Impact of Power Sector Reform on Poor: A Case Study of South and South East Asia

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Abstract

Electricity is one of the key inputs for socio-economic development. Efficient provision of electricity contributes to poverty reduction by fuelling economic growth and enabling the fulfilment of the basic human needs of health and education. Provision of electricity is thus crucial for improving living standards, supporting development and job opportunities, and fostering social activities. To meet the challenges of ever-increasing demand for electricity different models for reforming the power sector have been adopted across the developing world. Following a decade of energy sector reforms in many developing countries, it is appropriate to ask the extent to which these reforms have benefited the poor. In particular, their impact on access, quality and reliability of electricity available to the poor. This paper investigates this in a systematic manner by critically examining the impact of reform processes, adopted in selected states in India and in the Philippines, on access of electricity to the poor.

It is observed that the focus of Indian reform legislation has been more on improving financial viability of the ailing power sector than on improving access to electricity. The legislation does not explicitly spell out the provisions for the extension of electricity services to the poor and the need and mechanism for subsidizing marginalized consumers. In contrast, the Philippines legislation has provision of lifeline rates for the poor and the approach to cross-subsidy, subsidy and the expansion of network. The Act stipulates a definite time frame for the elimination of cross-subsidy and at the same time it ensures subsidized rates for the identified poor. The paper brings out the need to have a proactive legislation that addresses issues linked to access to reliable and affordable sources of electricity. To effectively meet the electricity needs of the poor, legislative and policy support for mechanisms like the provision of lifeline rates and special functions like missionary electrification needs to be put in place.

1. Introduction

Electricity is one of the key inputs for socio-economic development. Efficient provision of electricity not only contributes to poverty reduction indirectly through economic growth, but being central to the basic human needs of health and education, electricity access also has a direct bearing on poverty reduction. To meet the challenges of ever-increasing demand of electricity different models for reforming the power sector have been adopted across the developing world. Power sector reforms generally involve commercialization, setting up of independent regulators, restructuring, and privatization of the electricity sector. Ensuring that power sector interventions are designed so as to benefit the poor is vital both for social equity and sustainability of the reform process. Following a decade of energy sector reforms in many developing countries, it is appropriate to ask the extent to which these reforms have benefited the poor. There is often a concern that these reforms are a setback for the poor. This paper is an attempt at investigating this in a systematic manner by critically examining the reform processes adopted in selected states in India and in the Philippines vis-à-vis their impact on the access of electricity to the poor.

2. Background on electricity services for the poor in South and South - East Asia

The demographic indicators of electricity services in South and South East Asia show a wide variation. There is a large disparity in the per capita consumption of electricity in the region, with Singapore leading with per capita consumption of 6,641 kWh per year, with Nepal at the other end at 47 kWh per year. As per recent estimates, the per capita consumption of electricity in India at 379 kWh is one of the lowest in the world. Similar unevenness is prevalent in electrification levels, with Thailand having the highest electrification level of 97% and Bhutan only 11%. While The Philippines is at the high end of the regional electrification spectrum (87%), India is in the middle (46%). Propelled by rising income and electrification levels, electricity demand in South and South-East Asian region is projected to rise sharply in future. To meet this challenge many developing countries in the region embarked on restructuring their electricity industry by adopting different models for restructuring, privatization and competition.

Table 1. Power sector reform in South and South - East Asia

S.No.	South and South - East Asian countries	Old structure	Restructuring	Corporatisation	Unbundling	Independent regulator	Privatisation	Competition
1	Bangladesh	✓		✓				
2	Bhutan	✓						
3	India	✓	✓	✓	✓	✓	✓	
4	Indonesia		✓	✓	✓	✓	✓	✓
5	Malaysia		✓	✓	✓	✓	✓	✓
6	Maldives	✓						
7	Nepal	✓				✓		
8	Pakistan	✓				✓		
9	The Philippines		✓	✓	✓	✓	✓	✓
10	Singapore		✓	✓	✓	✓	✓	✓
11	Sri Lanka	✓		✓		✓		
12	Thailand		✓	✓	✓	✓	✓	✓

Source: Authors compilation (2002).

Countries like Indonesia, Malaysia, Singapore, Philippines and Thailand have already introduced competition in the power market, whereas, in countries like Bangladesh, Bhutan, Nepal, Pakistan, and Sri Lanka, the reforms are in early stages. In India, power sector restructuring and setting up of independent regulators started in the late 1990's. Therefore, it would be useful to assess the experience and also draw lessons from the experience of other countries that could provide useful learnings for the reform process.

3. Selected case studies in South and South - East Asia: the Philippines and India

This paper analyses the impact of power sector reforms on poor through the selected case studies of India and Philippines. To assess the impact of power reforms on the poor, it is essential to calculate the electricity indicators separately for poor and non-poor groups in society. International comparisons of poverty data entail both conceptual and practical problems. Different countries have different definitions of poverty, and consistent comparisons between countries can be difficult. Local poverty lines tend to have higher purchasing power in rich countries, where more generous standards are used than in poor countries. The conventional definition of poverty equates it with income or expenditure levels that enable an individual to satisfy a certain minimum consumption level. The proportion of population not able to attain the specified level of expenditure is then segregated as poor. Using such an approach the Planning Commission, Government of India has been estimating the Head Count Ratio of the poor at State level, separately for rural and urban areas for over three decades. It currently uses minimum consumption expenditure; anchored in an average (food) energy adequacy norm of 2,400 and 2,100 calories per capita per day to define state specific poverty lines, separately for rural and urban areas [National Human Development Report, 2001]. As per the 55th NSS [National Sample Survey, 1999-2000], poverty line for urban areas was Rs.854.96 (US$19.02) per capita per month and Rs.486.07 (US$10.82) per capita month for rural areas. According to this definition, 26.1% of the Indians fall below the poverty line. In Philippines, poverty line is defined in terms of a least-cost consumption basket of food that provides 2,016 calories and 50 grams of protein per day and of non-food items consumed by families in the lowest quintile of the population. The poverty threshold for Philippines in 2000 stood at 967 Pesos (US$21.88) per capita per month (National Statistical Office, Philippines). Therefore, in nominal dollar terms, the India poverty line is less than that of Philippines. As of 2001, 40% percent of total population were officially considered poor in the Philippines. Table 2 compares the socio-economic, demographic, and electricity characteristics of the Philippines and India.

Table 2. Socio-economic, demographic, and electricity characteristics between the Philippines and India

Indicator	The Philippines	India
Population, total (millions)	77.02	1033.39
Population growth (annual %)	1.88	1.70
% Population below poverty line	40.00	26.10
GDP (current US$ Billions)	71.44	477.55
GDP growth (annual %)	3.40	4.50
Illiteracy rate, adult male (% of population ages 15 and above)	4.52	42.34
Inflation, GDP deflator (annual %)	6.67	6.00
Life expectancy at birth, total (years)	69.27	62.80
Infant mortality rate, (per 1000 live births)	30.72	69.20
Electric power consumption (Billion kWh)	34.97	391.65
Exchange rates (Jan 2002)	51.20	48.56
Per Capita GNI ($)	1050	460
Per capita consumption of Electricity (kWh)	454.00	379.00
Electrification levels	87%	46%

Source: www.worldbank.org

On the reform front, in India, unbundling and privatization of distribution has taken place in two states, vertical unbundling and restructuring has taken place in seven states, and 21 states have established independent regulatory commissions. The Philippines has gone a step further by moving towards competition in the sector. An independent regulatory commission has also been put in place to regulate and supervise the sector to assure stakeholders interests.

4. Methodology and Data Issues

In the Philippines, the Republic Act 9136 was passed in 2001 with the mandate of setting up of an independent regulatory commission, promoting rural electrification, and undertaking sector restructuring. In case of India, the Electricity Regulatory Commission Act was passed in 1998 for setting up of independent regulatory commissions with the objective of tariff rationalization, that is, aligning tariffs with the costs of delivery of power by reducing cross-subsidies. Electricity being a concurrent subject in India, where both the center and the states can formulate policy, there is a significant variation with respect to the progress of reforms across the states. This often makes the task of implementing reforms much more complex in case of India as compared to Philippines where the central government has complete jurisdiction over organization and reform of power sector. In case of India, following three states representing different phases of the reform process have been taken for this study:

- **Orissa:** Orissa was the first state in India and South Asia to corporatize and unbundle its state-owned electricity industry and privatize the distribution while establishing an independent regulatory body. Orissa's experience can provide lessons not only to other Indian states but also to other developing countries that are in the process of reforming their power sector.
- **Karnataka:** Karnataka has a four-year old regulatory reforms history with the recent unbundling of the sector. However, distribution had not been privatised in Karnataka
- **Himachal Pradesh:** The reform process in Himachal Pradesh is in its nascent stage with a newly established regulatory commission. The electricity utility is yet to be corporatised or unbundled.

In all these three cases, the need for direct subsidy and the role of the government in the provision of electricity for the poor is discussed (Table 3). The paper also looks at the legal and policy framework governing power sector reforms in the Philippines and India.

