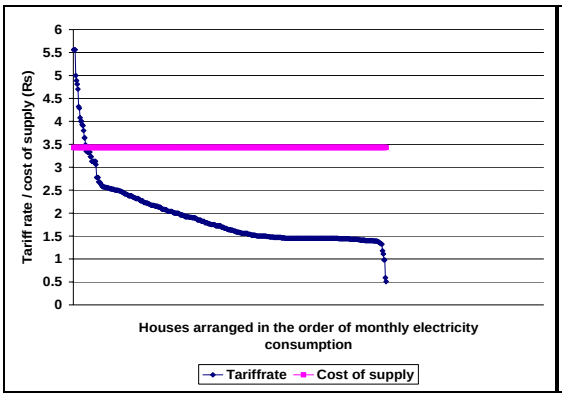
further reduction in tariff as efficiency improves. Thus it is unlikely to see the majority of consumers (and of all households because of the higher percentage of connected households) demanding or supporting any major efficiency measure (such as privatisation) in these states. These predictions are also validated by the aggregate reform response in these states. However this line of argument is not adequate to explain the divergent graphical patterns in UP, MP and West Bengal. UP and West Bengal have, by and large, similar graphical patterns in figure 6.2. Here probably one needs to bring in the quality of supply. Notably average duration of power cut is more than 1000 minutes in UP where as it is only 38 minutes in West Bengal. Thus it may not be surprising to see a pro-reform response in UP. A similar argument can also be made in the case of MP, which has a graphical pattern similar to the anti-reform states. But the quality of supply in MP as reflected in its average duration of power cut is more than 740 minutes per day where as the worst quality among the anti-reform states is only 280 minutes. Thus consumers in MP are likely to support reform (which is confirmed from their stated responses). This is despite that fact that the majority are connected and receive subsidy.

Figure 6.2: Graphical patterns of distribution of tariff and cost of supply (based on survey data)

