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**GLOBAL NETWORK ON ENERGY  
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## **Energy Access theme results**

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

**Sub regional technical report by  
The Energy and Resources Institute (TERI),  
India**

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# 1 Impact of power sector reforms on the poor

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## Introduction

Electricity constitutes 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. Households use energy for a variety of purposes: cooking, lighting, water heating, and space conditioning. The provision of superior energy sources like electricity and LPG (Liquified Petroleum Gas) has important economic and social implications because of significant monetary and non-monetary benefits vis-à-vis the use of traditional fuels. Electrification fosters business development and increases employment opportunities. Electricity is also an important input in the provision of social infrastructure such as street lighting, piped water, television, and better-equipped hospitals, and schools. Provision of electricity can thus have far-reaching implications for improving living standards, supporting development and job opportunities, and fostering social activities.

To meet the challenges of the ever-increasing demand of electricity different models for reforming the power sector have been adopted across the developing world. These power sector reforms generally involve commercialisation, setting up of independent regulators, restructuring, and privatization of the electricity sector. Following a decade of energy sector reforms in many developing countries people are increasingly questioning the extent to which these reforms have benefited the poor. There is often a concern that these reforms are a retrogressive for the poor, and this study is an attempt at investigating this in a systematic manner. Ensuring that the power sector interventions are designed to benefit the poor who form the most vulnerable section in society, is vital both from the perspective of social equity and because it is likely to affect the ultimate sustainability of the reform process. This paper reviews the reform processes adopted and their impact on the poor by analyzing some indicators on electrification and rates. The paper would especially highlight the impact of legal and institutional changes on the poor, through setting up of independent

regulatory commissions. These regulatory commissions were set up to promote efficiency, competition, and financial viability of the sector. The prerequisite for this was tariff rationalization. The objective of this paper is to critically examine the impact of power sector reforms on the poor and to suggest orientations for future research.

## 1.0 Background on electricity services for the poor in South and South-East Asia

1.0.1 Electricity is a basic amenity today. Provision of electricity is of particular importance to developing countries, as access to affordable and reliable electricity is one the key drivers of economic development. It is projected that electricity demand in South and South-East Asia will grow at the rate of 7% per annum during the period 2003–10. Not only will the increase in income levels bring about a higher consumption of electricity, but also electrification of areas not having access to electrical power will cause a substantial increase in the consumption. To meet the challenges of the increasing demand of electricity and the lack of ability of the government to finance electricity projects, it was felt that private investment should be encouraged. Therefore, since the 1980s many countries restructured their electricity industry by adopting different models for restructuring, privatization, and competition (Table 1).

**Table 1 Power sector reforms in South and South-East Asia**

| No. | South and South-East Asian countries | Old structure | Restructuring of the sector | Corporatization | Unbundling | Setting up of independent regulator | Privatization | 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 (websites 2002)

- 1.0.2 Singapore, Indonesia, Malaysia, and the Philippines have already introduced competition in the power market, whereas, Bangladesh, Bhutan, Nepal, Pakistan, and Sri Lanka restructuring of the sector is still on paper. In India, power sector restructuring and setting up of independent regulators started in the late 1990s. Therefore, as reforms are still in the nascent stage the experiences of other countries could provide useful learning for the reform process.
- 1.0.3 To assess the impact of power reforms on the poor, it is necessary to calculate the indicators separately for the poor and the non-poor. Therefore, it is imperative to think of poverty in economic terms. International comparisons of the poverty data involves both conceptual and practical problems. Different countries have different definitions of poverty, and thus comparisons between countries can be difficult. Local poverty lines tend to entail a higher purchasing power in rich countries, where more generous standards are used than the in poor countries. For instance, as per the Government of India ([www.india-watch.com/2a.htm](http://www.india-watch.com/2a.htm)), persons with earnings of less than 10 rupees (around 21 cents) per day are considered below the poverty line (the critical amount of income necessary to satisfy nutritional requirements (2000 calories) and other basic needs). Whereas, international agencies like the World Bank, and UNEP (United Nations Environment Programme) define the poor as the population surviving on less than 2 dollars per day. By this definition almost 86% of the population in India is poor (Table 2).

**Table 2 Electricity Services in South and South-East****Asia (Year 2002)**

| No. | South and South-East Asian countries | Electricity consumption (billion kWh) | Population | % Population below poverty line* | % Population below 1 dollar | % Population below 2 dollars | Electrification levels** | Per capita consumption (kWh) |
|-----|--------------------------------------|---------------------------------------|------------|----------------------------------|-----------------------------|------------------------------|--------------------------|------------------------------|
| 1   | Bangladesh                           | 11.87                                 | 133405392  | 35.6 (1996)                      | 29.10%                      | 77.80%                       | 30%                      | 89                           |
| 2   | Bhutan                               | NA                                    | 828044     | NA                               | NA                          | NA                           | 11%                      | NA                           |
| 3   | India                                | 391.65                                | 1033389824 | 26.10 (2000)                     | 44.20%                      | 86.20%                       | 46%                      | 379                          |
| 4   | Indonesia                            | 73.70                                 | 213637568  | 27.1 (1999)                      | 7.70%                       | 55.30%                       | 67%                      | 345                          |
| 5   | Malaysia                             | 58.87                                 | 23795592   | 15.5 (1989)                      | NA                          | NA                           | 90%                      | 2474                         |
| 6   | Maldives                             | NA                                    | 282752     | NA                               | NA                          | NA                           | 62%                      | NA                           |
| 7   | Nepal                                | 1.11                                  | 23584706   | 42.0 (1996)                      | 37.70%                      | 82.50%                       | 15%                      | 47                           |
| 8   | Pakistan                             | 45.41                                 | 141450160  | 34.0 (1991)                      | 31.00%                      | 84.70%                       | 55%                      | 321                          |
| 9   | The Philippines                      | 34.97                                 | 77015488   | 40.00 (2001)                     | NA                          | NA                           | 87%                      | 454                          |
| 10  | Singapore                            | 27.25                                 | 4102565    | 25.0 (1996)                      | NA                          | NA                           | NA                       | 6641                         |
| 11  | Sri Lanka                            | 5.01                                  | 19649486   | NA                               | 6.60%                       | 45.40%                       | 50%                      | 255                          |
| 12  | Thailand                             | 82.79                                 | 61238240   | 13.1 (1992)                      | 2.00%                       | 28.20%                       | 97%                      | 1352                         |
| 13  | Vietnam                              | 20.04                                 | 79526048   | 50.9 (1993)                      | NA                          | NA                           | 58%                      | 252                          |