Table 3. Reforms option

S No	Country/ State	Reform option	Mandate
1	The Philippines	Reform Act, 2001	Restructuring, privatization and competition, rural electrification, setting up of independent regulatory commission.
2	India	Reform Act, 1998	Legislation spelling out the role, objective, functions of independent regulatory commissions at the central and state level
2 a	Karnataka	Reform Act, 1999	Restructuring, unbundling, and setting up of independent regulatory commission. The government is planning to privatize the distribution business.
2 b	Himachal Pradesh	No Act	Setting up of independent regulatory commission under the Federal Act
2 c	Orissa	Reform Act, 1995	Corporatization, unbundling, privatization, setting up of independent regulatory commission

Source: Authors compilation

Since the study seeks to identify the extent of the impact of reforms on the poor, it is necessary to make a distinction between the poor and the non-poor. Various options available to distinguish electricity access for the poor and the non-poor along with their merits and demerits are discussed below:

- **Electricity access for BPL (below poverty line) population**: The ideal option would be to study electricity access for the poor as defined by the national poverty line or other income definitions of the poor. However, often data on these is not available directly. The Government of India launched the KJ (Kutir Jyoti) Programme in 1998-99 for extending single-point light connections to the households of BPL rural families. Since the KJ programme was designed to target the BPL population, the number of KJ connections has been used for identifying electricity access to the BPL population. This methodology has a limitation that barring a few states, this scheme excludes the urban poor. Nevertheless, under the existing data constraints, linking KJ consumers with the BPL population provides the best approximation for the electrification levels of poor households.
- **Linking rural population with the poor population**: A second option is to use the electricity data for rural access as a proxy for the poor. The rationale for using this proxy is that the income levels and access to electricity in rural areas are significantly lower than for those in urban areas. The limitation of this approach is that it implies that the total population in rural areas is poor and ignores the urban

poor. In India, utilities compile data according to different categories of consumers, and not according to urban or rural areas. Due to non-availability of the data, this approach has not been adopted in this paper.

- **Considering lowest tariff band consumers as poor consumers of electricity**: The third option is to use the utility's data and identify the number of customers in the different consumption bands. The consumers in the lowest consumption band, usually 1–50 kWh, can be taken as a proxy for the poor while consumers in other consumption bands are considered non-poor. However, this proxy for the poor may not prove useful in some cases. The low consumption may be due to low penetration of electrical appliances or less supply of electricity from the utility. The limitation of this approach is that while it covers the affordability dimension of access at the lower end of the consumption, it ignores the population of the poor who do not have connections.

Due to these limitations of various approaches the following definitions and supplementary proxies have been used to distinguish between the poor and the non-poor:

- In the Philippines, the regulatory commission identifies the marginalized end-users after conducting a simulation exercise on the paying capacity of the poor. The marginalized consumers are referred to as low-income household electricity consumers who cannot afford to pay at the full rate. In this study, marginalized consumers have been taken as a proxy for the poor. Also, remote village electrification has been taken as a proxy for the electrification of the poor.
- In Orissa, the number of KJ connections has been used as a proxy for the poor households electrified in rural areas. For this study, the urban poor in Orissa have not been considered, which is not a serious limitation as 85% of the poor population in Orissa lives in rural areas.
- In Karnataka, the number of BJ (Bhagya Jyoti) connections has been used as a proxy for the poor households electrified. The BJ scheme is the same as the KJ scheme, except that it includes both the rural and the urban poor.
- In Himachal Pradesh, a single light connection is provided to the BPL population. However, there is no separate consumption slab or tariff slab for these consumers. The lowest-tariff slab consumers have been considered as a proxy for the poor. Data on rural and urban populations has also been linked with the poor and non-poor populations. This methodology has certain limitations, as the Government of India defines rural and urban areas according to the number of inhabitants, non-agricultural workforce, and density of population, and not according to the income. Nevertheless, as the per capita expenditure of rural households is far less than the per capita expenditure of urban households, any policy or any programme to improve access in the rural areas would have a pro-poor bias. Therefore, the proxy of rural areas for the poor is reasonably justified.

To assess the impact of reforms on poor the following indicators linked to access and affordability of electricity have been used.

Indicators for "Access"

- **Electrification levels**: Use of electrification levels is probably the simplest indicator of electricity access. This indicator provides an estimate of the proportion of the households that has physical access to electricity.
- **Electrification rate** (i.e. the rate at which new connections are being made): indicating to what extent a particular reform is accelerating (or possibly retarding) access to electricity.
- **Electricity consumption**: this indicator can provide some pointers as to how reforms affect the poor; it, however, depends on changes in tariffs, types of appliances used, and supply constraints, if any.

Indicators for "Affordability"

- **Electricity tariffs**: when combined with income data, tariffs can indicate to what extent various groups in society can afford electricity.
- **Cross Subsidy**: An additional indicator on cross- subsidy has been used in this study. In India, one of the reform mandates was to introduce cost-reflective tariffs. In practical terms, this has meant designing tariffs in such a manner so that the average realization from each category converges with the overall average realization. To measure the extent to which this has been done, TERI has developed the following index:

$$\text{CI (Convergence index)} = \sqrt{\left\{ \sum_{C=1}^{N} \left[\left(AR_c / AR_o \right) - 1 \right]^2 / N \right\}}$$

Where, ARc = Average realization from category C
ARo = Overall average realization
N = Number of categories

This implies that if the average realization from each category equals the overall average realization the CI would be zero, indicating that no category of consumers cross-subsidizes another with reference to the average realization. Therefore, a reduction in the CI is an indicator of a reduction in the cross-subsidy.

5. Assessment of selected reform option: Indian case study

5.1. Power sector reforms in India- historical perspective till 1995

Electricity is covered under the concurrent list in the Constitution of India, implying that both central and state governments have the power to legislate the sector. The structure of the power industry in India has evolved considerably post independence (1947). In the pre-independence era, the Indian Electricity Act, 1910, governed the electricity industry. The Act provided for private participation in the generation and supply of electricity and the industry comprised of a large number of independent private or municipal electricity utilities.

In the post-Independence era, vide the Electricity Supply Act, 1948 (with various amendments therein) and the Industrial Policy Resolution, 1956, private participation diminished progressively. The sector gradually assumed its current form of vertically integrated statewide public sector utilities – the SEBs (State Electricity Boards). The Electricity Supply Act also created the CEA (Central Electricity Authority) with the mandate for efficient techno-economic systems planning. Till the onset of 1990s, the electricity industry was regulated and owned by various government agencies and organizations with the role and participation of the private sector being limited to specific areas of small jurisdiction and consumer base. Thus, the government performed the multiple roles of developer, promoter, and regulator of the power industry.

5.2. Growth of the sector

The demand for electricity has grown rapidly since independence, with the per capita consumption of electricity increasing at a CAGR (compounded annual growth rate) of 6.04% [TEDDY, 2002]. This sustained growth is the result of economic development and has been accompanied by structural shifts in the consumption pattern. In spite of this growth per capita electricity consumption in India is 379 kWh per annum, which is far below the world average of 2,252 kWh. Close to 90% of the villages are electrified officially. However, only 46% of the Indian population has access to electricity.

Table 4. Household access to electricity in India in 2001-02 (%)

Total access*	**46**
Rural access*	33
Urban access*	82
Rural population as % of total population**	72
Urban population as % of total population**	28

Source: *Planning Commission (2001), **Census 2001

5.3. Description of various reform initiatives

Historically, policy and regulatory regime in India's power sector made significant efforts to bring energy services to its vast population. Several efforts were made in the form of

national programmes for rural electrification, and promoting renewable energy technologies like biogas, improved cooking stoves and solar cookers. However, in spite of the existence of these programmes for a long time, coverage of modern energy services in rural areas remains a challenge. Besides, to meet energy needs of some sections of population both subsidies and cross subsidies, and particularly the latter were used. However, these policies led to problems and bred inefficiency in the sector. As the industry and commerce consumer categories subsidized the agriculture and domestic consumer categories, the resultant high tariffs for industrial consumers led to shifting or closure of industries in many cases. The power sector continued to suffer from considerable defaults on payments of dues from various entities. Poor fiscal health and lack of capability to invest in the sector compelled the government to look for private sector participation. Reforms were initiated by the central government in 1991, when it introduced the policy to liberalize the sector and promote private investments (Table 5). This policy initially focused on the generation aspect of electricity. Its main objective was to add generation capacity in a short timeframe through private capital by making the sector attractive for investments. Later, it was perceived that the private power policy for generation projects would not succeed unless it was preceded by extensive reforms in the distribution of electricity. Unless the industry provided a strong base of commercial working at the point of sale of electricity, it would not be able to attract the requisite capital investments in generation, transmission, and distribution projects and other related inputs. It was recognized that fundamental organizational changes would have to be effected to restore financial viability of the sector. Private investment was not forthcoming in undertaking generation as the SEB's were in no position to pay for the power purchases. Hence, the need for restructuring the electricity sector was felt.

The goal of restructuring was to increase transparency, accountability, and viability of the industry, facilitate private sector participation, and promote a competitive market. The responsibility for ensuring efficient operations of the industry would gradually shift to an independent regulator, and the government would continue to be responsible for long-term planning, legislation, and evaluation of sector performance. Unfortunately, improving electricity access was not recognized explicitly as an objective of the restructuring exercise and the regulatory legislation, which is perhaps a major lacuna in the Indian reform process.

Table 5. Chronology of events in electricity sector reforms in India

1991	Electricity Laws (Amendment) Act allows private sector participation in generation with foreign investors allowed 100 % ownership.
1992-97	Eight projects given 'fast-track' approval status and sovereign guarantees by the central government.
1995	Orissa Electricity Reform Act establishes the Orissa Electricity Regulatory Commission and provides for unbundling of the Orissa State Electricity Board.
1996	World Bank support for Orissa Power Sector Restructuring project approved.
1996	Chief minister's conference formulates a Common Minimum National Action Plan for electricity.
1997	Electricity Regulatory Commission Ordinance Notification provides for the establishment of a CERC (Central Electricity Regulatory Commission) and SERCs (State Electricity Regulatory Commissions)
1998	Andhra Pradesh, Karnataka, and Uttar Pradesh proceed with the preparation of Electricity Reform Acts. The World Bank prepares and approves projects supporting reforms in each of these states.
1999-2001	Energy conservation bill passed by the Parliament.
2001	Draft central government Electricity Bill prepared and introduced in the Parliament
Till December 2002	Establishment of independent regulatory commissions in 21 states.

Source: Authors compilation

5.4. Reform Mandate

5.4.1. Establishment of Regulatory Commissions: In 1996, the central government, along with the state governments, decided on the Common Minimum National Action Plan to initiate steps to improve the performance of the sector at the central and state level. Accordingly, the central government passed the legislation enabling the setting up of independent and autonomous regulatory bodies at the central and the state levels in July 1998. Broadly, the roles of these regulatory commissions as envisaged in the ERC (Electricity Regulatory Commission) Act, 1998 are (i) Setting retail tariffs (ii) Gradual elimination of cross-subsidy at improving efficiency levels (iii) Setting performance standards in the supply of electricity (iv) Setting performance standards in the promotion of efficient use of electricity by consumers (v) Promotion of competition (vi) Creation of a conducive environment for private sector participation.