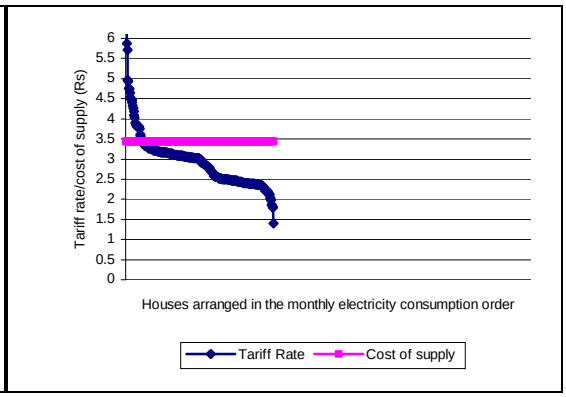
Kerala **Tamil Nadu**



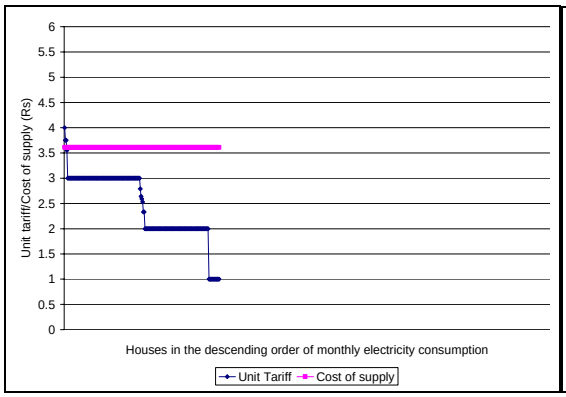
Andhra Pradesh



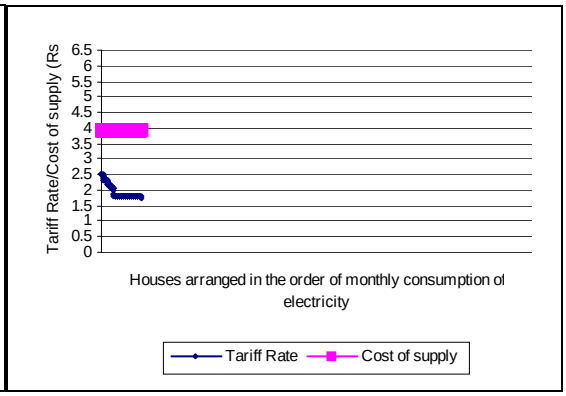
West Bengal



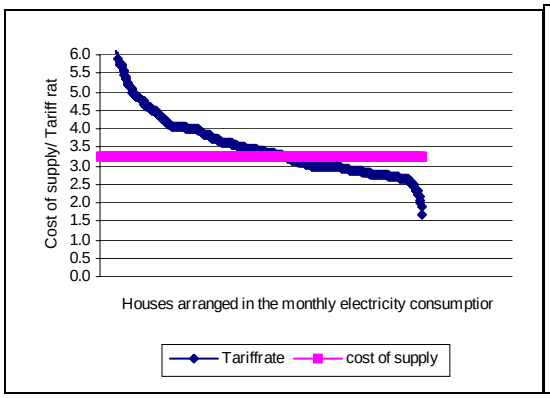
Uttar Pradesh



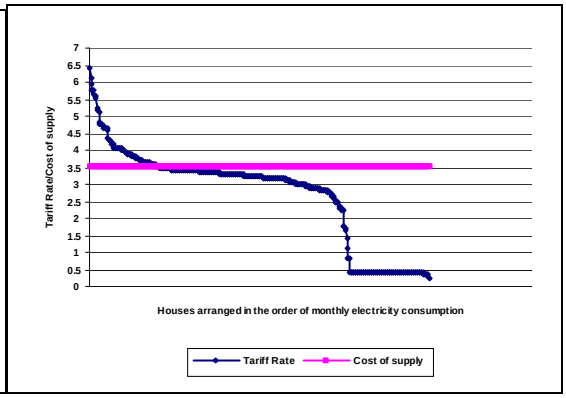
Bihar



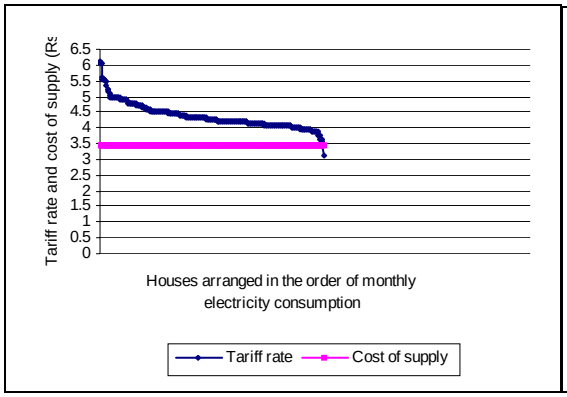
Karnataka



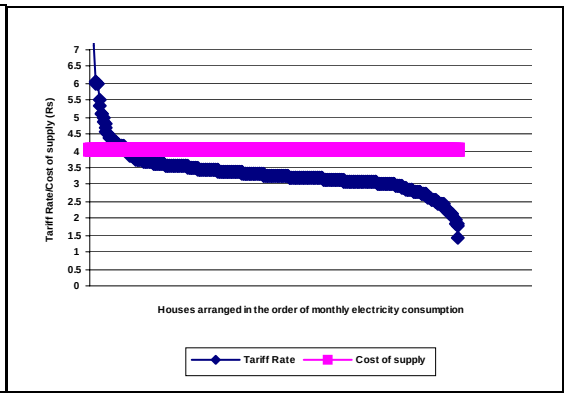
Gujarat



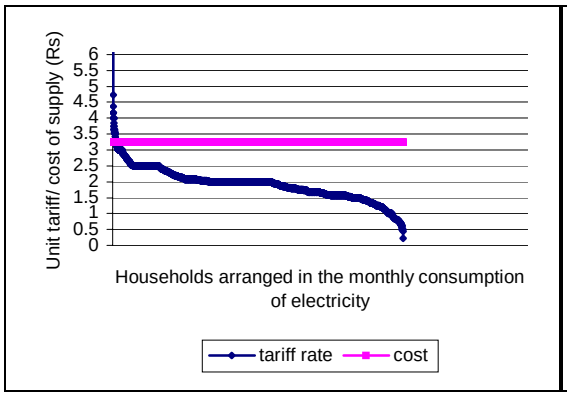
Rajasthan



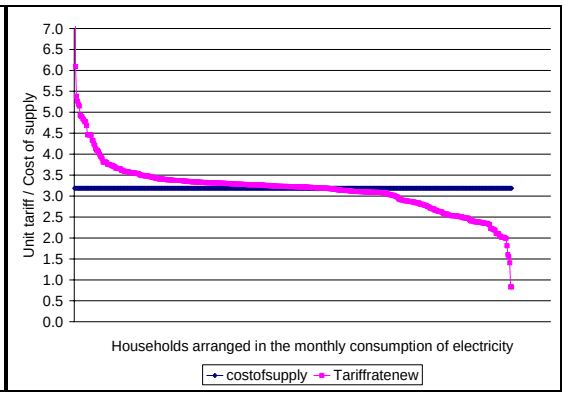
Haryana



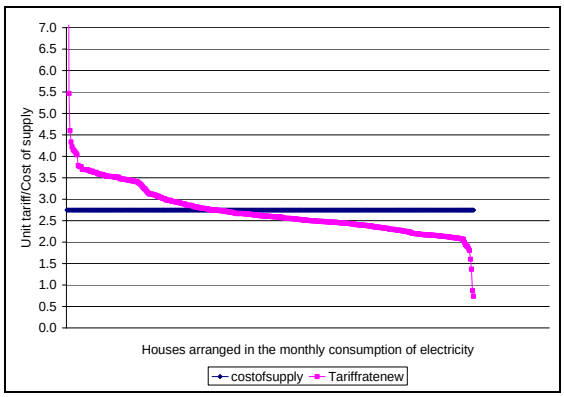
Madhya Pradesh*



Maharastra



Punjab



*This is based on NSSO 57th round (2001-02) since primary survey in MP could not provide tariff rates clearly.

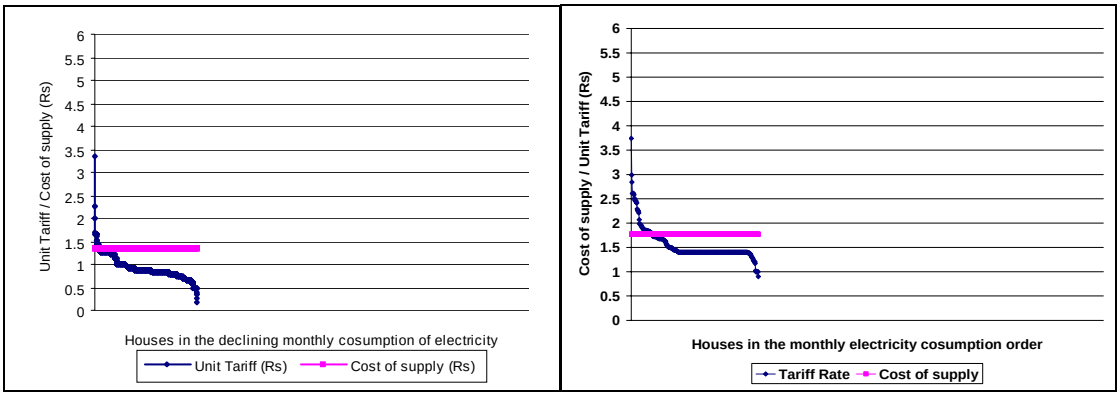
6.3. Linkage Between Aggregate Response to Reforms and the Actual Implementation of Reforms

As discussed in the chapter detailing the context of this study, the power sector reforms have been implemented in the Indian states only partially. Almost all the major states have instituted regulatory commissions. Among the states considered here, Orissa undertook privatisation around eight years ago, whereas AP, Karnataka, MP, UP, have gone in for unbundling electricity boards and turning the consequent units into state-owned companies. The states of Kerala, TN, WB, and Maharashtra are yet to make any major structural changes in the existing electricity boards.

Before attempting to relate the insights of the discussions in the previous section to the actual implementation of reforms in these states, this issue can be analysed in the state of Orissa, which undertook privatisation eight years ago. Hence an attempt is made in Figure 6.3 to develop a graphical pattern for Orissa similar to the ones in figure 6.2, based on secondary data for the period 1993-94[49] (i.e., before the privatisation).

Figure 6.3: Graphical pattern of tariff distribution and cost in Orissa as per NSS 50th round (1993-94) and primary survey

NSSO (1993-94) **Primary Survey**



Orissa had about 70% of households without electricity connections. This may be the reason for less opposition to power sector reforms, as evident indirectly from the re-election of the state government, which implemented privatisation (at a time

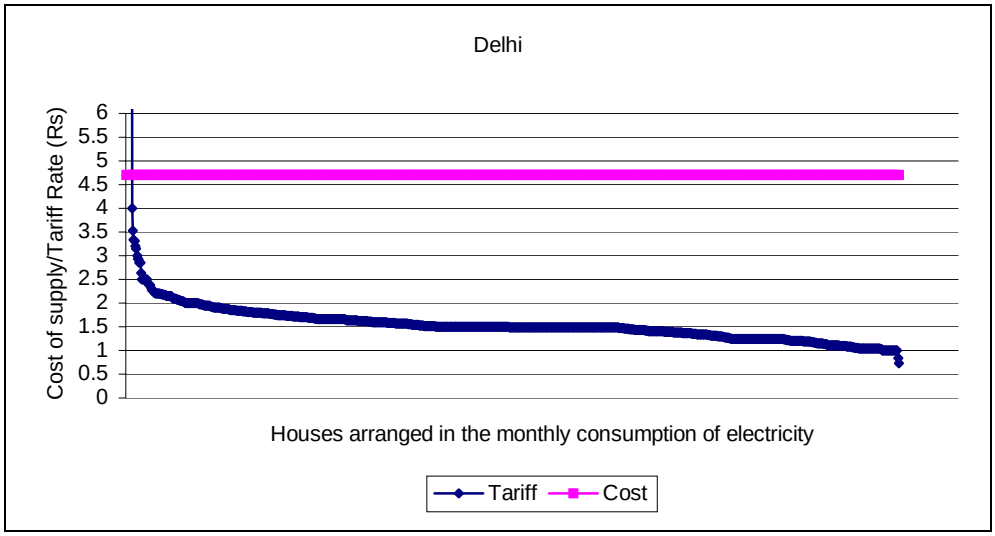
[49] It was based on 50th round National Sample Survey conducted in 1993-94.

when electoral setbacks occurred in a number of states ostensibly due to reforms including those in power sector). From Figure 6.3, which depicts the current situation in Orissa in terms of the relative position of tariff and cost based on our primary survey, it is evident that a much greater section of the connected consumers currently pay close to the cost of supply than was the situation before 1993-94. The information in Table 5.12 shows that the majority of these consumers see an improvement in the quality of supply and note that the increase in tariff that has occurred is reasonable considering the enhancement of quality. Thus support for power sector reforms in Orissa follows a pattern that is predictable within the framework of this study. The study also shows that the reforms were seen as beneficial by the majority of connected consumers.

One can also relate the system of arguments developed in this study to the actual implementation of reforms in the state of Delhi (the national capital) where privatisation was carried out around four years ago (and where the government which implemented privatisation was re-elected). We have not carried out the survey in Delhi, but a graphical pattern on the relative position of tariff and cost that existed in Delhi before the privatisation can be prepared with secondary data, and is provided in figure 6.4. Here the pattern seems to be similar to the anti-reform states of today. However, the quality of power supply that prevailed then in Delhi is missing. Though we do not have quantitative data on the quality of electricity supply in Delhi (where the per capita consumption of electricity is more than 1300 KWh per annum which is much higher compared to other states) four years ago, qualitative descriptions about the condition that existed before the reforms are available:

> *It would be difficult to try to capture…. the atmosphere of governance in Delhi during periods of severe power shortage or break downs especially during the summer season - demonstrations, riots, headlines; the constant `monitoring' of harassed engineers; tense, repetitive meetings, press releases, press conferences, widely publicised ministerial site visits, frantic excuse-making at all levels (Sagar, 2004: 169)*

Figure 6.4:Graphical pattern of tariff distribution and cost in Delhi (2001-02)



This indicates the very poor quality of supply that prevailed in Delhi before the privatisation. Thus the situation in Delhi five years ago seems to be similar to the current situation in MP as revealed in this study, where more people are connected, and receive subsidy but significant sections of households support reform, probably due to the very poor quality of electricity supply.