Source: World Bank website, \*Author's compilation (web-site 2002) and Year mentioned in the bracket

1.0.4 There is a large disparity in the per capita consumption of electricity in South and South-East Asia. Singapore leads the list with a per capita consumption of 6641 units per year and Nepal has the least per capita consumption of 47 units per year. According to recent estimates, the per capita consumption of electricity in India is one of the lowest in the world. A similar unevenness is prevalent in the electrification levels with Thailand having the highest level of 97% and Bhutan having only 11%. Electrification levels in India and the Philippines are 46% and 87% respectively. While the Philippines is placed at the high end of the regional electrification spectrum India lies in the middle.

## 2 Selected case studies in South and South-East Asia: the Philippines and India

---

Table 3 compares the socio-economic, demographic, and electricity characteristics of the Philippines and India.

**Table 3 Comparison of socio-economic, demographic, and electricity characteristics between the Philippines and India**

| Series  | The Philippines | India   |
|---|-----------------|---------|
| Population (millions)   | 77.02           | 1033.39 |
| Population growth (annual %)                                    | 1.88            | 1.70    |
| % population below poverty line                                 | 40.00           | 26.10   |
| GDP (gross domestic product) (current US\$ billion dollars)     | 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 (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 (January 2002)                                   | 51.20           | 48.56   |
| Per capita GNI (dollar)   | 1050            | 460     |
| Per capita consumption of electricity (kWh)                     | 454.00          | 379.00  |
| Electrification levels  | 87%             | 46%     |

Source: [www.worldbank.org](http://www.worldbank.org)

2.0.1 As stated earlier, the definition of poverty line varies across the world. As per the Government of India ([www.india-watch.com/2a.htm](http://www.india-watch.com/2a.htm)), the poverty line for urban areas is 296 rupees (6.10 dollars) per month and for rural areas it is 276 rupees (5.68 dollars) per month— that is people who earn less than 10 rupees (around 21 cents) per day. This amount, which translates into approximately 3650 rupees per year or 75 dollars per year, will buy food equivalent to 2200 calories per day for the urban poor and 2400 calories for the rural poor, which is considered medically

efficient to prevent death. According to this definition, as of 2002, 25% of the Indians fall below the poverty line. Whereas, in the Philippines, as of 2002, 35.5% of the total families and 40.6% of the total population, were officially considered poor. That is, their annual per capita income fell below the poverty threshold or the poverty line, placed at about 340 dollars per person per year, or less than 1 dollar per person per day ([www.aklatan.org/information/poverty.html](http://www.aklatan.org/information/poverty.html)). Therefore, the income of a person living below the poverty line is five times less than that of a person in the Philippines, however, in both cases the minimum nutritional levels are satisfied.

- 2.0.2 On the reforms 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 ensure the stakeholder's interests.
- 2.0.3 On the issue of access to electricity for the poor, the Philippines reform act—Republic Act, 1936—clearly defines poor and marginal consumers and the need and mechanism for subsidizing the rates for poor, whereas, the reform act in India—Electricity Regulatory Commission Act (1998)—does not give clear guidelines. The focus of reforms in India has so far been on improving the financial viability of the sector. Further, while the Philippines legislation focuses on rural electrification and raising funds for remote electrification the Indian legislation does not deal with these issues. This paper will compare the restructuring and regulatory impacts on the poor in the two countries, and discuss the lessons that can be learnt from this.

## 3 Methodology

---

- 3.0.1 This study addresses the 'Access' theme by first comparing the reform processes adopted in the two countries chosen in South and South-East Asia, that is the Philippines and India. In the Philippines, the Republic 9136 Act was passed in 2001 with the mandate of setting up of an independent regulatory commission, promoting rural electrification, and undertaking sector restructuring. Thereafter, generation and supply of electricity were made competitive.
- 3.0.2 In India, the Electricity Regulatory Commission Act was passed in 1998 for setting up of independent regulatory commissions with the objective of tariff rationalization. However, electricity is a concurrent subject, where both the centre and the states can formulate policy, and hence there is wide variation with respect to the progress of reforms across the states.
- 3.0.3 In India, three states, Orissa, Karnataka, and Himachal Pradesh have been taken up for study because they show three different phases of the reform process.
- Orissa was the first state in India and South Asia to corporatize and unbundle its state-owned electricity industry and privatize the distribution by establishing an independent regulatory body. As it was a pioneer in initiating reforms, Orissa encountered several challenges. Orissa's experience can thus provide lessons not only to other Indian states but also to other developing countries that are in process of reforming their power sector. The study traces the development of the reform process in Orissa and specifically discusses the impact of privatization on electrification rates and rural access.
  - Karnataka has a four-year old regulatory reforms history with the recent unbundling of the sector and the distribution of electricity, which is about to be privatized. The study highlights the need for metering all consumers including poor consumers, whose consumption levels are inflated to show lower commercial losses<sup>1</sup>.