5.4.2. Cost of supply and tariff

The regulatory commissions in India have been mandated to phase out the cross-subsidies in tariff. The ERC Act, 1998 stipulates that tariff should progressively reflect the cost of supply of electricity. However, the Act does not clearly define a path or time frame to achieve tariff alignment, nor does it mandate any lifeline or subsidized rates for the poor.

The Electricity Act (2003) mandates a national electricity policy. The draft tariff policy, however, does not address key issues such as the time frame for the elimination of cross-subsides and effective mechanisms for delivering support to the targeted consumers.

5.4.3. Efficiency improvements through reduction in T&D losses

The link between T&D losses and electricity access for the poor is indirect but important. In India, a large part of electricity loss is due to pilferage by residential, commercial, and low-voltage industrial customers. Agricultural and poor residential consumers are not metered and often the consumption by these categories is inflated to mask the operational inefficiencies and high distribution losses. Thus, actual availability and consumption of electricity by these categories is lower than what the statistics would imply. The reform mandate requires reduction in T&D losses but does not specify any means for achieving this reduction such as 100% metering and curbing of thefts and pilferage. The Electricity Act (2003) addresses this lacuna to some extent by provides for penalties for power theft.

5.4.4. Government support

The reform mandates that if the state government wants to subsidize some consumers, then it would bear the burden through budgetary support and fully compensate the utility for the same. This requires smooth communication and co-ordination between the state government, the utility, and the commission. Sometimes the decision of the government, regarding the grant of subsidy has come after the issuing of the tariff order, which has led to a partial rollback of the announced tariff increase. Often the committed government support is not provided. The new Electricity Act (2003) addresses this by explicitly prescribing that the government support is provided in advance.

5.5. Rural electrification in India

The Rural Electricification Corporation (REC) provides financial assistance to SEBs, state power corporations, electricity departments of the state governments and rural electric co-operatives for various rural electrification schemes. Setting up of REC has definitely acted as a catalyst for rural electrification in India. Of the 0.509 million villages electrified in the country, about 0.305 million villages have been electrified under REC - financed schemes. Schemes financed by REC include the K J (Kutir Jyoti) scheme, Dalit Basthi scheme, Hamlet Electrification, Pumpsets Energisation, system improvements, small generation, and Rural Electric Cooperatives. Some of the achievements of the KJ scheme of REC are discussed below.

5.5.1. Kutir Jyoti Programme

The Government of India in 1988 launched the KJ Programme–89 for extending single-point light connections to the households of rural families BPL (below the poverty line). Under this scheme, a one-time cost of internal wiring and service connection charges is provided by way of 100% grants by REC to the states. According to REC, till March

2002, 4.85 million households of the BPL rural poor have benefited under this programme and a grant of over 65.28 million dollars has been drawn by the implementing agencies.

5.5.2. Challenges in rural electrification

With 78, 240 villages still awaiting electrification much needs to be done. The overall pace of rural electrification as well as energization of pump sets received a setback in the last reform decade. The poor financial health of the SEBs, increasing reluctance to move to rural areas because of high costs and low returns is largely responsible for this trend (Gokak, 2002). The Gokak study also points that the financial problem posed by the programme of rural electrification, which is subsidized, is enormous. The net subsidy after accounting for amounts received from state governments was 1,034 million dollars in 1991 and increased to 4,710.87 million dollars in 1999–2000.

In view of these problems, the Government of India has taken new initiatives for rural electrification. This is reflected in the Electricity Act (2003), which envisages stand-alone systems for generation and distribution of power and decentralized management of distribution through Panchayats, users associations, and co-operatives or franchisees.

6. Power Sector Reforms in Orissa

6.1. Description of the reforms process

Orissa was the first state in India to initiate power sector reforms with the enactment of the Orissa Electricity Reforms Act in 1995. As a part of the reform programme, the OSEB (Orissa State Electricity Board) was unbundled. The generation business was hived off into two corporations—the OPGC (Orissa Power Generation Corporation), which took over thermal plants of the erstwhile OSEB, and the OHPC (Orissa Hydro Power Corporation), which took over the hydro plants. The transmission and the distribution businesses were entrusted to GRIDCO (Grid Corporation of Orissa Limited), which is the successor organization of the OSEB. The distribution business was privatised in 1998/99 and has been divided into four zones.

The OERC (Orissa Electricity Regulatory Commission) was established in 1996 as a part of the reform process. The powers and functions of the regulatory commission include issue of licences, enforcement and regulation of licensees, promotion of economic efficiency and safety in transmission, distribution, and use, regulation of bulk supply and retail supply tariffs, collection of data and forecasting, and promotion of competition.

6.2 . Identification of the reform process

The following reform processes can be identified in Orissa (Table 6) (a) Corporatization of the electricity board (b) Management contract (c) Establishment of an independent regulatory commission and issuing of four orders (d) Vertical unbundling into separate generation, transmission, and distribution companies (e) Privatization of four distribution zones in Orissa. The period after the privatization of distribution has been considered as the post-reform period (1999-2003) and 1996-1999 as the pre-reform period.

Table 6. Chronology of events in Orissa power sector reforms

November 1993	Chief Minister of Orissa confirms the state government's commitment to power sector reforms
April 1995	GRIDCO (Grid Corporation of Orissa Limited) and OHPC (Orissa Hydro Power Corporation) incorporated under Companies Act 1956
January 1996	Orissa Electricity Reforms Act (1995) is notified n Official Gazette
April 1996	Reform Act comes into force GRIDCO takes over T&D business from OSEB (Orissa State Electricity Board) OHPC takes hydro projects from OSEB and DoE OERC (Orissa Electricity Regulatory Commission) becomes operational Management contract awarded to BSES in respect of central zone OERC issue license to GRIDCO Management contract to BSES terminated
November 1997	Chief Minister of Orissa announces the privatisation of four DISTCOs GRIDCO incorporated four wholly owned subsidiary companies
November 1998	Four distribution subsidiary companies become operational
Jan- April 1999	OERC issues separate transmission (to GRIDCO) and distribution (to four DISTCOs) licences
April 1999	BSES takes over WESCO (Western Electricity Supply Company of Orissa Limited), NESCO (North Eastern Electricity Supply Company of Orissa Limited), and SOUTHCO (Southern Electricity Supply Company of Orissa Limited)
September 1999	AES consortium takes over CESCO (Central Electric Supply Company of Orissa Limited)
August 2001	Following AES pullout, OERC vests management of CESCO in a chief executive officer

Source: Authors compilation

6.3 . Definition of poor and policy context

Orissa has a population of 36706,20 with an annual growth rate of 1.4%. Only 14.97% of the total population in the state is urban. It is one of the poorest states in India with the highest percentage of BPL population (47.15%)Table 7.

Table 7. Rural/urban population

Year	Urban %	Rural %	Rural population % BPL (below poverty line)	Urban population % BPL (below poverty line)
1991	13.38	86.62	49.72	41.64
2001	14.97	85.03	48.01	42.83

Source: Authors compilation from Census of India 2001 and tariff orders

To encourage electrification of BPL households, Orissa adopted the KJ (Kutir Jyoti) programme in 1988-89 for extending a single-point light connection to the households of

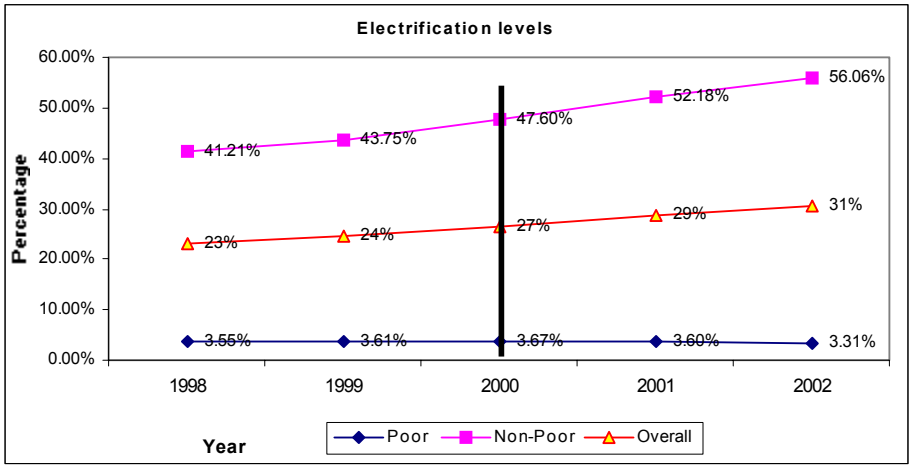
BPL rural families, including harijan and adivasi families. For the purpose of this study, the number of KJ connections has been linked with the rural poor BPL households.

6.4. Assessment of the impact of the reforms in Orissa on the poor

6.4.1. Electrification levels

Electrification level provides an estimate of the proportion of the population that has physical access to electricity. The electrification levels for the non - poor in Orissa increased from 47.60% in 1999–2000 to 56.06% in 2001–02, whereas electrification levels for the poor decreased from 3.67% to 3.31% in the same period (Figure 1). The reason for this could be disconnection of installations due to payment default. Also, when OSEB was restructured and distribution companies were privatised, the rural electrification wing was disbanded and the focus on rural electrification was lost. As a result, the number of villages electrified in Orissa declined from 800 in 1997–98 to a mere 42 in 2000-01.