The evidence of the study in terms of the positive aggregate response to reform can be an indirect indication of why the government in UP, which is currently riding on a number of electoral successes, has been going ahead with the steps to privatise its government-owned utilities in power sector. The advanced stages of unbundling and formation of corporations in many of the states, which have recorded an aggregate positive response (to reform) based on the survey of households, and the continuation of state electricity boards without any change in 3 out of 4 states[50] in which the aggregate response according to the survey is against reform, also show the broad validity of the analytical framework of the study. Beyond this, a linkage

[50] Thus in Kerala, the previous left-led and the current congress-led governments are unwilling to take any substantial step to reform its power sector. The SEB in the Tamil Nadu 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. In West Bengal too, electricity utility continue to remain bundled and state-owned.

between the aggregate reform response in the states and the implementation of reform cannot be established because of the slow pace of reforms in many states, especially during the last two years.

6.4. Linkage Between Aggregate Response to Reforms and the Losses/ Gains to Different Income Groups

We have seen in chapter 5 (section 5.1.2.1 and in Table 5.6) that the monthly consumption of electricity (hence average tariff paid by households because of a tariff structure with a rate per unit that increases with the number of units of consumed) may be an indirect indication of the household's income/assets/affluence. Moreover, we have seen in section 5.1.1 (and Table 5.1) that unconnected households are more likely to be poor. By considering these two indications, and also the graphical patterns provided for different states in figure 6.2, one can make some observations on the linkage between the aggregate response to reforms and the gains/losses to households at different levels of affluence.

Even the most connected states have 10 to 20 % unconnected consumers and they are more likely to be poor. As discussed earlier, they are unlikely to oppose reforms. In general, major sections of poor, who belong to the lower three deciles of households based on an income ordering, are by and large outside the coverage of power sector in a number of states. This is due to low connectivity of poor households 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[51]. However their lack of opposition to reforms cannot influence the predominantly anti-reform response in states such as Kerala, TN, AP and West Bengal. Thus the losses or gains for the poor due to reform are unlikely to influence the pace of power sector reform in the Indian states.

[51] 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 consumption. 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 second by reducing resources for other public services that benefit them.

There is another section of households, around 15% in AP and much more in West Bengal, who are paying more than or close to the cost of supply. Our analysis shows that these consumers are more likely to belong to relatively richer sections of society, and that they are less likely to oppose reform. Even in Kerala about 20% of the households have said Yes to privatisation and it is likely that they belong to the richer sections. This is true of many other states too. If we define the households that fall within the upper two deciles on 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 expensive supplementary sources of power in spite of paying a tariff rate close to (if not higher than) the cost of supply. However this group may not be able to change the overriding response in anti-reform states. Moreover their support may not be adequate to provide an aggregate pro-reform response in states such as Gujarat. In the case of Orissa, where most of the electricity connections are in this group, the implementation of reform might have been facilitated by the presence of about 70% of households who are likely to be indifferent to the reform due to lack of connections. Thus the benefits to the `rich' are not sufficient to encourage political decision-makers to go ahead with reforms.

Thus the anti-reform position in these four states is determined mainly by sections of people, who are neither rich nor poor, broadly the middle class. However in 3 out 4 anti-reform states (barring West Bengal) such groups also constitute the majority of people. In these cases, they are the gainers of the status quo (non-reform), since the rate of tariff that they pay is much lower than the cost of supply and they enjoy electricity supply of not-so-poor quality.

Chapter 7

CONCLUSION AND POLICY IMPLICATIONS

It is not intended to provide a summary of all the major findings of the study here. Instead this chapter attempts to provide a broader argument based on categorisation of Indian states in terms of the difficulty faced in implementing power sector reforms emerging from our analysis. The current situation in different states may be seen as representing different stages in the growth of power sector in a state. Thus it is argued that different levels of difficulties are associated with different stages. Some policy implications are derived in the second section of the paper.

7.1. Easiness of Reform: Following a U-shape Pattern?

Broadly the Indian states analysed here fall into four categories, which could reflect different stages of growth in power sector. The first stage is epitomised by Bihar and (pre-reform) Orissa (and UP to a smaller extent), where only a minority have electricity connections, and where the quality of supply is very poor. Under such conditions, reform can be attempted even when the majority of connected consumers get the benefit of subsidy. Though reform can lead to betterment of quality, this need not lead to an enhancement of connectivity. On the other hand, if a state is enhancing connectivity without undertaking reform, then one likely scene is that of MP, where connectivity is achieved but with poor quality. Even under this situation, the very poor quality may encourage society to support reform.

If governments choose to invest in enhancing connectivity and to provide reasonable quality electricity-supply at subsidised rates to connected consumers, then the situation may become closer to AP or WB, or at the extreme level to Kerala or Tamil Nadu. Here the reform may be very difficult to implement. However the lack of reform need not necessarily create any problem for the quality of supply because better governance under the public sector combined with governmental expenditure can sustain a relatively better quality supply as in Tamil Nadu (or the regulated power interruptions in Andhra Pradesh)[52]. However whether further efficiency in power sector may be achieved without attempting structural and

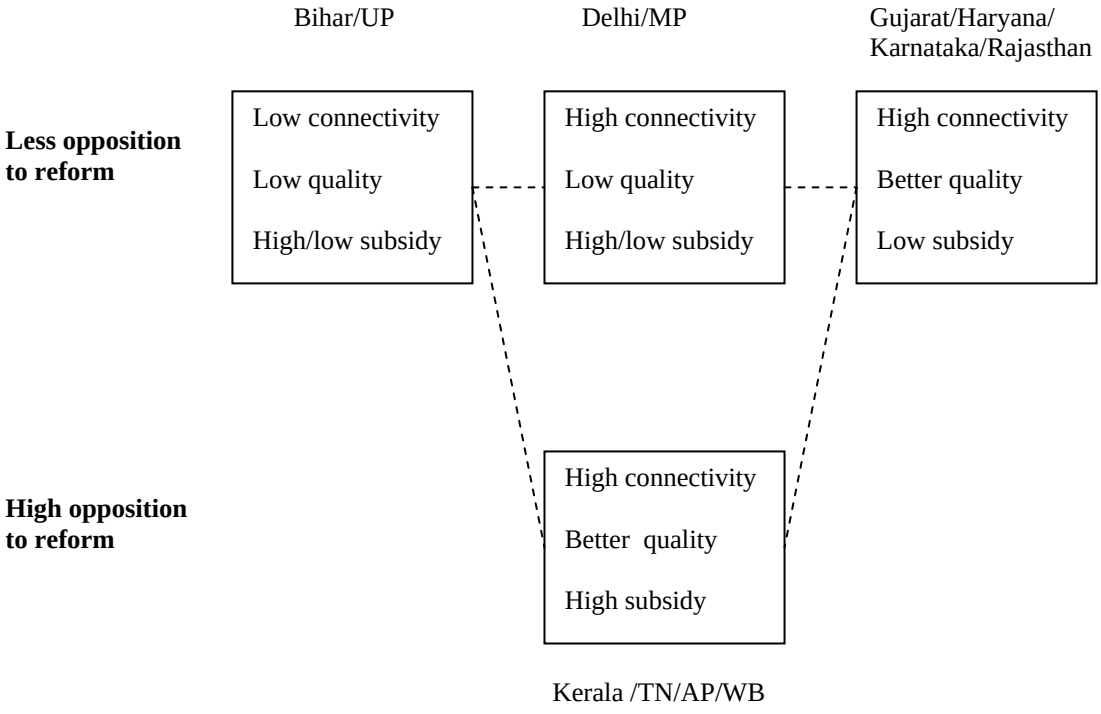
[52] The fifty per cent electricity generation through hydropower might be sustaining such a quality without huge governmental subsidy in Kerala.

ownership changes, and whether the current quality may be sustained without either increasing tariffs further or without affecting the fiscal problems of the state is a moot question. Anyhow it appears that currently reforms are very difficult to introduce in these states.

In states such as Karnataka, Gujarat, and Haryana, where connectivity has been enhanced and relatively better quality electricity has been provided but by charging a significant section of society a tariff close to the cost of providing such a service. In such states, further reforms are easier to implement.

These discussions show the possibility of a U-shape pattern in the ease of reform, which is higher in early stages of power sector growth (as in Bihar), and declines as states enhance connectivity and quality with governmental subsidy, but increases when more and more people start paying the cost of electricity supply. Of course, there is no need for every state to go through these different stages, as states such as Bihar currently in the first stage can directly opt for reforms rather than opting for the Kerala-TN like governmental expenditure route. This is diagrammatically presented in the figure 7.1.