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<sup>1</sup>Here commercial losses means losses due to theft and pilferage

- The reform process in Himachal Pradesh is in its nascent stage with a newly established regulatory commission. This study discusses an innovative approach adopted by the regulatory commission that; of linking electricity access, and rates with an income-based definition of the poorest of the poor.

In all the three cases, the need for direct subsidy and the role of the government in the provision of electricity for the poor is discussed (Table 4).

**Table 4 Reforms option**

| S No | Country/ State   | Reform option    | Mandate  |
|------|------------------|------------------|--|
| 1    | The Philippines  | Reform Act, 2001 | Restructuring, privatization and competition, rural electrification, and setting up of independent regulatory commission.                          |
| 2    | India            | Reform Act, 1998 | Legislation spelling out the role, objective, and 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, and setting up of independent regulatory commission  |

3.0.4 In the study, emphasis has been given to the legal and policy framework governing power sector reforms in the Philippines and India. The study discusses the reform process with respect to the following aspects:

- Tariff alignment with the cost of supply.
- Efficiency improvement in the system, especially reduction in T&D (transmission and distribution) losses.
- Role of the government in providing subsidy and other policy directives to improve sector performance.

3.0.5 The objective of tariff rationalization has been discussed in view of the current practice of inter-and intra-category cross-subsidy and the need to identify and target subsidy to the poor. The issue of cross-subsidy the access charges<sup>2</sup> is also discussed.

<sup>2</sup> The consumer has to pay two types of charges for electricity access. One is the fixed charge, also called capacity charge, which is linked to the capacity addition made by the utility. The

- 3.0.5 The issue of efficiency improvement through reduction in T&D losses is discussed as T&D losses are often conflated with unmetered consumption. Since the consumption by the poor is unmetered this is relevant for the purposes of our study. The government's role is discussed in the context of budgetary provisions for electricity access to the poor.
- 3.0.6 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. The possible options to distinguish electricity access for the poor and the non-poor along with their merits and demerits are outlined below.
- 3.0.7 *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 (and other income definitions of the poor such as 1 dollar or 2 dollars a day). However, often data is not available directly. For the poor defined by the national poverty line, the Government of India launched the KJ (Kutir Jyothi) Programme 1998-99 for extending single-point light connections to the households of BPL rural families. Following this, many states have adopted this scheme to electrify the poor. Since the KJ programme was designed to target the BPL population, we have used the number of KJ connections for identifying electricity access to the BPL population. The limitation of this methodology is that, barring a few states, this scheme excludes the urban poor. However, linking KJ consumers with the BPL population would provide the best approximation for the electrification levels of the poor households.
- 3.0.8 *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 (see para 3.0.13.). The limitations of this approach are that it assumes that the total population in the rural areas is poor, and also, the

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other charge is the energy charge, which is variable in nature and is paid according to the number of units consumed. In India, however, poor consumers are not metered and they pay a fixed monthly charge, regardless of the number of units consumed by them. The disadvantage of this approach is, consumer consuming less units will have to pay the same amount as the consumer consuming larger units. Therefore, the lesser they consume, more is the per unit cost of electricity. In our study we have discussed the problems associated with the unmetered consumption and the need for the introduction of a two-part tariff.

urban poor get ignored in this approach. We did not adopt this approach due to the non-availability of the time series data in the required format. In India, utilities compile data according to different categories of consumers, and not according to urban or rural areas. However, the programme of the REC (Rural Electrification Corporation) in India, which aims to extend the grid to rural areas through various financing option is taken up in the study. In the case of The Philippines, the performance of Rural Electrification Co-operatives, which were established to extend electricity access in rural areas is also discussed.

3.0.9 *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. In this context, the consumers in the lowest consumption band, that is usually 1–50 kWh, can be taken as a proxy for the poor. Consumers in other consumption bands are considered non-poor. This proxy for the poor in some cases, however, may not prove useful. For instance, in Himachal Pradesh, 77% of the population falls in the lowest slab of consumption. The low consumption may be due to low penetration of electrical appliances or less supply of electricity from the utility. Further, all the utilities in India do not maintain consumer data on the basis of different tariff slabs. The limitation of this approach is that while it covers the affordability dimension of access at the low end of the consumption, it ignores the population of the poor who do not have connections.

3.0.10 Therefore, we used the following definitions and supplementary proxies in case studies to distinguish between the poor and the non-poor.

- 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 and their lie below levels electricity below a threshold level, which is determined by the Commission. In this study marginalized consumers are taken as a proxy for the poor. However, in some places, due to lack of availability of data, we have used village electrification as a proxy for rural electrification.
- In Orissa, we have used the KJ connections as a proxy for poor households electrified in rural areas. For the purpose of the study we have ignored the urban poor in Orissa, but that is not a serious

limitation as 85% of the poor live in rural areas and only 15% live in urban areas<sup>3</sup>

- In Karnataka, we have used the BG (Bhagya Jyothi) connections 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. We have considered the lowest-tariff slab consumers as a proxy for the poor.

3.0.11 In the discussion on Himachal Pradesh, data on rural and urban populations is 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 programme to improve access in the rural areas would have a pro-poor bias. For example, in 1997, almost 59% of the rural population lay below the MPCE (monthly per capita expenditure) of 265 rupees as, compared to only 28% of the urban population. Further, only 20% of the rural population had an MPCE of 355 rupees or more, as compared to 51% in the case of the urban population. The average MPCE in the urban areas was 458 rupees, which is about 63% higher than the average MPCE in the rural sector, which is around 281 rupees (TEDDY 2002). Also access to electricity in rural areas in India is far less than that in the urban areas (Table 5). Therefore, the proxy of rural areas for the poor is reasonably justified.

**Table 5 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 (2002), \*\*Census 2001

<sup>3</sup> During the study we thought of linking lowest- slab consumers with the urban poor,

3.0.12 Of the indicators, we have not considered the household expenditure, for want of data in the case of India. However, we have used an additional indicator on cross- subsidy as outlined below.