Figure 1. Electrification levels



Source: Authors compilation from Census of India 2001 and tariff orders

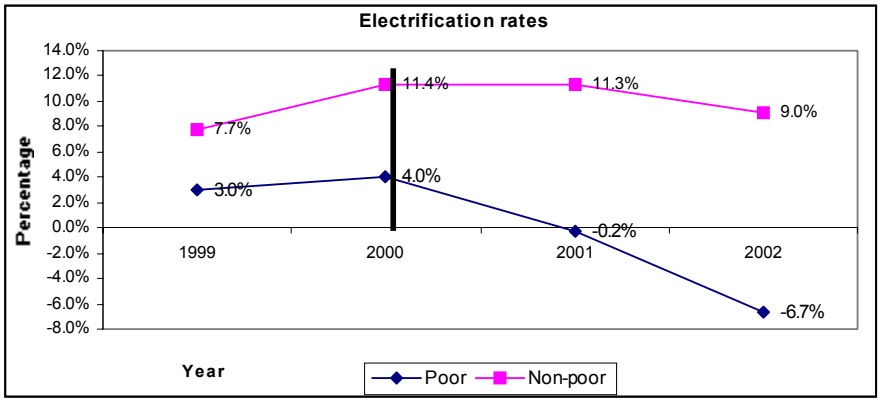
The electrification levels for the non-poor and the poor before reforms were growing at a CAGR (compounded annual growth rate) of 7.5% and 1.6% respectively. After reforms the tempo for electrification levels for poor has gone down drastically, while, electrification levels for the non-poor have increased by a CAGR of 8.5%. The deterioration in the electrification levels of the poor after the reforms could be due to the incentivisation of the private utility to try to minimize loss by discouraging new connections for the poor.

6.4.2. Electrification rates

The electrification rate measures the pace of electrification. This indicator is used to determine the extent to which the reforms option accelerates access to electricity,

especially among the poor. The electrification rates for the poor in Orissa have gone down drastically during the post-reforms period (1999–2000). With the advent of the reform process, electrification rates for the non-poor households in Orissa increased from 7.7% in the year 1998–99 to 9% in the year 2001–02 (Figure 2) .The reasons for the de-electrification of the poor consumer could be that many of them opted out due to relatively higher charges.

Figure 2. Electrification rates

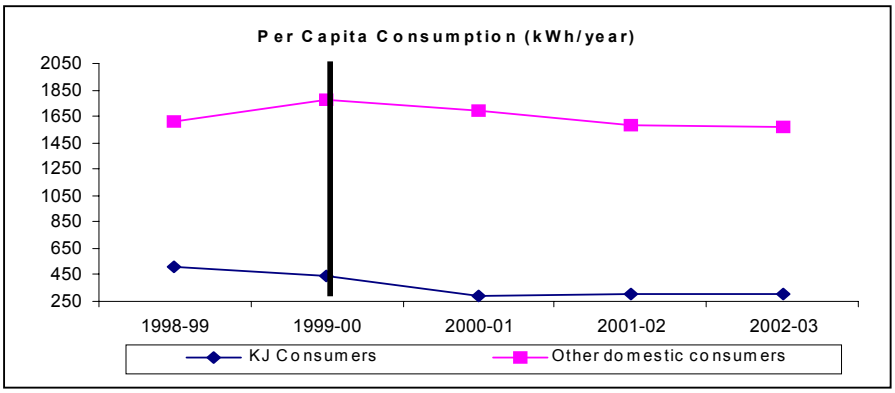


Source: Authors compilation from Census of India 2001 and tariff orders

6.4.3. Electricity consumption

Electricity consumption is another important indicator for analysing the impact of reforms on the poor. The electricity consumption per household for the poor households in Orissa shows a sharp decline of 41 percent between 1998-99 and 2002-03. Thus, the fall in consumption in the case of the poor consumers has been quite substantial (Figure 3).

Figure 3. Electricity consumption



Source: Authors compilation from Census of India 2001 and tariff orders

6.4.4. Electricity tariff

Over the years, the poor consumer in Orissa has had to pay a fixed charge of 61.78 US cents per month (Table 8) irrespective of their actual consumption of electricity. Thus, the poor consumer pays the same amount for consuming 10 units per month and 50 units per month, which is regressive.

Table 8. Tariff for the poor and non-poor

	Per unit charge for other domestic consumers (US cents per kWh)	Access charge per month for Kutir Jyoti Consumers (cents per month)
1997-98	2.74	61.78
1998-99	3.48	61.78
1999-00	3.53	61.78
2000-01	4.20	61.78
2001-02	4.20	61.78

Source: Authors compilation (Orissa Electricity Regulatory Commission, Tariff orders).

6.4.5. Subsidy and cross-subsidy

Prior to reforms, the Government of Orissa was providing subventions to OSEB under Section 59 of the Electricity Supply Act (1948). This practice was withdrawn immediately in the post-reform period on the basis of the assumption that the utility on its own would start earning profit from the year 1997–98. By this, the Government of Orissa saved subsidy payments of about 27.70 billion rupees during the period 1995–96 to 2000–01. One of the fundamental objectives of setting up an independent regulatory commission was to rationalize the tariff and eliminate cross-subsidy. However, since the inception of the reform process, cross-subsidy has increased, which is not consistent with the stated objectives of reforms.

6.5 . Conclusion

Over the years the electrification level for the poor in Orissa has shown a considerable decline. The Electrification rate for the poor consumers has declined after reforms, whereas for other domestic consumers electrification rates have risen. The per capita consumption for the KJ consumers has shown a sharp decline. Given the large rural population in Orissa, this raises concerns about reform process addressing the consumption needs of the poor in the state. Electricity reforms in Orissa have let to neglect of rural electrification, which in turn has had adverse impact on the consumption needs of the poor in the state. There is a need for clear policy directions, as the reforms act does not explicitly make any provision for serving the electricity needs of the poor.

7. Power Sector Reforms in Karnataka

7.1. Description of the reform process

In tune with the reforms initiated by the Government of India to improve the performance of the power sector, the Government of Karnataka enacted the Karnataka Electricity Reforms Act in June 1999. The Act mandated major corporatization and restructuring of the Karnataka Electricity Board. The Board was split into a T&D utility, KPTCL (Karnataka Power Transmission Corporation Limited) and the generation entity VVNL (Visweshwaraiah Vidyuth Nigam Limited) in August 1999.

The Act also provided for the setting up of an independent regulatory commission that would introduce tariff reforms. The Act specifically mentioned that, to the extent small rural consumers and the rural poor need to be protected, cross-subsidies might have to continue in the retail tariff structure in the short-to medium –term, however, these have to be gradually eliminated. Accordingly, KERC (Karnataka Electricity Regulatory Commission) was established in March 2000. The government has also expressed its intention to take steps to make the newly formed ESCOMs (electricity supply companies), to be regulated by the KERC completely independent without any handholding by either the KPTCL or the government.

7.2. Identification of the reforms steps

The following reform process can be identified (Table 9) (a) Establishment of an independent regulatory commission and issuing of three tariff orders (b) Corporatization of the electricity board (c) Vertical unbundling into separate generation, transmission, and distribution companies. The Karnataka Electricity Reform Act (1999) has been taken as the main reform option for this study. The period 2000–2003 has been considered as the post - reform period.

Table 9. Chronology of events in Karnataka power sector reforms

January 1997	Policy statement announced
June 1999	Promulgation of KER (Karnataka Electricity Reform) Act (1999)
August 1999	Restructuring of the Karnataka Electricity Board and its corporatization. As part of the corporatization, the Karnataka Electricity Board ceases to exist and KPTCL (Karnataka Power Transmission Corporation Limited) to look after transmission and distribution in the state and VVNL (Visweshwaraiah Vidyuth Nigam Limited) to look after the generating stations
March 2000	Establishment of KERC (Karnataka Electricity Regulatory Commission)
December 2000	First tariff order issued
October 2001	Privatisation strategy paper prepared
ay 2002	Second tariff order issued
October-March 2003	Four separate distribution companies operationalized. BESCO (Bangalore Electricity Supply Company Ltd) MESCOM (Mangalore Electricity Supply Company Ltd) HESCOM (Hubli Electricity Supply Company Ltd) GESCOM (Gulbargo Electricity Supply Company Ltd)
March 2003	Third tariff order issued

Source: Authors compilation

7.3. Definition of poor and policy context

Karnataka has a population of 52, 733,958, with a decadal growth rate of 17.25%. Of this, 34, 814, 100 people reside in the rural areas (Table 10). During the liberalization period the share of rural population in the state declined by 3%.

Table 10. Population distribution in Karnataka

Year	Urban %	Rural %
1991	30.92%	69.08%
2001	33.98%	66.02%

Source: Author's compilation from Census of India 2001 and tariff orders

The population living below the poverty line is 20.04%. For improving electricity access to the poor in Karnataka, the BJ (Bhagya Jyothi) scheme was started in the late 1970s for a single bulb installation for the BPL families. In this study, households with BJ connection have been considered as poor consumers of electricity.

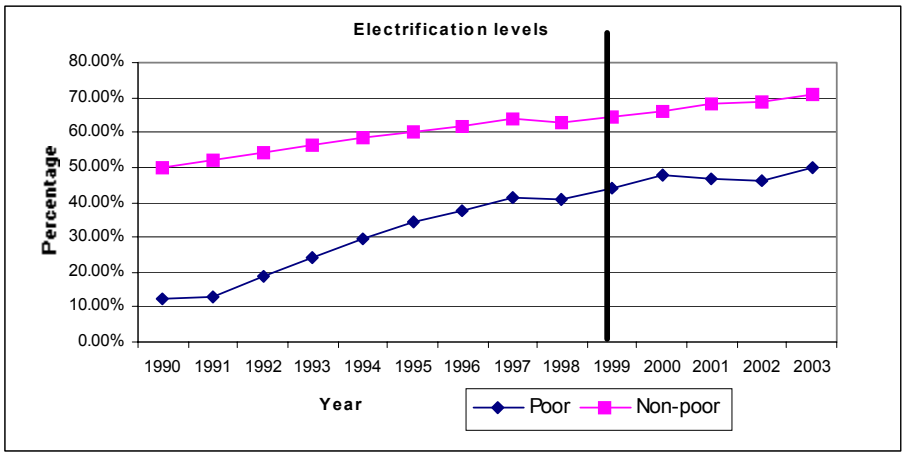
7.4. Assessment of the impact of the reforms In Karnataka on the poor

7.4.1. Electrification levels

While the electrification level for the poor was growing at a CAGR of 6.4% before reforms, the tempo for the electrification levels for the poor in Karnataka has gone down substantially to 3% post reforms (Figure 4). On the other hand, the CAGR for the electrification levels for the non-poor increased from 1.7% before reforms to 2.4% post-

reforms. The deterioration in the electrification levels of the poor after the reforms can be linked to the utility's intentions to minimize losses by discouraging new connections for the poor and encouraging new connections to more lucrative areas.