Figure 7.1 Demonstration of the relationship between the `easiness' to reform and variables reflecting losses/gains



Thus the states in the first category (UP, Bihar) have three options before them, whether to take the path of Orissa, emulate Kerala-TN-AP or go the way of Gujarat-Karnataka. Since the opposition to reform is not strong, they can have Orissa-type reform with significant improvements in quality for connected consumers. (However this may not be sufficient to enhance connectivity.) If these governments choose to enhance connectivity with heavy subsidy for quality as in AP or Kerala, they reach a stage where reforms would then become very difficult. On the other hand, if connectivity and quality enhancement is achieved through making the majority to pay for it, these states can be like Gujarat-Haryana, where reforms will not be opposed strongly.

7. 2 Strategies to Enhance Social Support for Reforms in 'Anti-reform' States

Under the current situation, the enhancement of efficiency in the electricity utilities of this state have to be based on the exercise of a `voice or political option', where people express their demands through voting or other means to their elected representatives. The governments would be responding albeit with delay and imperfectly to such demands. This is because the majority of consumers are not willing currently to experiment with market-based or competition-based routes to enhance the efficiency of the electricity utilities. However this situation can change under certain circumstances and these are discussed below.

7.2.1 Dividing the `anti-reform' forces

One path could be of gradually releasing certain sections of consumers from the subsidy net and making their tariff closer to the cost of supply. The research for this paper indicates that in these states, a substantial part of the subsidy in the power sector goes to the upper middle class and richer sections of society. This shows that it is possible to reduce financial problems without affecting the lower income groups, or without initially incurring the wrath of the majority of consumers or without creating major electoral repercussions. For example, the upper 20% of the households in terms of income in Kerala take about 30% of the subsidy. Releasing these groups from subsidy net will definitely enhance financial viability of the electricity utility (or the burden of the government in this regard). But more importantly from the point of view of this study, such a step would increase the

support base for power sector reforms in the state. This can be carried out subsequently for other higher income groups. This is more like `dividing' the current anti-reform base and gradually `building up' a pro-reform base. Such a step is likely to reduce the support for the anti-reform forces, which can eventually facilitate more radical reforms. In this case, these states are taking gradually a route to reach the position of pro-reform states. The other route for the second set is one in which the connectivity and quality are further enhanced or sustained through increases in governmental expenditure, which would only delay the process of structural reforms due to the building up of anti-reform forces.

7.2.2 Unbundling electricity supply `areas' with a greater support base within `anti-reform' states

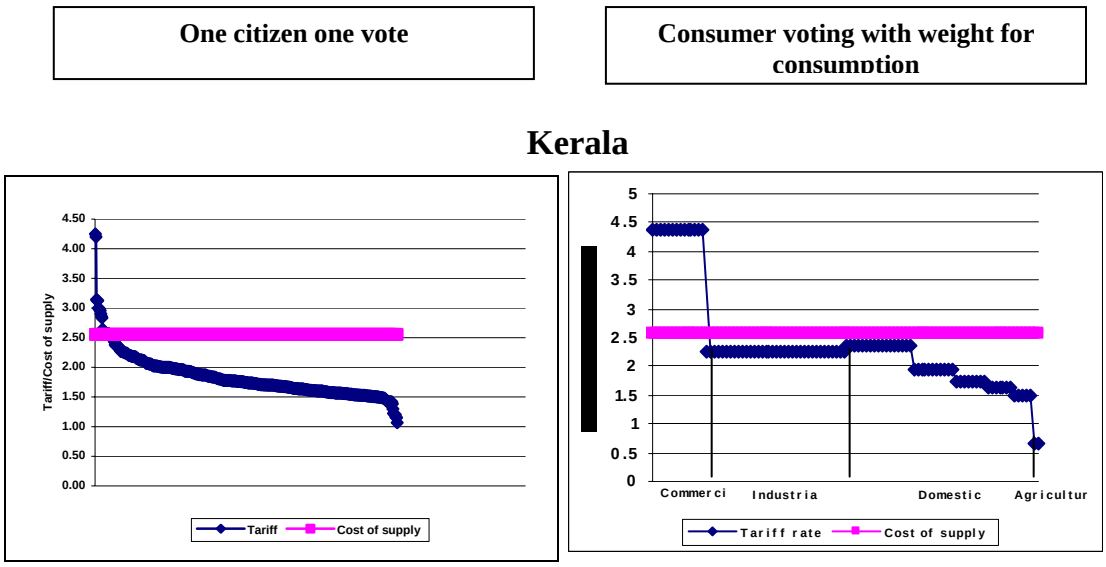
The research shows that the higher the level of consumption of the majority of domestic consumers, the easier it is to implement reforms. If people consume or need more electricity, they are likely to become net losers for two reasons. As the monthly consumption increases, the rate of tariff increases, reducing the gap between the tariff and cost of supply. Secondly, for those consumers, losses due to poor supply can also be high. This can be an incentive to support (or not to oppose) reforms. One strategy to implement reform then could be to isolate geographical areas (within the states) where substantial sections of people consume more electricity and pay a higher average tariff, and un-bundle the power distribution of such places into separate entities. 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 distribution systems in such localities (probably some cities or industrial areas) may be isolated to provide better quality service at close to cost tariff structure. Further reforms of such unbundled utilities will be subjected then to only local public pressures, and can be made unaffected by the state wide anti-reform responses.

7.2. 3 Political reform of the governance of electricity sector

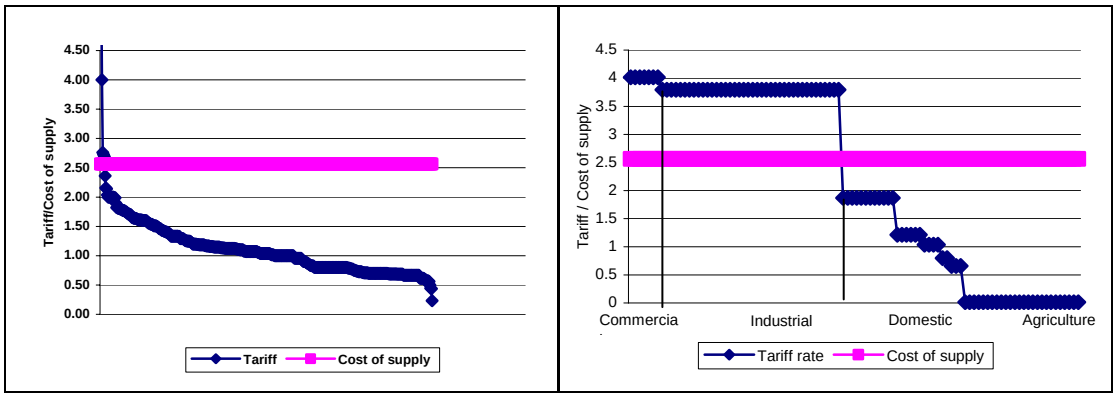
Currently the governance of sectors such as electricity is with state governments, which are elected in a general voting system of `one citizen and one vote'. That is why the reforms are blocked because of the fact that the majority of households get subsidy and they perceive immediate losses due to reform, and fail to perceive long

term gains to the economy due to reforms. There can also be political reforms that would take sectors such as electricity out of the general voting system of `one citizen one vote'. It is possible to think about entrusting the governance of sector on a body elected by its stakeholders with a voting power based on the amount of consumption and where non-citizens such as industrial firms can also vote (since they are also stakeholders and being affected by the performance of electricity sector). The Water Boards of the Netherlands which over see the management of floods, water supply and waste-water treatment are one such example. We can see from Figure 7.2 that if all consumers (and not only households) vote, then the majority of consumers would be paying a tariff higher than or closer to the average cost of supply, and this can be an incentive for the majority of such voters to opt for tariff and efficiency through more effective means.