3.0.13 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:

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

where  $AR_c$  = Average realization from category C

$AR_o$  = 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.

3.0.14 Certain limitations in these indicators are mentioned below.

- Linking the income-poor with the electricity-poor

It is not necessary that those who have limited access to electricity also be income-poor. For example, a farmer may live above the poverty line, but may be outside the electricity supply grid. Hence, he is electricity-poor but not income-poor.

- Time - series data is not compiled

While we have the time series data for the states of Karnataka and Orissa in India, the time series data for the Philippines is not readily available in the required format. This gap could be filled at a later stage. In Himachal Pradesh, we have no information on the past number of consumers and consumption by the lowest band of consumers, hence a proxy is used.

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however, the utility does not maintain tariff slab-wise data on the number of consumers.

- Linking two different sets of data

In Orissa, we have linked the poor population in the state with the number of KJ connections in the state. Thus, this approach ignores the urban poor.

The sources for the data are the Census of India, Planning Commission, and tariff orders issued by the regulatory commissions.

## **4** Assessment of selected reform option: Indian case study

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### **4.1. Power sector reform: historical perspective till 1995**

- 4.1.1 The structure of the power supply industry in India has evolved considerably post independence. In the pre-independence era, the electricity industry was governed by the Indian Electricity Act, (1910). The Act along with the amendments in 1956, provided for private participation in the generation and supply of electricity and the industry comprised of a large number of independent private/municipal electricity utilities. In 1950, about 63% of the installed capacity in the utilities was in the private sector, while 37% was in the public sector.
- 4.1.2 In the post-Independence era, vide the E(S) A [Supply] Act (1948), (with various amendments) and the Industrial Policy Resolution, (1956) private participation diminished progressively. The sector gradually assumed its current form of vertically integrated state-wide public sector utilities – the SEBs (State Electricity Boards). The E (S) Act (1948) also created the CEA (Central Electricity Authority) with the mandate for efficient techno-economic systems planning. As such, till the onset of the 1990, the electricity industry was regulated and owned by various government agencies and organizations. The role and participation of the private sector was limited to specific areas of small jurisdiction and consumer base. The government, through the authority conferred on it by different laws, performed the multiple roles of developer, promoter, and regulator of the power industry. The subject of electricity is covered under the concurrent list in the Constitution of India, implying that both the central government and the state governments have the power to legislate the sector.

## 4.2 Growth of the sector

- 4.2.1 The demand for electricity has grown rapidly since independence, with the per Capita consumption of electricity increasing by 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. These include, a gradual shift from non-commercial sources of energy, such as biomass, in the household and commercial sector as well as a reduction in the use of coal for heat in industry and kerosene for household lighting
- 4.2.2 Of total sales of 314.84 TWh in 2000–01 (Planning Commission 2002), industry accounted for 30.5%, agriculture for 29.1%, and the household sector for 21.3%. In spite of sustained growth, the electricity consumption per capita was only 488 kWh per annum, which is far below the world average of 2 252 kWh (Table 5).
- 4.2.3 The majority of the Indian population is rural. Officially, close to 90% of the villages are electrified<sup>4</sup>. However, only 50% the Indian population has electricity. Since a large portion of the population lives below the poverty line, they cannot afford electricity at current costs. This is particularly true in rural areas (IEA 2002a).

## 4.3 Issues

- 4.3.1 Despite a physical growth in infrastructure, the power sector in India is plagued by severe financial constraints that have in turn led to functional inefficiencies and shortages. The annual commercial losses of the SEBs, excluding the state government subsidy, were 87 700 million rupees in 1995–96. The main factors responsible for the under performance of the sector are as follows.
- Poor financial condition of the SEBs due to the following (TEDDY 2000)
    - a) An unremunerative tariff structure as the domestic/agricultural consumption, which accounts for almost 50% of the total, is highly subsidized.
    - b) Poor billing and collections.
    - c) The industrial sector, the major contributor to the revenues of SEBs, is moving out of the grid due to the poor quality of power

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<sup>4</sup>The definition of electrification could be misleading in India. A village with even single connection is called electrified irrespective of the fact that majority of the households in that village are not electrified.

and large cross-subsidization of residential and agricultural consumption.

- d) High and unaccounted T&D losses due to which the average cost of supplied electricity is unreasonably high.

- High T&D losses, are due to
  - a) pilferage and theft of electricity
  - b) weak and inadequate sub-transmission and distribution systems
  - c) large-scale rural electrification programme involving long LT (low tension) lines
  - d) inadequate investment for upgradation and maintenance
- Financial constraints have led to poor plant maintenance, which has adversely affecting plant availability and system efficiency.
- Generation resources are seriously insufficient on an installed capacity basis and there is a lack of the right kind of capacity to meet the demand.
- There is lack of adequate transmission capacity for linking the various regions.

## **4.4 Description of various reform initiatives**

4.4.1 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. This policy focused initially on the generation aspect of electricity. Its main objective was to add generation capacity in a short time frame 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 like fuel, transportation, etc. Also, if there was doubt regarding servicing of the capital investment, investors would be lukewarm in their response despite the most attractive rate of return in the policy.

4.4.2 It was recognized that fundamental organizational changes would have to be effected to restore financial viability of the sector, as the existing vertically integrated monopoly<sup>5</sup> were not in a position to improve their

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<sup>5</sup> Where a single entity is responsible for generation, transmission, and distribution of electricity.

performance. It was also felt that privatization of electricity services was not feasible given the existing structure of the sector. Private investment was not forthcoming in undertaking generation as the SEBs were in no position to pay for the power purchases. This was one of the main reasons for the failure of the earlier policy.