Figure 4. Electrification levels

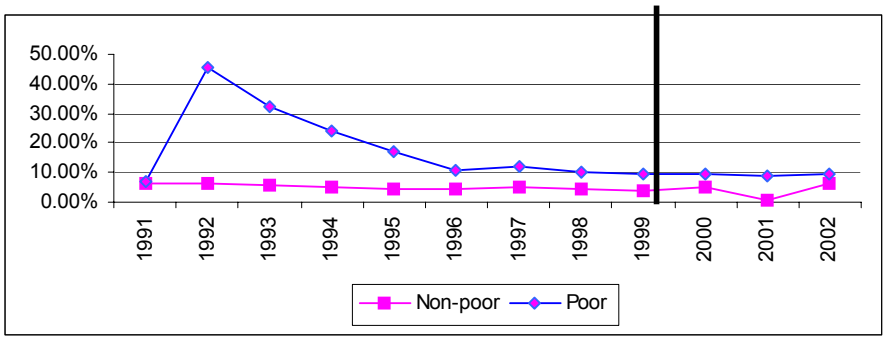


Source: Authors compilation from Census of India 2001 and tariff orders

7.4.2. Electrification rates

At the beginning of the 1990s, the electrification rate for the poor in Karnataka was very high. However, it has gradually declined. The electrification rates for the poor, which were as high as 45.88% in 1992, declined to 12.10% in 1997 and further to 9.48% in 2001. Post-reforms this rate for poor declined further and has now stagnated (Figure 5). In contrast, for the non-poor, this rate increased sharply in the year 2002.

Figure 5. Electrification rates



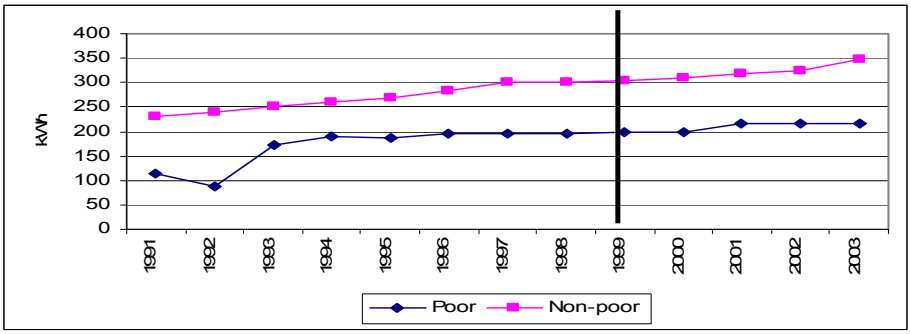
Source: Authors Compilation (Karnataka tariff orders)

7.4.3. Electricity consumption

The per household electricity consumption is obtained using the data provided by the utility by dividing the amount of electricity consumed by the number of electricity consumers. In the post-reform era (2000–2003), the electricity consumption of non-poor

in Karnataka increased by a CAGR of 3.83% and over last one year it s increased by over 7% (Figure 6).

Figure 6. Electricity consumption per household per year



Source: Authors compilation (Karnataka tariff orders).

As against this, the electricity consumption levels for the poor households in Karnataka stagnated at 216 kWh per year after the establishment of the regulatory commission, but this is more a reflection of the lack of metering and authentic data on consumption. In the circumstances, the Commission has been using the normative figure of 216 kWh. The data on actual consumption by this category are not available. The utility in its tariff filling (2002) reported that the average per capita consumption by the poor was 27 units per month. However, the Commission did not take this consumption level at its face value, as being unmetered the consumption could serve to hide T&D losses. According to the Commission's analysis, the earlier norm of 18 units per month was more realistic.

7.4.4. Electricity tariff

The tariff in the beginning of the BJ scheme was 2.50 rupees per month (US cents 5.15) towards energy charge and 1.61 rupees (US cents 3.32) per month as connection charges towards the investment made in extending the facility. The rates charged from the poor consumers were kept at very low levels till the advent of the reform process (Table 11).

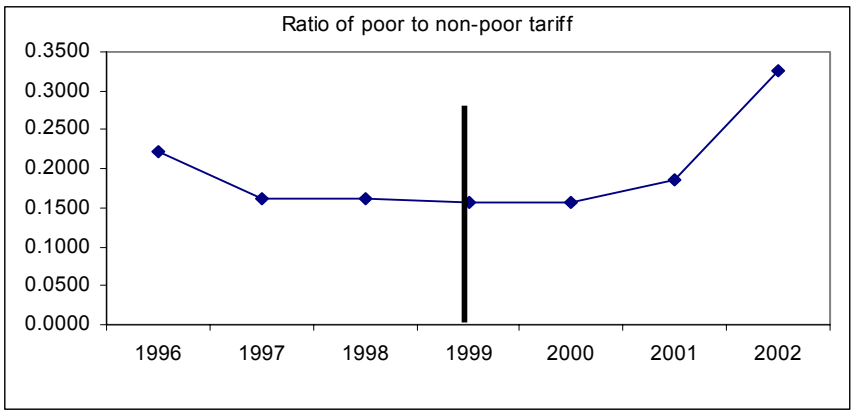
Table 11. Amount charged under the BJ (Bhagya Jyothi) scheme still the reform process

	Energy Charge per month (US cents)	Fixed Charge per month towards investment (US cents)	Total amount payable per month (US cents)
1979–Feb 1981	5.15	3.32	8.46
Feb 1981–April 1981	4.43	3.32	7.74
April 1981–Aug 1981	4.43	4.51	8.94
Aug 1981–Sept 1986	4.35	4.51	8.86
1986–1987	4.35	5.35	9.70
1987–1992	5.15	5.35	10.50
1992–93	5.15	5.77	10.91
1993–98	5.15	6.28	11.43
1998–2000	5.15	6.80	11.94

Source: KERC Tariff order 2000

The commission in its first order (2000) observed that the rates charged to the poor consumers (BJ installations) had been kept very low. Further, the Commission observed that as per the KRC (Karnataka Regulatory Commission) Act, the tariff should progressively reflect the cost of supply and the cross- subsidy in the tariff structure has to be reduced. Considering these facts the Commission increased the rate for poor consumers to 10 rupees (20.6 US cents) per month including recovery towards the capital loan portion and also mentioned that this tariff is only 19.4% of the average cost of supply and needs to be increased in the future tariff orders. The tariff for the poor increased by a CAGR of 35% in the post– reform era as against a CAGR of a mere 2% in the pre-reform era. However, the average tariff for the non-poor has increased by a CAGR of 13% during the reform period. This is because the Act mandates reduction in cross-subsidy in tariff. This is also evident from the fact that the ratio of the poor to the non-poor tariff has increased drastically during the post-reform period, which is again a clear reflection of reduction in cross-subsidy in tariff (Figure 7).

Figure 7. Ratio of poor to non-poor tariffs



Source: Authors compilation (Karnataka tariff orders)

7.4.5. Subsidy and Cross-subsidy

- Cross-subsidy

  As discussed in Section 4, the CI indicator is used in the study for the analysis of trends in cross-subsidy reduction. The CI has been calculated for Karnataka at the existing tariff in the year 2000 and also at the revised tariff approved by the Commission (Table 12). Over the years in Karnataka, the CI index has gone down, which is reflective of a reduction in cross-subsidy in the tariff structure.

Table12. CI (Convergence Index)

Description	
CI in FY 2000	0.6236
CI in FY 2003	0.4671

Source: Authors Analysis (Karnataka tariff orders).

- Subsidy

  Two salient features emerge from Karnataka's power sector reforms. One, the subsidy provided by the government budget has increased drastically over the years. In the year 1997–98, the subsidy claimed from the government was 78.28 million dollars and in the year 2002–03 the claim rose more than eight-fold to a figure of 652.26 million dollars. One reason for this trend is that the tariffs for agricultural and residential consumers have still not been aligned with the cost of supply.

  The second aspect is that the subsidy amount outstanding with the government of Karnataka has risen sharply. It increased from 2.49 million dollars in the year 1997–98 to 336.26 million dollars in the year 2001–02. For the year 2002–2003, the government has committed to provide 575.72 million dollars, thereby reducing the outstanding amount to 76.54 million dollars. The Commission expressed its concern over the outstanding amount, which has an impact on the ability of the utility to meet their liabilities in a timely fashion. The Commission has urged the government to release subsidy payments at least in equal quarterly instalments.

7.5. Conclusion

Post-reform, there has been a substantial decline in the growth of electrification levels and electrification rates for the poor in Karnataka. In view of the fact that the Act makes no explicit commitment to the extension of electricity access for the poor, this is not surprising. It is difficult to comment on the average consumption by poor households in the absence of 100% metering which makes the current estimates of consumption unreliable. However, the increase in tariffs in the post-reform era can only contribute to

decline in the electricity consumption levels of the poor in the future. From the point of view of tariff, the fact that the tariff for the poor has increased more than the tariffs for the non-poor implies that cross-subsidy has decreased, which is actually in conformity with the reform mandate. However, the Act ignores the fact that poor consumers cannot afford the true cost of supply and therefore tariffs for the marginal consumer need to be subsidized. The Karnataka government is planning to privatise its distribution. However, as mentioned earlier, private companies on their own would neither be willing nor be able to improve access, unless a clear policy regarding lifeline rates and subsidy from the government is formulated.