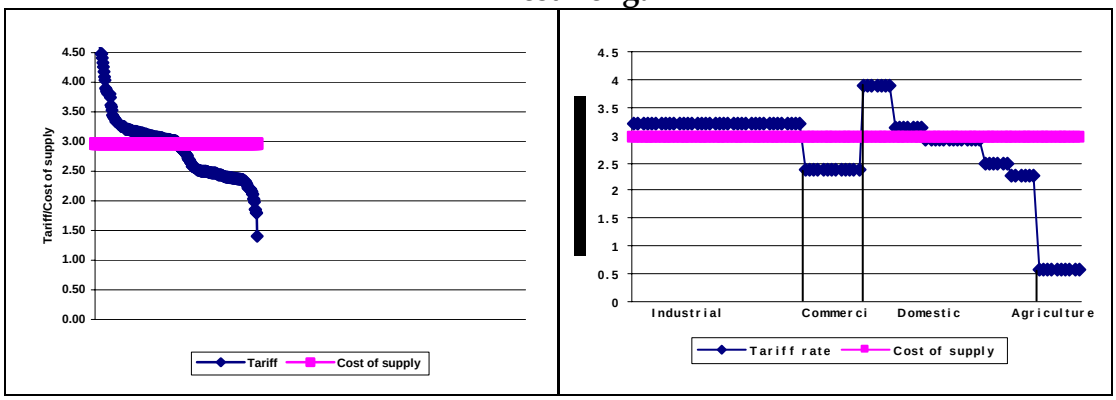
Figure 7.2:Distribution of voters and consumers with regard to tariff and cost of electricity



Tamil Nadu



West Bengal



7.3. Other Implications for policy making

1. An analysis of the anti-reform states show that when reasonable quality of electricity is supplied at subsidised rates (i.e., the tariff paid per unit is much lower than the average cost per unit) to the majority of residential households, reforms are very difficult to implement. In such cases, opposition is directed not only at tariff reform, but also efficiency reform strategies such as privatisation (probably under the impression that such efficiency strategies may ultimately lead to reform of tariff to meet the cost of supply). This may indicate that the separation of efficiency reform and tariff reforms is not feasible. Substantial improvement of power supply may not take place in the near future unless the core issue creating opposition to reform is addressed.

2. There is a popular perception that tariff reforms in the electricity sector will affect the poor. This is incorrect. The distribution of subsidy is highly regressive in India because it is given per unit consumed, and the average

rates for different levels of consumption are not very different. Thus subsidies for the poorer 50% of the population can be retained with less than one-third of the resources currently spent for providing near-universal subsidy in many states. The regressive nature of subsidy in the electricity sector can only be corrected either by giving a lump-sum subsidy to the needy or by making the average tariff rates for consumption beyond the basic minimum, much higher than the prevailing rates.

3. Though the popular perception in India is that power for irrigation creates the biggest hurdle against power sector reforms in the country, our empirical evidence indicates a different picture. The percentage of irrigation connections is relatively high among some of the pro-reform as well as anti-reform states. Households with irrigation connections may be opposing reforms. However the aggregate response at the state level is determined more by residential households because of their very high number. Thus subsidy given for residential consumption of electricity is a far more decisive factor in the support base of reform.

4. 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), the majority of the consumers are not willing to pay more for improving quality. This is evident from their revealed preference derived from expenditure on alternative equipment and from their stated preference in our survey. Less than 10% of the consumers in all states use alternative sources/equipments, which works out to be more expensive per unit of energy than the centralised electricity supply. 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 downward quality adjustment seems unavoidable. Otherwise, government transfer may have to continue to sustain the current quality.

5. The reforms, as evident from Orissa, may lead to an improvement in the quality of service of connected consumers but may not lead to any significant

improvement in the level of connectivity. There may be 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 sector[53]. This money may be given to public and private utilities on a competitive basis to carry out rural electrification efficiently. However in the Indian states, significant amounts of money for extending connections to the poor can be obtained by taking away subsidy from the upper income groups. 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 amount saved is more than adequate to provide one-time expenditure for extending electricity connections to all poor who do not have electricity supply. Thus substantial amount of resources can be mobilised by reorienting existing subsidies.

6. Connections may be extended to the poor with an on-time expenditure. However electricity provided to such newly connected households at subsidised rates should not affect the future possibilities of reforms in the sector. We have seen that subsidised provision of reliable electricity supply to significant sections of the people not only creates a financial burden for the utility/government but also major hurdles against reform.

7. Though states such as Bihar and UP (with low connectivity and very poor quality) have less opposition to reforms, the Orissa experience shows that there may not be many private firms showing interest in taking over their distribution utilities even if these are open to investment. This may lead to a

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

situation in which only a few firms show interest or take control, which can create monopoly related problems (warranting regulation), or state-owned companies have to operate even after attempts of privatisation. Thus lesser opposition to reforms need not necessarily translate into privatisation in such states.

8. The research in the paper indicates that the majority of households do not see the relationship between government expenditure in the power sector and the provision of other public services. The reasons for such a state of affairs need further investigation, but we may speculate on this. 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 the power sector for other governmental services[54]. 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 of people. The reforms in taxes, the 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. It is especially important to have reforms in contexts and sectors, where the middle class or the 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). Reforms may be needed even when the majority of citizens see the status quo as beneficial due to fiscal balance considerations of the government or to make a sector capable of delivering a better service in order to take the economy to a higher equilibrium. (It is quite likely that the majority of citizens may not see the

[54]There 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.

dispersed and uncertain benefits of reform as clearly as the direct benefits of the status quo, and this can discourage them from being the supporters of reforms driven by the needs to take economy to a higher equilibrium).

Our research has generated a part of the much-needed data to facilitate public discussion and decisions on power sector reforms in India. 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 and for designing a lifeline tariff for poorer consumers. Similarly the general public and many political decision-makers have little information on the losses that different income groups including the poor sustain on account of the status quo in the power sector. The data generated and analysed in this study, though not comprehensive, has provided reliable indications in this regard.

BIBLIOGRAPHY AND REFERENCES

Alesina, A and D. Rodrik (1994). **Distributive Politics and Economic Growth**, *Quarterly Journal of Economics,* 109(2): 465-90.

Alesina, A. and A. Drazen (1991) **Why are Stabilisations Delayed?** *American Economic Review*, 81 (5), 1170-88

Anand, P.B and R. Perman (1999), **Preferences, Inequality and Entitlements: Some Issues from a CVM Study of Water Supply in Madras, India,** *Journal of International Development,* 11: 27-46.

Asian Development Bank (2003) **Special Evaluation Study of Cost Recovery in the Power Sector,** Report No. SST: STU 2003-11.

Bardhan, P (1984) **Political Economy of Development in India,** New Delhi: Oxford University Press.

Bardhan, P.K. (1997) **The Role of Governance in Economic Development: A Political Economy Approach**, Paris: OCDE

Bates, R and A. O. Krueger eds. (1993), **Political and Economic Interactions in Economic Policy Reform: Evidence from Eight Countries.** Oxford: Basil Blackwell.

Bernard J-T and M. Roland (1997) **Rent Dissipation Through Electricity Prices of Publicly Owned Utilities**, *Canadian Journal Economics,* 30: 1204-19

Bhattacharya, S. and Patel, U.R. (2003) **Markets, Regulatory Institutions, Competitiveness and Reforms**, Theme Paper No.5, Workshop on Understanding Reform, GDN, Cairo, January 16-17

Birdsall, N. (2001) **Comment on `Consensus Building, Knowledge, and Conditionality' by Paul Collier and `Development Strategies for the 21st Century' by Dani Rodrik** in B. Pleskovic and N. Stern (eds.), *Annual World Bank Conference on Development Economics 2000*, Washington, DC: World Bank

Bruno, M. and W. Easterly (1996) **Inflation's Children: Tales of Crises that Beget Reforms**, *American Economic Review*, 86: 213-17

Carson, R. T (2000) **Contingent Valuation: A User's Guide**, *Environmental Science and Technology*, 34 (8), 1413-1418.

Cheung, S.N.S. (1998) **The curse of democracy as an instrument of reform in collapsed communist economies**, *Contemporary Economic Policy,* 16, 247-249

Cremer H, F. Gasmi, A. Grimaud and J. J. Laffont (1998), **The Economics of Universal Services: Theory,** The Economic Development Institute of the World Bank.

Cukierman, A. and M. Tommasi (1998) **When Does it Take a Nixon to Go to China?** *American Economic Review*, 88(1), 180-197

Dewatripont, M. and G. Roland (1992a) **The Virtues of Gradualism and Legitimacy in the Transition to Market Economy**, *Economic Journal*, 102 (March) 291-300

Dewatripont, M. and G. Roland (1992b) **Economic Reform and Dynamic Political Constraints**, *Review of Economic Studies*, 59, 703-730

Drazen A. and W. Easterly (2001) **Do Crises Induce Reform? Simple Empirical Test of Conventional Wisdom**, *Economics and Politics*, 13(2), 129-157

Drazen, A. and V. Grilli (1993) **The Benefits of Crises for Economic Reforms**, *American Economic Review*, 83(3), 598-607

Energy Infrastructure Services Project (2002), **Electricity options for the poor**, Madhya Pradesh State Electricity Board, Jabalpur

Energy Infrastructure Services Project (2000) **Social and Gender Impact Assessment of power Sector Reforms in Kerala**, Trivandrum: Kerala State Electricity Board

Fernandez, R. and D. Rodrik (1991) **Resistance to reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty**, *American Economic Review*, 81(5), 1146-1155

Fidrmuc, J (1999), **Unemployment and the Dynamics of Political Support for Economic Reforms**, *Journal of Policy Reforms* 3 (2), 139-156.