- 4.4.3 Hence, the need for restructuring the current 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 idea was to bring about a change in the role of the government, from that of a service provider to that of a policymaker. The responsibility for ensuring efficient operations of the industry would gradually shift 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.

#### **4.5 Restructuring of the sector and status of reform in the electricity sector**

- 4.5.1 The power supply industry can be restructured in a number of ways. The steps taken by various states in India are outlined below. Orissa was the first Indian state to restructure the power sector through corporatization, setting up of an independent regulatory commission, unbundling of the utility, and finally privatizing electricity distribution.
- 4.5.2 In Haryana, the board was unbundled with separate corporations for generation, transmission, and distribution businesses. Distribution was further split geographically into two zones with the intention of privatizing the control of the corporation in the east zone.
- 4.5.3 In Andhra Pradesh, the board was unbundled into separate generation, transmission, and distribution companies. The state is also planning to privatize some distribution activities.
- 4.5.4 In Gujarat, the Government of Gujarat initiated the reform programme in 1997. The principal components of the programme involved setting up an independent regulatory commission, modernizing and upgrading the distribution system, clearing the backlog of connections for the agriculture sector, and making the sector profitable through commercial orientation. The state government established the Gujarat Electricity

Regulatory Commission in November 1998. Any major restructuring of the Gujarat Electricity Board is yet to be undertaken.

- 4.5.5 As against this, in the states of Rajasthan, Tamil Nadu, and Kerala the distribution business of the utilities had been geographically split up into separate profit centres right from the beginning.
- 4.5.6 In Uttar Pradesh, private sector participation is limited to specific cities, which have greater chances of commercial success. West Bengal is following a significantly different structure whereby all the distribution in the rural areas is handed over by the board to a new organization called the State Rural Electrification Development Corporation. This organization is to be structured like the rural cooperatives, buying power from the SEBs and managing affairs at a local level (Box 1).

**Box 1 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.  |

## 4.6 Regulatory reform and legislation

- 4.6.1 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 in a time-bound manner.
- 4.6.2 Setting up the CERC and the SERCs was a key element of this plan. 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 functions and powers of the SERCs as envisaged in the Electricity Regulatory Commission Act 1998 are as follows:

- Setting retail tariffs.
- Gradual elimination of cross-subsidy at improving efficiency levels.
- Setting related performance standards in the supply of electricity.
- Setting performance standards in the promotion of efficient use of electricity by consumers to be achieved by licensees.
- Promotion of competition.
- Creation of an environment for private sector participation.

4.6.3 As the focus of this study is to assess the impact of the reforms on the poor. It would be relevant to highlight the performance of REC (Rural Electrification Corporation), a central body with the mandate to promote rural electrification. While reforms have not had any direct impact on the activities of REC as a development financing body yet, its performance during the period under reference would be of interest for the 'Access' theme.

## **4.7 Rural electrification in India**

4.7.1 REC was incorporated on 25 July 1969 under the Companies Act 1956. It is wholly owned by the Government of India with a net worth of over 2466 billion rupees. Its main objective is to finance and promote rural electrification projects all over the country. It provides financial assistance to SEBs state power corporations, electricity departments of the state governments and rural electric co-operatives, for various rural electrification schemes. Cumulatively, as on 31 March 2002, REC had disbursed loan assistance of 246.87 billion rupees to SEBs/state power utilities.

4.7.2 The setting up of REC has definitely acted as a catalyst for rural electrification. Of the total of 0.509 million villages so far reported to be electrified in the country, about 0.305 million villages have been electrified under REC - financed schemes. Some other schemes financed by REC were the K J (Kutir Jyothi) scheme, Dalit Basthi scheme, Hamlet Electrification, Pumpsets Energisation, system improvements, small

generation, and Rural Electric Cooperatives. Some of the achievements of important schemes as claimed by REC are discussed below.

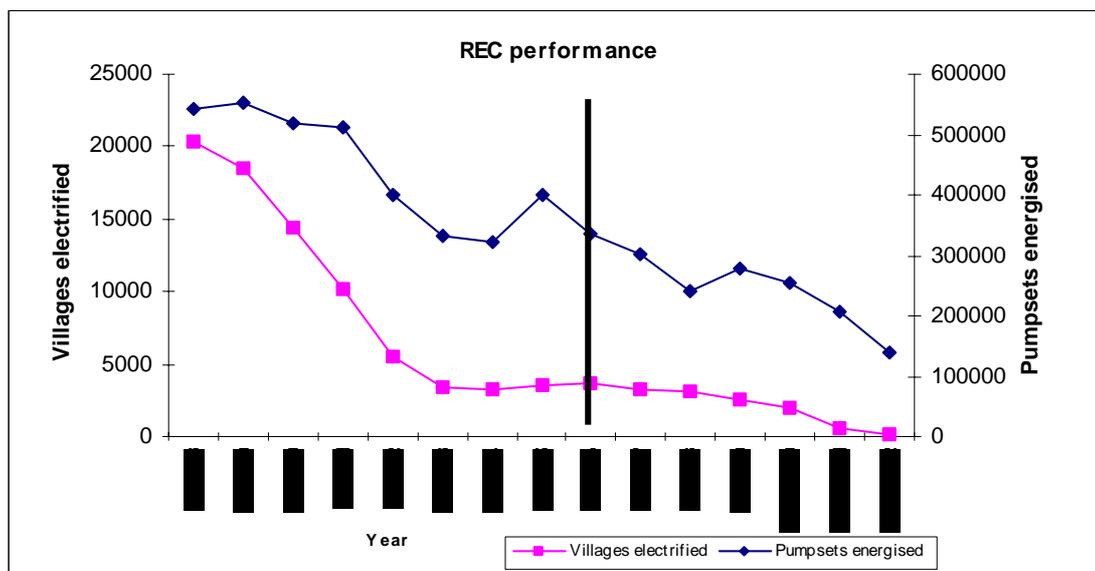
### **Kutir Jyothi Programme**

- 4.7.3 The KJ Programme was launched by the Government of India in 1988–89 for extending single-point light connections to the households of rural families BPL (below the poverty line) including harijan and adivasi families<sup>6</sup>.
- 4.7.4 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. The respective state governments are responsible for executing the target connections against which they receive the grant through REC. After clearance by REC, 50% of the cost is released by REC to the state governments / SEBs in advance, and the balance amount is reimbursed on actual release of connections and formulation of the list of beneficiaries. While discussing Orissa and Karnataka, we will look at the impact of reform initiatives (specially impact of institutional changes) on this scheme.
- 4.7.5 Presently, the Government of India is providing a grant of 37.07 dollars per connection to the special category states and 30.89 dollars per connection to other 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.