8. Power Sector reforms in Himachal Pradesh

8.1. Description of the reforms process

In Himachal Pradesh, power sector reforms were initiated with the establishment of the HPERC (Himachal Pradesh Electricity Regulatory Commission) in December 2000. The Commission is a single-member regulatory authority assisted by technical and administrative staff. Its role is to regulate the working of the electricity industry in the state of Himachal Pradesh. Its mandatory functions include determination of tariff for wholesale, bulk, grid, or retail electricity; transmission tariff; gradual phasing out of cross-subsidy; and to promote competition, efficiency, and economy in the activities of the electricity industry.

8.2. Identification of reform steps

Here the term reform should be understood in its wider meaning to include institutional changes (that is setting up of an independent regulatory commission) aimed at improving the sector performance. This reform option is analysed in the context of the role of the regulatory commission in improving electricity access for the poor.

8.3. Definition of poor and policy context

Himachal Pradesh has a population of 6,077,248, with a decadal growth rate of 17.53%. Of these, 5,482,367 reside in the rural areas and 594,881 are urban dwellers. The urban population in the state increased from 8.69% in the year 1991 to 9.79% in 2001, which makes Himachal Pradesh the state with lowest proportion of urban population in India (Table 13). Even with the highest proportion of rural population, only 7.63% of the population is below poverty line in Himachal Pradesh (Planning Commission 2002) for which a single-light connection scheme was started in 1973. Under this scheme, the REC and the Welfare Department provide the capital cost of installation (Figure 8). However, there is no separate tariff or consumption slab for these consumers. For the purpose of analysis, consumers falling in the lowest band of consumption and tariff are considered poor.

Table 13. Rural/urban population

Year	% Urban	% Rural
1991	8.69%	91.31%
2001	9.79%	90.21%

Source: **Author's compilation from Census of India 2001 and tariff orders**

The lowest slab of consumers in Himachal Pradesh consists of those consuming less than 45 units per month and 77% of the electrified households fall under this category. However, all consumers falling in this category need not be income- poor. The

Commission came up with the approach of targeting subsidy to the poorest of the poor, as described later.

8.4. Assessment of the impact of the reform option on the poor on various indicators

8.4.1. Electrification levels

Till 2000–01, the Board did not maintain any data on the number of consumers in various consumption categories. Due to this constraint it is not possible to estimate the number of poor and non-poor households electrified in Himachal Pradesh (as defined in Section 8.3). However, with the setting up of the independent regulatory commission in 2001, the Board has started maintaining category-wise data on consumers and sales for the year 2001–02. In the absence of pre-reforms data, it has been assumed that proportions of poor and non-poor consumers has not changed in the pre-reform to post-reform periods.

Using this assumption, it is observed that the electrification levels for the poor have increased from 74.32% in 1997–98 to 84.27% in 2002–03, whereas electrification levels for the non-poor have increased from 77.58% in the year 1997–98 to 87.97% in 2002–03. Thus, the setting up of the independent regulatory commission in 2000 has not had a negative impact on electrification levels. However, the percentage of increase in the electrification levels has gone down after the reform process. Overall electrification levels increased with a CAGR of 6.81% during the pre-reform era and by merely 3.8% in the post- reform era.

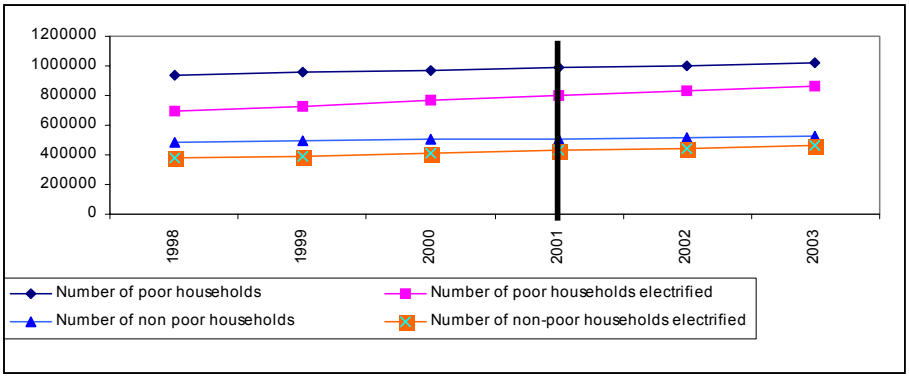


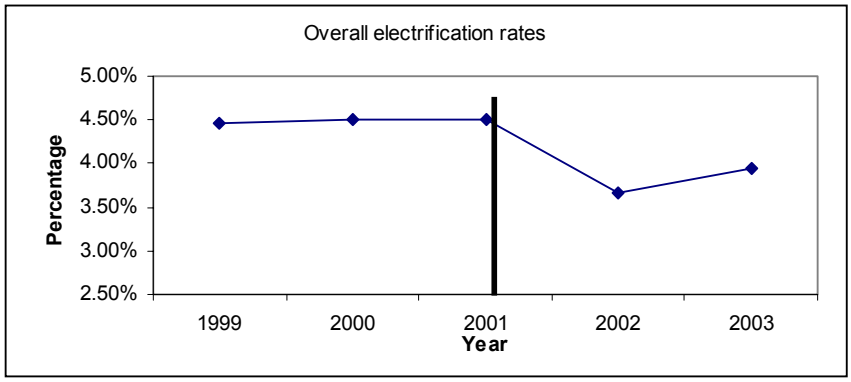
Figure 9. Electrification levels

Source: Authors compilation (HPSEB).

8.4.2. Electrification rates

Data on the number of consumers falling under the lowest category of consumption is not maintained by the utility, which makes it difficult to estimate the electrification rate. Nevertheless, if we analyse the overall electrification rate over the years, it is observed that it has gone down from 4.5% in 1999 to 3.6% in year 2002 (Figure 10).

Figure 10.: Overall electrification rates



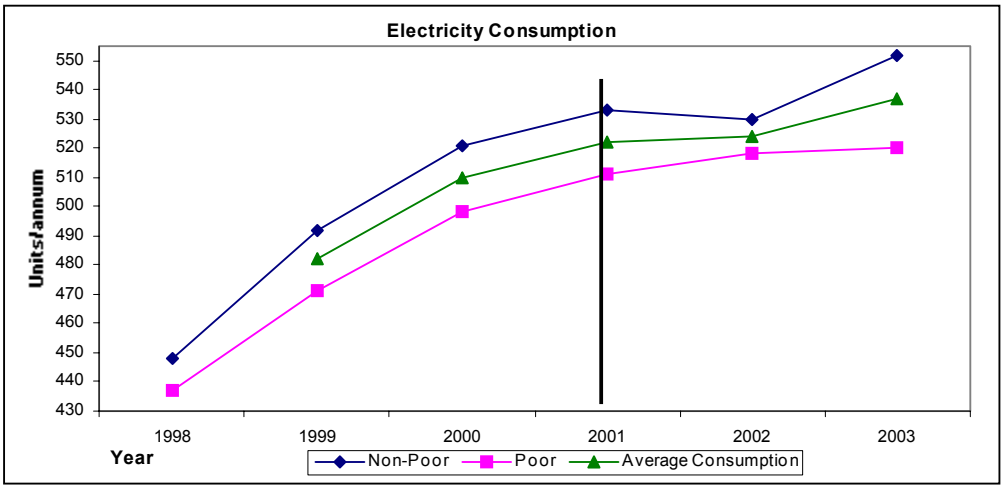
Source: Authors compilation (HPSEB).

The Commission issued its first tariff order in the year 2001–02, and it is possible that due to the tighter norms on expenditure this area was neglected.

8.4.3. Electricity Consumption

The electricity consumption per household for the non-poor has risen more than for the poor households. Electricity consumption levels for the non-poor have increased by a CAGR of 1.77% during the reform period (2001–03), whereas in the same period, the consumption levels of the poor have increased by a CAGR of only 0.88%. In contrast, the electricity consumption for the poor and non-poor was increasing at a CAGR of 8.14% and 9.07%, respectively during the pre-reform period (1998–2000) (Figure 11.)

Figure 11. Electricity Consumption in Himachal Pradesh



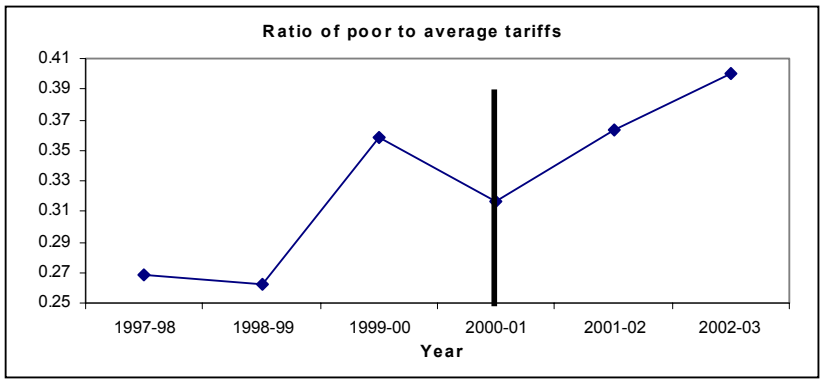
Source: Authors compilation from Census of India 2001 and tariff orders

8.4.4. Electricity tariff

Electricity tariffs determine the affordability of electricity for various income groups. As discussed earlier, the lowest band of consumers paying the lowest tariffs has been

considered poor for this case study. However, currently 77% of the household consumers fall under this category and therefore it becomes difficult to provide preferential tariff to such a large segment. Therefore, in its first tariff order the commission introduced a separate lifeline slab for families identified under the AAY (Antyodaya Anna Yojna) scheme of the Government of Himachal Pradesh within the domestic category. The benefit of the concessional tariff would be available to those families consuming up to a maximum of 45 units per month. In case this limit is exceeded, the normal domestic tariff will apply for the entire consumption. However, following directions of the state government the new tariff slab was withdrawn and the old slab reintroduced. As per the reform mandate, the Commission has increased the tariff for the poor as compared to the average tariff to reduce the cross-subsidy. This is evident from the increase in ratio of tariff for the poor to the average tariff (Figure 12).