Fidrmuc, J (2000a) **Political Support for Reforms: Economics of Voting in Transition Countries**. *European Economic Review* 44 (8), 1491-1513.

Fidrmuc, J (2000b) **Economics of Voting in Post-Communist Countries**," *Electoral Studies* **19** (2/3), Special issue: Economics and Elections, June/September 2000, 199-217.

Fidrmuc, J (2003), **Economic Reform, Democracy and Growth during Post-communist Transition**, *European Journal of Political Economy*, forthcoming.

Fidrmuc, J. and A.G. Noury (2002) **Interest Groups, Stakeholders and the Distribution of benefits and Costs of Reform**, mimeo, prepared for the GDN Global Research Project on `Understanding Reform'

Government of India (1996) **The India Infrastructure Report - Vol. III: Sector Reports**, Expert Group on the Commercialisation of Infrastructure Projects, Ministry of Finance, New Delhi

Government of India (1999) Annual Report of the Working of SEBs and EDs, Planning Commission, New Delhi.

Government of India (2002) **Annual Report of The Working of State Electricity Departments & Electricity Departments**, Planning Commission, New Delhi

Government of India, (2001), **Economic Survey 2000-01,** Ministry of Finance, New Delhi.

Grindle. M. S. (1996) **In Quest of the Political: The political economy of development policy making**, in Meier. G. M and J. E. Stiglitz, (eds.) *Frontiers of Development Economics: The Future in Perspective.* Oxford: Oxford University Press.

Gulati, A and Narayanan, S (2003) **The Subsidy Syndrome in Indian Agriculture,** Oxford University Press: New Delhi.

Hellman, J.S. (1998) **Winners Take All: The Politics of Partial Reform in Post-Communist Transitions**, *World Politics,* 50 (January), 203-234

Hirschman, A. O (1970) **Exit, voice and loyalty: Responses to decline in firms, organizations and states** Cambridge: Harward University Press.

Jamasb, T., Mota, R., Newbery, D. and Pollitt, M. (2005), **Electricity sector reform in developing countries : a survey of empirical evidence on determinants of Performance,** Working paper No. 3549, World Bank: Washington D.C.

Kannan, K. P and N. V. Pillai (2002) **Plight of the Power Sector in India: Inefficiency, Reform and Political Economy,** Centre for Development Studies, Trivandrum.

Kannan, K.P. and N.V. Pillai (2001a) **Plight of the Power Sector in India**, *Economic and Political Weekly*, January 13&20, 130-139; 234-246

Kannan, K.P. and N.V. Pillai (2001b) **The Political Economy of Public Utilities: A Study of Indian Power Sector**, Working Paper No. 316, Centre for Development Studies, Trivandrum.

Katiyar, S. K. (2005) **Political Economy of Electricity Theft in Rural Areas: A case study from Rajasthan,** *Economic and Political Weekly,* Vol. XL, No. 7, pp. 644-648.

Krueger, A. O. (1992) **Economic Policy Reform in Developing Countries,** Oxford: Basil Blackwell.

Krueger, A.O. (1993) **Political Economy of Policy Reform in Developing Countries**, Cambridge, MA: MIT Press

Lal, D (1989), The Hindu Equilibrium Vol 1: Cultural Stability of Economic Stagnation in India 1500 BC - AD 1980, Oxford: Clarendon Press.

Lal, S (2005) **Can Good Economics Ever Be Good Politics: Case study of power sector in India,** *Economic and Political Weekly,* Vol. XL, No. 7, pp. 649-656.

Morris, S, (1996) **The Political Economy of Electric Power in India (Part I and II),** *Economic and Political Weekly,* Vol 31 (No. 20 and 21).

Munasinghe, M. (1979) **The Economics of Power System Reliability and Planning: Theory and Case Study**, Baltimore and London: The John Hopkins University Press

Persson, T and G. Tabellini (1994), **Is Inequality Harmful for Growth**?, *American Economic Review,* 84(3): 600-21.

Pillai, N.V. and K.P. Kannan (2001) **Time and Cost Overruns of the Power Projects in Kerala**, Working Paper No. 320, Trivandrum: Centre for Development Studies.

Ranganathan, V (2005) **Determining T & D Losses in India: Their Impact on Distribution Privatisation and Regulation,** *Economic and Political Weekly,* Vol. XL, No. 7, pp. 657-668.

Ranganathan, V and T. K. Ramanayya (1998) **Long Term Impact of Rural Electrification: A study of UP and MP,** *Economic and Political Weekly,* 33 (50), pp.3181-85.

Rao, M.G., R. T. Shand and K.P. Kalirajan (1998) **State Electricity Boards: A Performance Evaluation,** *The Indian Economic Journal*, 46 (2)

Rodrik, D. (1994) **The Rush to Free Trade in the Developing World** in S. Haggard and S. Webb (eds.) *Voting for Reform*, New York: Oxford University Press

Rodrik, D. (1996) **Understanding Economic Policy Reform**, *Journal of Economic Literature*, 36 (March) 9-41

Sagar, J (2004), **Round Table on Power Sector Reforms,** *IIMB Management Review,* 16(1).

Santhakumar, V. (2003), **Citizens' Action for Protecting the Environment in Developing Countries: An economic analysis of the outcome with empirical cases from India,** *Environment and Development Economics,* 8: 505-528.

Santhakumar, V. (2003a) **The impact of distribution of costs and benefits of non-reform - a case study of power sector reforms in Kerala between 1996 and 2000,** *Economic and Political Weekly,* 38, 2, 147-154.

Santhakumar, V. (2003b) **Poverty and Social Impact Assessment of Power Sector Reforms in Kerala**, Kerala Power Development Project, Asian Development Bank

Santhakumar, V. (2003c) **Poverty and Social Impact Assessment of Power Sector Reforms in Assam**, Assam Power Development Project, Asian Development Bank

Santhakumar, V. (2004a), **Poverty and Social Impact of Power Sector Reforms in Madhya Pradesh**, M.P. Power Sector Development Project, Asian Development Bank

Schamis, H. E (1999) **Distributional Coalitions and the Politics of Economic Reform in Latin America,** *World Politics* 51: 236-68.

Singh, B., R. Ramasubban, R. Bhatla, J.Briscoe, C.G.Griffin, and C. Kim (1993) **Rural Water Supply in Kerala: How to Emerge from a Low Equilibrium Trap,** *Water Resource Research*, 29(7), 1931-1942

Singh, N. and T.N. Srinivasan (2002) **Indian Federalism, Economic Reform and Globalisation**, mimeo, University of Santa Cruz and Yale University

Sinha, S (2005), **Introducing Competition in the Power Sector,** *Economic and Political Weekly,* Vol. XL, No. 7, pp. 631-637.

Tommasi, M and A. Velasco (1996) **Where Are We in the Political Economy of Reform?,** *Journal of Policy Reform* 1 (2): 187-238.

Weyland, K. (2002) **The Politics of Market Reform in Fragile Democracies**, Princeton and Oxford: Princeton University Press

Whittington, D., D.T. Lauria, A.M. Wright, K.Choe, J.A. Hughes, and V. Swarna (1993) **Household Demand for Improved Sanitation Services in Kumasi, Ghana: A Contingent Valuation Study**, *Water Resource Research*, 29(6), 1539-1560

Williamson, J. (1994) **The Political Economy of Policy Reform**, Washington, DC: Institute for International Economics

World Bank (2001), **India: Power Supply to Agriculture,** Energy Sector Unit, South Asia Regional Office, Report No. 22171-IN.

World Bank, (2002), **India: Power Sector Reform and the Poor**, Report No. 20517-IN, South Asia Energy and Infrastructure

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

World Bank, (1995), **Economic Developments in India: Achievements and Challenges,** *World Bank Country Study,* Washington D.C.

World Bank, (1996), **India: Five Years of Stabilisation and Reform and the Challenges Ahead,** Washington. D. C

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[55]	Education[56]	Does he/she own house?	Does he/she own land?