### **Rural Electric Cooperatives**

- 4.7.6 In India, steps for the formation of rural electric co-operatives for the distribution of power in rural areas for the first time were taken in the latter half of the 1960s when the Government of India sponsored an investigation by an expert team from the NRECA (National Rural Electric Co-operatives Association) USA, for identifying a few areas with adequate potential for the establishment of rural electric cooperatives.
- 4.7.7 As on March 2002, 33 rural electric co-operatives societies were operating in India. However, as compared to the Philippines, the rural electric co-operatives are not significant in India.

## Critical evaluation of REC performance



**Figure 1: REC (Rural Electrification Corporation) performance 2002**

4.7.8 The performance of the REC has, no doubt, contributed to the spread of rural electrification in the country, yet 78 240 villages are awaiting electrification. These are mainly in Bihar, West Bengal, Orissa, Uttar Pradesh, and Assam, the states that account for 40% of the country's population.

4.7.9 The overall pace of rural electrification as well as energization of pump sets received a setback in the last reform decade (Figure 1). The poor financial health of the SEBs, increasingly reluctant to move to rural areas because of high costs and low returns is largely responsible for this trend (Gokak 2002).

4.7.10 The Gokak study has mentioned the following adverse features plaguing the programme of rural electrification:

- The cost of transmission lines is very high—20 000 Rupees—30 000 rupees per kilometre depending on the terrain.
- High T&D losses.
- Low and fluctuating voltage on account of the overloading of the grid system.
- Erratic power supply and poor maintenance.<sup>7</sup>

<sup>6</sup> A member of certain classes in India, formerly considered inferior and untouchable.

<sup>7</sup> This apart, the programme of rural electrification has created a very serious problem of depleting the ground water tables due to the faulty tariff policies adopted so far. As the tariff is levied at a flat

- 4.7.11 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 1034.6 million dollars in 1991 and increased to 4710.87 dollars million in 1999–2000.
- 4.7.12 The Government of India has recognized the need for new initiatives in rural electrification in the wake of the problems outlined above. This has been reflected in Section 5, Part II of the Electricity Act, (2001), which views distributed generation as a possible alternative to the current problem<sup>8</sup>. It envisages stand-alone systems for generation and distribution of power and decentralized management of distribution through Panchayats,<sup>9</sup> users associations, and co-operatives or franchisees. However, implementation of new concepts on rural electrification would require articulation of a clear policy in terms of Clause 5 of the Electricity Act (2001), at the national level.<sup>10</sup>

## 4.8. Reform mandate

### *Cost of supply and tariff*

- 4.8.1 The regulatory commissions in India have been mandated to phase out the cross-subsidies in tariff. Section 29, Chapter VI of the ERC Act, (1998) stipulates that the tariff should progressively reflect the cost of supply of electricity at an adequate and improving level of efficiency<sup>11</sup>.

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rate, irrespective of the number of units consumed, the farmers draw very heavily on the ground water resources, thereby leading to lowering of the water table. Declining levels of water table have caused a great deal of anxiety among the state governments, some of which have enacted legislation to ban digging of new wells. The problem was accentuated, as simultaneous steps for recharging ground water sources through appropriate measures like soil conservation and watershed development were not initiated.

<sup>8</sup> Section 5 of Part II states; 'The central government shall also formulate a national policy, in consultation with the state Governments and the State Commissions, for rural electrification and for bulk purchase of power and management of local distribution in rural areas through panchayat, institutions, users' associations, cooperative societies, non-governmental organizations or franchisees.

<sup>9</sup> A village council in India consisting of a five member jury.

<sup>10</sup> The Electricity Act (2003) seeks to integrate efforts for rural electrification through notification of national policies vide Section 4 and 5 of the Act. The Act envisages a (a) A national policy for stand-alone systems and (b) A national policy for rural electrification. Pursuant to these developments, the Ministry of Power of India has recently come out with a discussion paper on rural electrification policies in India.

<sup>11</sup> Section 29 of Chapter VI of ERC Act (1998) states that: 'the tariff progressively reflects the cost of supply of electricity at an adequate and improving level of efficiency' the interests of the consumers are safeguarded and at the same time, the consumers pay for the use of electricity in a reasonable manner based on the average cost of supply of energy.'

- 4.8.2 However, this section of the Act does not clearly define a path or time frame to achieve tariff alignment and lends itself to different interpretations<sup>12</sup>. Further, it does not mandate any lifeline or subsidize rates for the poor. Even the new Electricity Act (2003)<sup>13</sup>, does not clearly deal with this matter.
- 4.8.3 Part II of the Electricity Act (2001) mandates a national electricity policy (including tariff policy). A draft tariff policy has been put out by the government for wider consultation. Ideally, the tariff policy should specify the time frame for the elimination of cross-subsidies identify the consumer categories that will need protection under cost-based tariffs, and suggest mechanisms for delivering support in an efficient manner to the targeted consumers. However, the draft policy does not explicitly cover these.
- 4.8.4 On matters related to rural electrification, the new bill recommends that the central government shall formulate a national policy, in consultation with the state governments and state commissions, for rural electrification and bulk purchase of power and the management of local distribution in rural areas through panchayat institutions, users associations, co-operatives societies, and non-governmental organizations or franchisees. This was missing in the earlier legislation. Further, the new bill recommends that the appropriate government shall endeavour to supply electricity to all areas including villages and hamlets. The new legislation, however, does not mandate time-bound rural electrification and does not mention any means to finance rural electrification programmes.
- 4.8.5 Therefore, the Indian legislation does not explicitly mandate subsidized tariff for the poor and extension of services in rural areas.