Figure 12. Ratio of tariffs



Source: Authors analysis (HPERC 2001).

8.4.5. Subsidy and cross-subsidy

The Commission in its tariff order has recognized that the burden of high tariffs for industrial consumers has led to shutting down of industries and has caused impediments in the economic development of the state. Hence, the Commission, in its tariff order, intended to reduce the cross subsidy in the tariff for different consumer-categories. This can be concluded from the decline in the CI index after the revision in tariff (Table 14).

Table 14. Convergence Index

Description	
CI at existing tariff	0.08672
CI at revised tariff	0.08515

Source: Authors compilation (2002).

However, the tariff revision for residential consumers (other than the consumers under AAY) was withdrawn at the instance of the state government, as the government was reluctant to scrap the lifeline rates for consumers other than Antyodya families. The government also assured the utility that it would provide subsidy support to cover the revenue gap due to this tariff rollback. However, no support was provided till the end of the financial year. The net impact of this rollback on HPSEB's finances was around 1.07 million dollars. This amount could have been utilized for providing the additional 28,831 connections to the poor households.

8.5. Conclusion

Post-reforms, the overall electrification levels and the electrification rates in Himachal Pradesh have gone down. Electricity consumption for the non-poor has increased more than that for the poor while the electricity tariff for the poor has increased more than that for the non-poor. However, it would be inappropriate to deduce that the consumers consuming less than 45 units per month are income-poor and cannot afford to pay the cost of supply. As of now, neither the Commission and nor the utility have conducted any study on the affordability or the willingness to pay for these consumers. Identification of the poor, and a government policy on targeting of subsidy would be useful. Linking lifeline rates with the income-poor was an innovative concept that helped in targeting subsidy to the poorest of the poor. However, due to the government's apprehension over the scrapping of lifeline rates for non-Antyodaya consumers, the scheme was withdrawn.

9. Indian summary and Conclusion

In India, the reform process was carried out without any specific legislative provisions for enhancing electricity access for the poor. Neither the central Act (ERC Act [1998]) nor the individual state reform act/policy explicitly mentioned the universal service obligation of electricity.

It is evident from the Orissa case that electricity access for the poor has declined after the privatisation of electricity distribution. The policy did not provide incentives to the private utilities to supply electricity to the poor and at the same time no government support was provided to enhance access to electricity.

In the case of Karnataka, the regulatory commission is pursuing the mandate of aligning the tariff with the cost of supply. The budgetary support from the state government has increased in the post-reform era. The State Government of Karnataka is planning to privatise electricity distribution. Some lessons can be learnt from Orissa before going ahead with privatisation.

In Himachal Pradesh, the lowest tariff slab is set at too high a level to meaningfully distinguish between the poor and the non-poor. This case also reflects that the movement towards an independent regulatory tariff-setting process is shaky. This is evident from the roll-back in the tariff increase announced by the Commission without timely subsidy to the utility.

10. Assessment of selected reform option: The Philippines case study

10.1. Description of the reform process

In 1936, the NPC (National Power Corporation) was created in Philippines to develop the country's hydroelectric resources. NPC has also been responsible for transmitting electricity to distributors and large industrial customers via high-voltage wires, and for constructing the transmission grid highway interconnecting the main islands nationwide. Distribution of electricity to end-consumers has been performed by investor-owned electric utilities, notably the Manila Electric Company (Meralco), a few local government-owned utilities, and numerous electric cooperatives that sell to households as well as commercial and industrial enterprises located within their franchise areas. The DoE (Department of Energy) is entrusted with the responsibility of setting policy directions for the energy industry, while the NEA (National Electrification Administration) is responsible for providing financial and technical assistance to electric co-operatives.

The Philippines sustained severe power outages and brown-outs during 1992–93, compelling the government to look again at the reform of the power sector. In response, BOO (build-own-operate) or BoT (build-own-transfer) contracts were signed between NPC (National Power Corporation) and IPPs (Independent Power Producers) that would permit quick expansion of power generation capacity and improve the quality of electricity supply. However, in 1997, a number of problems emerged with IPP contracts.

The electricity prices NPC agreed to pay under the PPAs were nearly twice the cost of power from NPC plants. This led to a huge financial crisis for NPC, which was unable to pay its liability.

Subsequently, two major reforms were envisaged in late 1990's— the restructuring of the electricity supply industry and the privatisation of the NPC. These two reform processes aimed at encouraging greater competition and attracting more private-sector investments in the power industry. It was conceived that a more competitive power industry would in turn result in lower power rates and more efficient delivery of electricity supply to end-users.

The EIRA (Electric Industry Reform Act) was passed in 2001, which mandates restructuring of the electric power industry and privatisation of the state-owned NPC. The legislation also aimed to prevent the creation of a private monopoly by capping the maximum market share for any one generator. It also opened wholesale spot market for generators. EIRA also aimed to lower the electricity rates (among the highest in the region) and increase the generation capacity to avoid an electricity shortage projected for 2005. This Act enabled the creation of an independent regulator in 2001.

10.2. Rural Electrification Co-operatives

The government of the Philippines passed the Electric Industry Reform Act (The Republic Act [9136]) in June 2001. The new legislation laid the foundation for the privatization of RECs and setting up of an independent regulatory commission which would ensure rural electrification, lifeline rates for marginalized consumers, and levy of universal charge for rural electrification programmes. The government of the Philippines has aimed at total electrification of all villages by the year 2006. It has embarked on an ambitious electrification plan, which aims to utilize new and renewable energy to bring electricity to remote and relatively inaccessible barangays (villages). Dubbed as 'O I law Programme', the programme consolidates the regular programmes undertaken by NEA/electric co-operatives, NPC SPUG (Small Power Utilities Group), and DoE and other agencies of the government and seeks to maximize participation of the private sector in rural electrification projects. The O–I Law Programme has set specific targets for rural electrification till the year 2006 (Table 15). Options that are being considered are installation of stand-alone photovoltaic systems for lighting and battery charging stations, micro-hydro systems and wind generators. Extension of electricity grid lines is also being considered as per feasibility.

Table 15. Performance and implementation schedule for O-I Law programme during 1999–2006

Year	Barangay Electrification. Level
1999 (actual)	76.9%
2000 (actual)	80.1%
2001 (actual)	83.1%
2002 (targeted)	87.0%
2003 (targeted)	91.0%
2004 (targeted)	95.0%
2005 (targeted)	97.6%
2006 (targeted)	100.0%

Source: Department of Energy, the Philippines

Table 16. Chronology of events in the Philippines power sector reforms

1900s	Integrated electric utilities
1936	NPC (National Power Corporation) created
1970	Electric co-operatives created NPC develops nationwide grid Generation nationalized to NPC
1980s	National Electricity Administration created to control rural co-operatives Massive blackouts in late 1980s
1990s	BOT (build-operate-transfer) law passed Luzan and Visayas created IPPs negotiated
2001	Power Reform Act passed • Creation of National Transmission Company • Creation of Power Sector Asset and Liabilities Management Corporation • Creation of WESM (Wholesale Electricity Spot Market) • Privatisation of the NPC • Open access subject to pre-conditions • Creation of a new energy regulatory commission • Competitive generation through creation of several generating companies
February 2002	• Regulated transmission and distribution: unbundling of electricity rates for transparency
June 2002	• Competitive retail electricity providers through opening up of high voltage transmission for easy access of distributors and large consumers • End-users: open access of distribution lines for competitive consumers • Promulgation of WESM rules

Source: Authors compilation

10.3. Reform Mandate

10.3.1.Cost of supply and cross-subsidy

The Act mandates that the rate structure reflect the true cost of serving each customer class. Thus, rates determined are to be free from all inter- grid and intra-grid subsidies. The Act also provides for lifeline rates for low-income end-users to balance the social impact of the rates on the marginalized sections of the society. The Act exempts this class of consumers from the cross-subsidy phase-out for the next 10 years, unless extended by law. The legislation also stipulates creation of a universal fund, by levying a universal charge to other consumers that will be used for subsidizing the lifeline rates and the extension of electricity services to remote and un-electrified areas.

10.3.2. Efficiency improvement and government's role

Under the Act, the utilities are required to establish separate retail rates for each category of service. This requires the unbundling or separation of all elements of the revenue requirements calculation so that transparent retail rates can be determined for each category of service. According to the ERC (Energy Regulatory Commission), this would be the first step towards efficient and transparent pricing [ERC, 2002]. This clause has helped to reduce the rates by 0.59 US Cents /kWh for residential consumers. The system losses of the utilities are to be maintained and capped as prescribed in the earlier Act.

The reform act also mandates expansion and upgradation of electrification in the Philippines. For this, the Act empowers NPC to own and control corporations to perform the missionary electrification function through SPUG (Small Power Utilities Group) and to be responsible for providing power generation and its associated power delivery systems in areas that are not connected to the transmission system. The missionary electrification function shall be funded from the revenues from sales in missionary areas and from the universal charge as determined by the ERC. The provision of electric service in remote and unviable villages that the franchised utility is unable to service for any reason shall be opened to qualified third parties. For improving the financial viability of REC, all outstanding financial obligations of electric co-operatives to NEA and other government agencies incurred for the purpose of financing the rural electrification programme shall be assumed by the government-owned PSALM (Power Sector Assets and Liabilities Management Corp).