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

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

[56] 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	

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

37. Do you get adequate electricity for pumping?	Yes	No

38. If No, what do you do when electricity is not available for pumping water

Diesel pump	Kerosene pump	Nothing	_____

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

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

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

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

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		Equipment Name	
Fixed Cost		Fixed Cost	
Operating cost		Operating cost	
Number		Number	

APPENDIX II

Table 2A.1: Determinants of opinion on privatization across states (estimated odd ratios from a multinomial logistic regression model with reference 0 if no to privatization)

		Don't know		Indifferent		Yes to privatisation	
		SE	Exp(B)	SE	Exp(B)	SE	Exp(B)
Andhra Pradesh	Affecting Other Services	0.744	0.033	0.704	0.073	0.354	1.643
	Business shop	3.3E+03	0	5218.86	0	0.457	2.238
	Consumption	0.469	0.753	0.591	2.764	0.348	1.854
	Electric Items	2.9E+03	0	4.8E+03	0	0.467	2.559
	Generator/Inverter	8.7E+03	0	0	0	1.206	0.404
	Irrigation Connection	1.078	0.291	0.617	3.599	0.381	2.469
	Powercut	2.1E+03	0	1.031	0.447	0.465	1.017
	Problems due to powercut	0.396	0.348	0.578	1.2	0.338	1.566
	Problems in Work place	3.3E+03	0	1.423	1.449	0.468	1.315
	Tariff Range	0.508	2.077	0.54	3.478	0.423	1.078
	Voltage	0.402	1.484	1.093	0.113	0.385	0.876
Bihar	Affecting Other Services	0.506	0.198	0.723	0.124	0.462	0.516
	Business shop	4.3E+03	0	1.35	0.76	0.958	0.186
	Consumption	0.683	0.19	0.784	0.394	0.62	0.337
	Electric Items	0.918	0.146	0.881	0.827	0.692	0.429
	Generator/Inverter	2.8E+03	0	1.387	0.424	0.978	4.285
	Irrigation Connection	1.2E+04	0.416	0	0.769	9.9E+03	7.6E+07
	Powercut	1.669	0.371	1.726	0.377	1.291	0.706
	Problems due to powercut	0.572	0.636	0.672	0.793	0.563	1.428
	Problems in Work place	0.779	1.373	1.265	0.369	0.714	2.272
	Tariff Range	0.883	4.391	1.134	1.413	0.794	4.404
	Voltage	1.066	0.263	0.995	0.057	0.822	0.601
Gujarat	Affecting Other Services	0.501	0.574	0.547	0.18	0.542	1.201
	Business shop	0.649	3.357	0.646	2.269	0.681	22.645
	Consumption	0.352	0.666	0.364	1.348	0.465	0.691
	Electric Items	0.395	0.767	0.369	2.399	0.449	1.604
	Generator/Inverter	0	0	9.8E+03	0	0	0
	Irrigation Connection	1.119	0.076	0.88	0.296	0.887	0.342
	Powercut	0.353	0.637	0.378	1.348	0.477	0.326
	Problems due to powercut	6.9E+03	0.949	5.2E+03	8.6E+06	5.2E+03	2.3E+08
	Problems in Work place	0.409	0.885	0.432	0.553	0.473	4.175
	Tariff Range	0.364	1.199	0.368	1.416	0.451	0.407
	Voltage	0.33	1.049	0.367	0.302	0.419	0.868
Haryana	Affecting Other Services	0.37	0.194	0.464	0.995	0.563	0.537
	Business shop	0.909	1.762	1.022	2.644	0.972	4.075
	Consumption	0.296	1.248	0.666	0.109	0.471	1.817

	Electric Items	0.296	0.263	0.399	0.489	0.485	0.676
	Generator/Inverter	0.469	0.518	1.184	0.494	0.614	0.798
	Irrigation Connection	0.395	1.237	0.523	0.953	0.584	1.981
	Powercut	2.657	1.989	1.0E+04	0	0	0
	Problems due to powercut	0.334	1.965	0.613	3.974	0.619	3.067
	Problems in Work place	0.48	0.414	0.575	2.001	0.668	0.948
	Tariff Range	0.32	1.719	0.418	1.035	0.619	0.643
	Voltage	0.288	2.085	0.659	11.23	0.457	1.695
Karnataka	Affecting Other Services	0.399	0.216	1.631	0.29	0.281	2.141
	Business shop	3.2E+03	0	1.323	7.398	0.592	1.185
	Consumption	0.552	0.577	1.662	1.677	0.361	0.736
	Electric Items	0.658	0.495	1.46	2.712	0.393	1.828
	Generator/Inverter	4.2E+03	0	0	0	3.7E+03	0
	Irrigation Connection	0.396	0.776	1.3E+03	0	0.346	1.902
	Powercut	8.8E+02	0	594.217	0	0.522	0.458
	Problems due to powercut	0.409	0.446	1.5E+03	2.0E+06	0.383	0.49
	Problems in Work place	0.577	0.334	1.297	0.884	0.35	0.703
	Tariff Range	0.485	2.384	5.1E+02	2.0E+05	0.331	1.527
	Voltage	0.322	0.514	1.366	1.587	0.288	0.901
Kerala	Affecting Other Services	1.077	0.173	0.829	0.792	0.695	1.213
	Business shop	0.453	0.906	0.77	0.398	0.421	1.093
	Consumption	0.277	1.048	0.337	1.137	0.348	1.256
	Electric Items	0.288	0.545	0.342	0.661	0.321	1.977
	Generator/Inverter	0	0	1.135	1.221	0.582	5.183
	Irrigation Connection	0.425	1.381	0.549	0.783	0.476	0.715
	Powercut	0.243	0.811	0.294	0.839	0.265	0.904
	Problems due to powercut	0.251	1.23	0.346	0.574	0.291	1.006
	Problems in Work place	0.3	0.755	0.405	0.554	0.308	1.557
	Tariff Range	0.511	0.405	0.57	0.464	0.395	1.088
	Voltage	0.289	0.868	0.322	1.551	0.325	0.918
Madhya Pradesh	Affecting Other Services	1.148	0.091	0.938	9.004	0.795	2.489
	Business shop	0	0	1.3E+03	0	1.278	9.228
	Consumption	.	.	.	.	.	.
	Electric Items	0.528	0.338	1.076	0.329	0.712	0.854
	Generator/Inverter	3.0E+03	0	1.1E+03	0	1.012	5.144
	Irrigation Connection	0.319	0.68	0.749	0.918	0.557	1.4
	Powercut	0.583	1.099	315.233	0	0.819	2.337
	Problems due to powercut	0.81	0.315	8.8E+02	2.3E+05	1.331	0.952
	Problems in Work place	0.56	1.244	3.3E+02	0	0.749	2.06
	Tariff Range	.	.	.	.	.	.
	Voltage	0.312	1.114	0.655	0.937	0.515	0.638
Maharastra	Affecting Other Services	1.125	0.301	1.291	0.148	0.622	1.494
	Business shop	3.8E+03	0	1.048	2.088	0.941	1.62
	Consumption	0.274	0.708	0.349	0.835	0.414	1.544
	Electric Items	0.283	1.001	0.36	1.983	0.344	3.339