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

<sup>12</sup> For instance, the West Bengal Electricity Regulatory Commission tariff order 2003 has eliminated all cross-subsidies in one year. This has led to an uproar in the state and the state government has gone to the high court to counter this tariff order.

<sup>13</sup> Section 61. (d) Pertains to safeguarding of consumers interest and at the same time recovery of the cost of electricity in a reasonable manner.

(g) that the tariff progressively reflects the cost of supply of electricity at an adequate and improving level of efficiency.

(h) that the tariff progressively reduces and eliminates cross-subsidies.

## **Efficiency improvements through reduction in T&D losses**

- 4.8.5 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. Further, agricultural and poor residential consumers (falling in the lowest band of consumption) are not metered and very often, the consumption by these categories is inflated to show lower commercial losses. This method of masking of losses ensures that the operational inefficiencies and high distribution losses, which are normally due to industrial and other big consumers, are concealed in consumption by unmetered and flat-rate consumers. This means the actual availability and consumption of electricity by these categories is lower than what the statistics would imply.
- 4.8.6 The reform mandate requires reduction in T&D losses but does not specify the means for achieving this reduction. For example, the legislation does not mandate 100% metering and curbing of thefts and pilferage. The new Electricity Act (2003), however, addresses this lacuna and provides for penalties for power theft and punishment for the employees of power companies who are caught conniving.
- 4.8.7 Once all the consumers are metered it would be possible to separate T&D losses from the consumption by these categories.

## **Government support**

- 4.8.8 The reform mandates that in case the state government requires that some consumers be subsidized then it would bear the burden through budgetary support and would fully compensate the utility for the same<sup>14</sup>. However, this would require smooth communication and co-ordination between the state government, the utility, and the Commission, which has not always been evident. 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.

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<sup>14</sup>If the state government requires to grant any subsidy to any consumer or class of consumers in the tariff determined by the State Commission under this section, the state government shall pay the amount to compensate the person affected by the grant of subsidy in the manner that state Commission may direct, as a condition for the licence or any other person concerned to implement the subsidy provided for by the state government.'

- 4.8.9 Another key issue regarding government support is that the committed support is not always actually provided. However, some improvement has been made in this in that the new Electricity Act (2003) explicitly prescribes that the government should provide the support in advance<sup>15</sup>. The Act also envisages a national policy permitting stand-alone systems for rural areas.

## Case 1: Orissa Power Sector Reform

### *Description of the reforms process*

- 4.9.1 Orissa was the first state in India to initiate power sector reforms with the enactment of the Orissa Electricity Reforms Act in 1995. Significant progress has been achieved since then. As a part of the reform programme, the OSEB (Orissa State Electricity Board) was dissolved and 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 privatized in 1998/99 and has been divided into four zones.
- 4.9.2 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.

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<sup>15</sup>If the state government requires the grant of any subsidy to any consumer or class of consumers in the tariff determined by the State Commission under Section 62, the state government shall pay, *in advance in such manner as may be specified*, the amount to compensate the person affected by the grant of subsidy in the manner the state commission may direct, as a condition for the licence or any other person concerned to implement the subsidy provided for by the state government.

Provided that no such direction of the state government shall be operative if the payments is not made in accordance with the provisions contained in this section and the tariff fixed by the state commission shall be applicable from the date of issue of orders by the commission in this regard.'

### *Identification of the reform process*

- 4.9.3 Some sector experts often criticize the Orissa power sector reforms and it is argued that Orissa was the wrong choice for privatizing its electricity distribution as it is one of the poorest states in India.
- 4.9.4 The following reform processes can be identified in Orissa (Box 2):
- (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.

#### **Box 2 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 in Official Gazette  |
| April 1996      | Reform Act comes into force<br>GRIDCO takes over T&D business from OSEB (Orissa State Electricity Board)<br>OHPC takes hydro projects from OSEB and DoE<br>OERC (Orissa Electricity Regulatory Commission) becomes operational<br>Management contract awarded to BSES in respect of central zone<br>OERC issue license to GRIDCO<br>Management contract to BSES terminated |
| November 1997   | Chief Minister of Orissa announces the privatization of four DISTCOs<br>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   |

In this study we have considered the period after the privatization of distribution as the post-reform period (1999-2003) and 1996-1999 as the pre-reform period.

## Definition of poor and policy context

4.9.5 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. Further, Orissa is one of the poorest states in India with the highest percentage of BPL population (47.15%) Table 6.

**Table 6 Rural/urban population**

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

4.9.6 To encourage electrification of BPL households, Orissa adopted the KJ (Kutir Jyothi) programme launched by the Government of India in 1988-89 for extending a single-point light connection to the households of BPL rural families, including harijan and adivasi families. Under this programme, the one-time cost of internal wiring and service connection charges is provided by way of 100% grant to the states. For the purpose of this study, we have linked the number of KJ connections with the rural poor BPL households and have ignored the urban poor as they account for only 15% of the total BPL population.