10.4. Assessment of the impact of reform option on the poor by using various indicators

10.4.1.Definition of the poor and policy context

In this study, the marginalized end-users have been considered the poor consumers. These consumers are the low-income, captive, household electricity consumers, who cannot afford to pay at full cost and have levels of electricity consumption below a threshold level. This threshold consumption level might differ area-wise according to the socio-

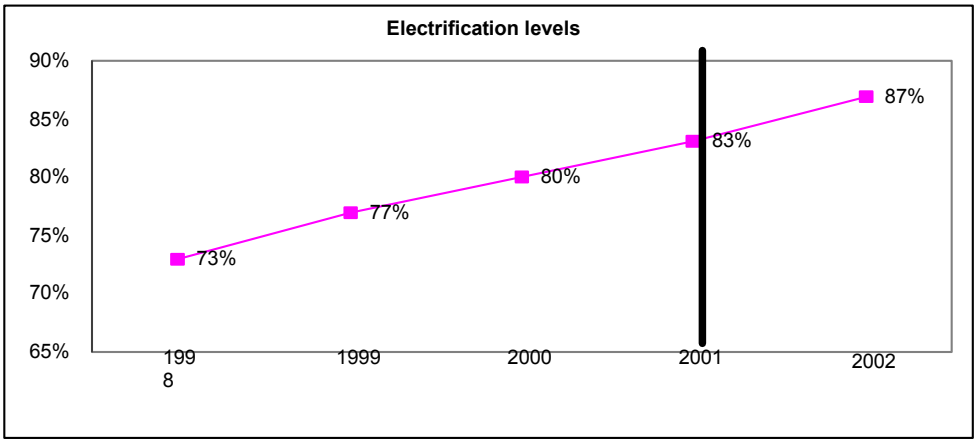
economic scenario of the region. The ERC has the mandate to determine the threshold level of consumption.

The Act provides for a socialized pricing mechanism called a lifeline rate for these marginalized end-users, which is to be set by the ERC. A lifeline tariff enables the poor who use minimal amounts of electricity to pay a lower price than wealthier households using higher levels of electricity. It is the responsibility of the ERC to monitor the compliance to specific guidelines and the implementation of lifeline rate.

10.4.2.Electrification levels and rates

In the absence of sufficient data on the marginalized consumers and other residential consumers, the electrification level of barangays (villages) has been considered as a proxy to assess the impact of reforms on the poor. The barangay electrification level in Philippines has gone up from 18% in the early 1970s to 73% in 1998. In the post-reform era, this figure has grown substantially to 87% (November 2002). This illustrates the positive impact of the Accelerated Rural Electrification Programme undertaken by the government of the Philippine (Figure 13).

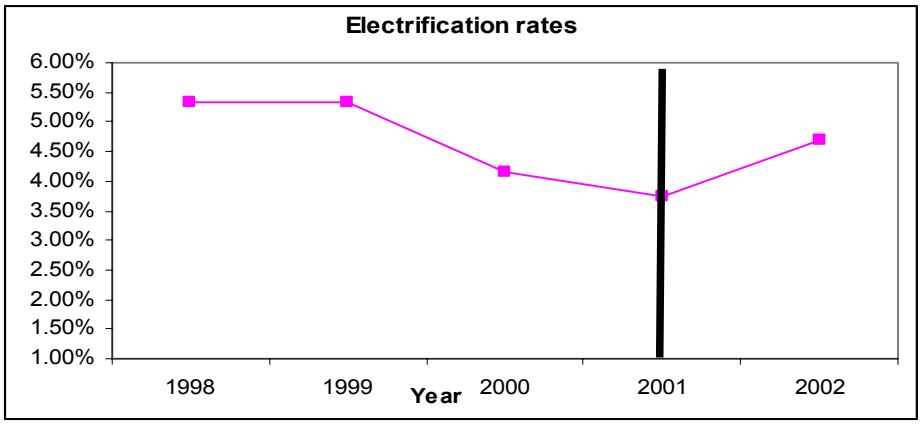
Figure 13. Overall Electrification levels in the barangays



Source: Meralco Rural Electrification Project (June 2002) and authors compilation from information received from ERC

Reforms have had a positive impact of electrification rates of Barangays. The electrification rates that were gradually declining in the pre reform period have increased post Reforms (Figure 14)

Figure 14. Overall Electrification rates in Barangays



Source: Meralco Rural Electrification Project (June 2002) and authors compilation from information received from ERC

Since its inception in 1999, the O-I law Programme has been able to energize barangays at the rate of 1,000 barangays per year. This is double the average number of 500 barangays accomplished prior to the creation of the O-I law Programme. Apart from this, the private sector showed its interest to take part in the programme through the establishment of the FREED (Foundation for Rural Electrification for Economic Development).

10.4.3.Per capita consumption

For assessing the electricity consumption in pre reform period the results of a survey, carried out in six barangays in the Philippine's largest distribution company Manila Power Corporation (Meralco), have been used. The survey results pointed out that the average electricity consumption was 891.6-kWh/ annum (or 75 kWh/month) in 2000. During the post-reform era, the per capita consumption by the poor has been determined by the ERC and it differs across areas, according to the economic scenario of that region. For instance, for two provinces, ZAMSURECO II and SORECO I, the Commission set the maximum lifeline consumption level at 18 kWh/month. On the other hand, the maximum lifeline consumption level set by the Commission for two other provinces, PELCO I and PANELCO I were at 20 kWh/month. Similarly, in the case of the private distribution utility (VECO), the Commission fixed the reasonable threshold level of consumption at 50 kWh per month. Further, tariff analysis carried out by the Commission for various provinces shows different consumption levels for the poor and the non-poor residential consumers. On an average, the consumption by the marginalized consumers is 20 kWh per month or 236 kWh per year, whereas for the non-marginalized consumers the consumption is 205 kWh per month. So there is a substantial variation in the consumption levels for the poor and the non-poor consumers. Comparing the pre-and post-reform

average per household consumption in the Meralco area, it is observed that the average consumption level has increased substantially during the post- reform era.

10.4.4.Electricity tariff

In determining the lifeline consumption level for the marginalized end-users in the electric co-operatives area, the Commission calculates the probable load requirements of a typical low-income consumer by considering two lighting facilities at 20W each and a 50W radio that are being used for a reasonable number of hours. As the number of hours of electricity supplied varies across the areas, accordingly, the marginalized consumption level also varies in these areas. After determining the consumption, the Commission conducts simulation models to find out the average paying capacity of the consumer in an area. Accordingly different discount levels are determined for the marginalized consumers. These discounts vary across the areas and within the consumption levels (Table 17).

Table 17. Consumption and discounts offered to marginalized consumers

	ZAMSURECO II	SORECO I	PELCO I	PANELCO I:
15 kWh and below	20%	25%	50%	30%
16 kWh	15%	20%	40%	25%
17 kWh	10%	10%	30%	20%
18 kWh	5%	5%	20%	15%
19 kWh			10%	10%
20 kWh			5%	5%

Source: Meralco Rural Electrification Project (June 2002) and authors compilation from information received from ERC

In the case of the private distribution utility (VECO), the Commission found its proposal for the threshold level of 56 kWh per month to be reasonable (Table 18).

Table 18. Consumption levels and discounts for the area served by the private utilities

	VECO I
50 kWh and below	35%
51 kWh	30%
52 kWh	25%
54 kWh	20%
55 kWh	15%
56 kWh	10%

Source: Authors compilation from information received from ERC

For the above utilities, the data on tariffs in the pre-and post- reform period is currently not compiled. However, some estimates for the Philippine's largest distribution company, Manila Power Company (Meralco) is available, which could be used as a proxy. The average rate for the Meralco area has increased from 10.73 US cents per kWh in December 2001 to 12.12 cents per kWh in June 2003 (Table 19).

Table 19. Average rate for the Meralco area

	ERC order 2001	ERC order 2003	% Increase
MERALCO	10.73	12.12	12.88%

Source :Authors compilation from information received from ERC

The Commission in the tariff order [ERC, 2003] mentioned that the marginalized consumers of the society with a minimal consumption of less than 50 kWh per month are projected to receive a hefty discount of almost a 100 pesos (195 cents) a month due to the lifeline rate policy. Further, in March and May 2003, the ERC (Energy Regulatory Commission) issued provisional authorities to 17 rural electric co-operatives directing them to reduce the rates being charged to all customer classes. Therefore, we can conclude that during the post-reform era the electricity tariffs for the poor have gone down.

11. Summary and recommendations

The Indian economy has undergone a structural change over the past decade with a liberalized policy for many sectors. Liberalization first opened up power generation for private sector participation. However, it was later realized that the private power policy for generation projects would not succeed unless preceded by extensive reforms in the distribution business. Thereafter, a new legislation was formed which paved the way for setting up of independent regulatory bodies in the power sector. Many states also restructured and unbundled the sector through appropriate legislation. Unfortunately, electricity sector reforms in India have invariably neglected the poor. The focus of reform legislation has been more on improving financial viability of the ailing power sector than on improving access to electricity. The legislation does not explicitly spell out any provisions for the extension of electricity services to the poor and the need and mechanism for subsidizing marginalized consumers. Until recently, the Indian reform legislation did not even contemplate rural electrification. This lacuna in the Indian reform model needs to be addressed through appropriate policy and legislative changes to meet the electricity needs of the large poor population of the country.

It is also important to note that electricity being a concurrent subject in India, both the center and the states can formulate policy. This often makes the task of implementing reforms much more complex in case of India as compared to Philippines where the central government has complete jurisdiction over organization and reform of power sector. Nevertheless, there are valuable lessons to be learnt from Philippines reform legislation in terms of addressing electricity needs of the poor.

In contrast to the Indian reform legislation, the Philippines legislation has provision of lifeline rates for poor and the treatment of cross-subsidy, subsidy and the expansion of network. The Act stipulates a definite time frame for the elimination of cross-subsidy and at the same time it ensures subsidized rates for the identified poor.

The Philippines Act mandates expansion of electricity services to the rural areas and compulsory levying of universal charge for meeting the subsidy requirement for the electrification of the poor. The Philippines government has also embarked on an electrification plan, which aims to utilize new and renewable energy to bring electricity to remote and relatively inaccessible barangays.

Indian policy-makers can draw useful lessons from the Philippines experience to enhance electricity access in the country. There is need to have a legislative commitment to address the issues of access to reliable and affordable sources of electricity. Innovative mechanisms like the provision of lifeline rates and special functions like missionary electrification to meet the electricity needs of the poor need to be developed.

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