	Generator/Inverter	8.7E+03	0	0	0	0.986	1.435
	Irrigation Connection	0.827	2.044	0.947	3.404	1.192	1.234
	Powercut	4.0E+03	0	0.96	4.958	5.1E+03	0
	Problems due to powercut	0.271	0.347	0.328	0.303	0.433	1.739
	Problems in Work place	0.593	1.559	0.826	0.643	0.495	2.419
	Tariff Range	0.323	0.636	0.397	0.594	0.461	0.596
	Voltage	0.279	0.169	0.32	0.784	0.311	0.754
Punjab	Affecting Other Services	0.684	0.1	0.433	0.183	1.119	0.185
	Business shop	0.592	1.353	0.492	2.293	0.827	2.345
	Consumption	0.476	0.184	0.348	0.494	0.962	0.098
	Electric Items	0.415	0.55	0.392	1.328	0.857	2.569
	Generator/Inverter	0.687	0.611	0.482	1.087	1.03	2.023
	Irrigation Connection	0.522	1.092	0.468	0.503	0.798	1.452
	Powercut	8.0E+03	0	5.6E+03	0	0	0
	Problems due to powercut	0.644	1.1	0.633	2.715	0.949	0.5
	Problems in Work place	0.387	0.487	0.325	0.618	0.64	0.454
	Tariff Range	0.619	0.493	0.476	1.276	1.092	0.482
	Voltage	0.576	0.442	0.533	0.264	0.856	0.522
Rajasthan	Affecting Other Services	0	0.718	0	.	0	2.9E+09
	Business shop	1.085	1.187	1.054	1.272	1.586	3.373
	Consumption	1.314	0.738	1.178	0.787	3.681	0.811
	Electric Items	0.837	0.732	0.805	0.78	1.554	0.374
	Generator/Inverter	1.034	0.262	0.925	0.428	2.62	0.536
	Irrigation Connection	1.857	0.781	1.794	1.455	2.868	0.872
	Powercut	.	.	.	.	.	.
	Problems due to powercut	1.103	3.986	1.059	3.987	1.503	0.401
	Problems in Work place	0.811	0.467	0.783	0.418	1.561	0.278
	Tariff Range	.	.	.	.	.	.
	Voltage	0.844	0.52	0.818	0.643	1.471	0.775
Tamil Nadu	Affecting Other Services	0.506	1.124	7117.401	0	1.085	0.413
	Business shop	0.471	0.835	6.4E+03	0	0.741	2.448
	Consumption	0.268	1.227	0.6	2.095	0.463	4.234
	Electric Items	0.249	1.186	0.511	1.318	0.337	0.865
	Generator/Inverter	0.966	0.994	0	0	9.8E+03	0
	Irrigation Connection	0.327	0.623	0.81	0.62	0.652	0.333
	Powercut	0.274	0.788	0.619	1.191	0.396	0.689
	Problems due to powercut	0.263	0.779	0.594	1.735	0.392	1.4
	Problems in Work place	0.421	1.095	6.3E+03	0	1.11	0.238
	Tariff Range	0.866	5.982	1.319	4.534	1.289	1.585
	Voltage	0.302	0.324	0.536	0.621	0.352	1.256
Uttar Pradesh	Affecting Other Services	0.567	0.516	0.586	0.156	0.338	1.544
	Business shop	1.598	18.2	2.2E+03	0	0.511	0.865
	Consumption	0.8	2.493	0.723	0.447	0.626	2.601
	Electric Items	1.4E+03	0	1.209	0.212	0.608	0.349
	Generator/Inverter	2.7E+03	0.285	2.318	12.635	0.445	1.012

	Irrigation Connection	0	1.1E+02	5.3E+03	3.2E+08	5.3E+03	2.2E+07
	Powercut	2.0E+03	0	1.3E+03	0	0.698	3.055
	Problems due to powercut	0.639	1.723	0.541	1.492	0.426	1.901
	Problems in Work place	0.563	0.324	0.55	0.53	0.382	0.572
	Tariff Range	0.55	0.629	0.486	1.645	0.358	0.616
	Voltage	0.723	0.123	0.602	0.598	0.488	3.143
	Affecting Other Services	0.462	0.283	0.451	0.957	0.4	1.638
	Business shop	0.525	0.68	0.548	0.767	0.443	1.47
	Consumption	0.418	1.063	0.595	1.657	0.593	2.054
	Electric Items	0.599	0.406	0.494	1.244	0.463	1.479
	Generator/Inverter	0.646	1.622	0.575	1.091	0.526	1.363
West Bengal	Irrigation Connection	4.5E+03	2.0E+07	0	1.671	1.0E+04	1.965
	Powercut	0.417	0.388	0.406	1.305	0.391	1.033
	Problems due to powercut	0.374	0.639	0.553	2.524	0.503	1.783
	Problems in Work place	0.681	1.63	0.826	0.629	0.63	1.223
	Tariff Range	0.35	0.8	0.417	0.928	0.403	1.488
	Voltage	0.37	1.645	0.406	1.616	0.394	2.545

Reference category: No to privatisation

Table 2A.2: Determinants of willingness to pay across states (estimated odd ratios from a binomial logistic regression model; 1 if positive willingness to pay, 0 otherwise)

	Affecting other services		Business shop		Consumption		Electric Items		Generator/Inverter	
	S.E.	Exp(B)	S.E.	Exp(B)	S.E.	Exp(B)	S.E.	Exp(B)	S.E.	Exp(B)
Andhra Pradesh	0.382	0.244	0.547	41.22	0.405	0.832	0.54	4.723	1.564	0.969
Bihar	0.519	3.932	1.281	0.115	0.512	0.62	0.59	0.277	0.783	1.086
Gujarat	0.489	1.406	0.464	3.031	0.289	1.022	0.317	1.865	4.02E+04	2.89E+08
Haryana	0.286	2.635	0.824	3.715	0.234	0.889	0.23	1.244	0.396	0.741
Karnataka	0.29	2.112	0.82	1.124	0.473	1.699	0.672	4.646	2.77E+04	1.03E+08
Kerala	0.829	1.391	0.608	0.593	0.415	0.747	0.401	1.613	0.579	6.922
Madhya Pradesh	0.888	1.946	1.221	0.851	.	.	0.641	1.847	1.279	0.71
Maharastra	0.573	1.664	0.841	1.385	0.279	2.158	0.254	1.026	1.16	0.517
Orissa	0.355	4.228	0.351	1.685	0.383	1.696	0.642	3.124	0.691	11.719
Punjab	0.454	2.402	0.355	1.028	0.333	2.26	0.331	0.492	0.473	1.861
Rajasthan	1.686	1.647	0.661	0.08	1.105	60.342	0.399	1.055	0.663	2.069
Tamil Nadu	0.8	0.647	1.087	0.445	0.423	7.208	0.315	0.712	1.92E+04	0
Uttar Pradesh	0.301	2.283	0.604	0.671	0.692	11.295	0.549	0.434	0.51	1.082
West Bengal	0.328	1.974	0.362	2.614	0.419	1.693	0.409	0.423	0.459	1.558

	Irrigation connection		Powercut		Problems due to powercut		Problems in workplace		Tariff range		Voltage		2 Log likely-hood ratio	Predict ion percen tage
	S.E.	Exp (B)	S.E.	Exp (B)	S.E.	Exp (B)	S.E.	Exp (B)	S.E.	Exp (B)	S.E.	Exp (B)		

Andhra Pradesh	0.688	0.312	0.505	1.507	0.343	2.046	0.566	1.616	0.454	1.238	0.382	2.06	272.925	88.5
Bihar	2.7E+04	2.3E+08	1.089	0.603	0.393	1.825	1.273	11.911	0.644	1.53	0.637	3.286	207.171	84
Gujarat	0.721	1.873	0.297	1.07	1.211	1.524	0.344	2.227	0.299	0.859	0.284	0.118	371.912	78.3
Haryana	0.333	0.465	1.94	0.283	0.271	0.466	0.354	1.848	0.246	0.503	0.253	1.021	555.048	67.2
Karnataka	0.34	2.76	0.58	0.309	0.315	4.119	0.472	1.862	0.373	1.453	0.267	1.551	477.421	77.9
Kerala	0.467	2.381	0.334	1.637	0.379	0.946	0.399	1.208	0.487	1.534	0.373	1.437	289.328	91.5
Madhya Pradesh	0.325	1.657	0.495	0.925	9.4E+03	0	0.478	0.995	.	.	0.292	0.721	388.271	78.7
Maharastra	0.727	6.249	1.6E+04	0	0.266	2.437	0.453	0.851	0.315	0.87	0.23	2.396	502.772	72.5
Orissa	2.8E+04	0	0.35	1.034	0.371	0.489	0.398	1.861	4.0E+04	0	0.327	1.308	288.775	82.5
Punjab	0.497	0.931	4.0E+04	2.0E+09	0.862	0.975	0.285	1.157	0.486	0.747	0.37	1.764	376.027	76.4
Rajasthan	1.084	0.1	.	.	6.3E+03	4.5E+08	0.328	1.581	.	.	0.332	9.339	263.689	83.2
Tamil Nadu	0.464	0.648	0.341	0.309	0.344	0.672	0.631	0.775	0.86	0.996	0.344	0.618	270.696	85.4
Uttar Pradesh	1.4	2.042	0.617	0.548	0.348	2.761	0.347	0.936	0.296	0.603	0.386	2.542	389.089	72.1
West Bengal	4.0E+04	0	0.32	0.683	0.428	6.427	0.551	1.188	0.311	0.754	0.308	1.537	299.395	75.3