### *Assessment of the impact of the reforms option on the poor by using various indicators*

#### Electrification levels

- 4.9.7 An electrification level is probably the simplest indicator of electricity access. This indicator provides an estimate of the proportion of the population that has physical access to electricity.
- 4.9.8 Considering the definition of the poor and non-poor outlined above. It is observed that the electrification levels for the non-poor have increased, whereas electrification levels for the poor have gone down in the post- reform period. The electrification levels for the non - poor have increased from 47.60% in 1999–2000 to 56.06% in 2001–02, whereas electrification levels for the poor have decreased from 3.67% to 3.31% in the same period (Figure 2). The reason for this

could be disconnection of installations due to payment default<sup>16</sup>. Also, when OSEB was restructured and DISCOMs (distribution companies) were privatized, the rural electrification wing was disbanded and the focus on rural electrification was lost, though the programme was not given up. The supercyclone (October 1999) and non-payment of assured capital subsidy to DISCOMs by the government also contributed to the slackening of interest in taking up new programmes. As a result, the number of villages electrified in Orissa declined from 800 in 1997–98 to a mere 42 in 2000–01.

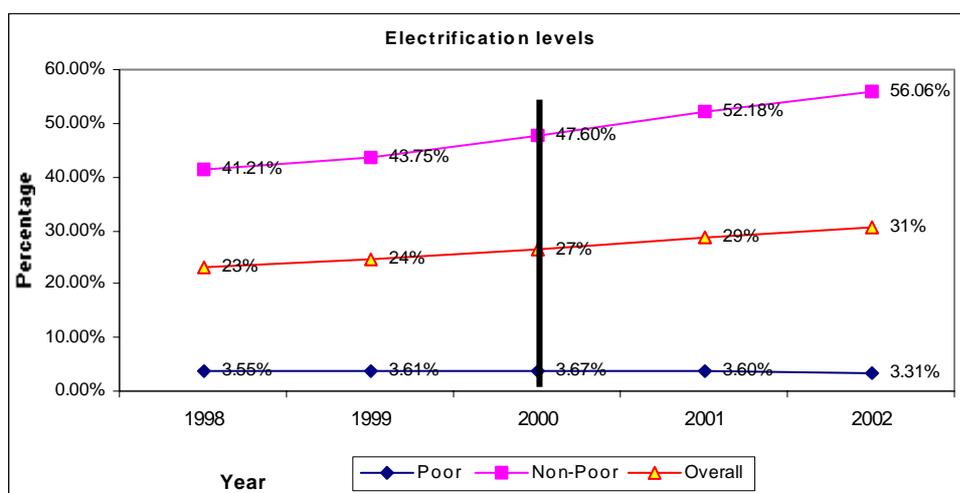


Figure 2: Electrification levels

**Table 7. CAGR (Compounded Annual Growth Rate) – Electrification levels**

|               | Poor  | Non-poor | Overall |
|---------------|-------|----------|---------|
| Pre-reform    | 1.6%  | 7.5%     | 7.0%    |
| Post - reform | -4.9% | 8.5%     | 7.7%    |

4.9.9 While the electrification levels for the non-poor and the poor before reform 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,

<sup>16</sup> One of the major thrusts of the reforms was to curb theft and pilferage and increase collection efficiency. The collection efficiency at the start of the reform process was only 70%.

electrification levels for the non-poor have increased by a CAGR of 8.5%.

- 4.9.10 The deterioration in the electrification levels of the poor after the reforms act could be linked to the intention of the private utility to try to minimize loss by discouraging new connections for the poor. The electrification levels of the KJ consumers relative to other domestic consumers thus raises a question about the actual benefits of privatization of electricity distribution for the poor households of the state.

## Electrification rates

- 4.9.11 The electrification rate measures the pace of electrification (for example, the rate of new connections). 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 have also gone down drastically during the post-reforms period (1999–2000).

- 4.9.12 With the advent of the reform process, electrification rates for the non-poor households in Orissa have increased from 7.7% in the year 1998–99 to 9% in the year 2001–02. The reasons for the de-electrification of the poor consumer could be that many of them opted out due to relatively higher charges. Better supervision by the commission could also have resulted in service disconnection for the defaulting consumers (Figures).

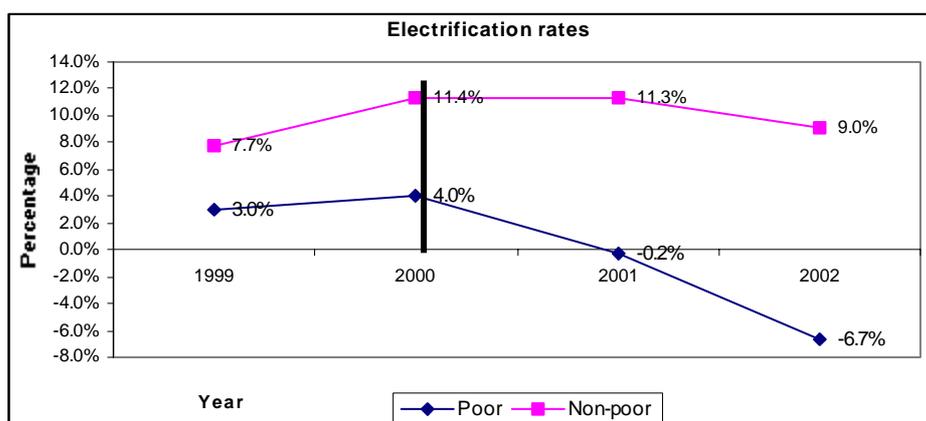


Figure 3: Electrification rates

## Electricity consumption

- 4.9.13 electricity consumption is another important indicator for analyzing the impact of reforms on the poor. The electricity consumption per household for the poor households in Orissa has fallen drastically from 513 units per annum in 1998–99 to 299 units per annum in 2002–03, which is a sharp decline of 41%. In the case of other domestic consumers, the per capita electricity consumption has gone down from 1607 units per annum in 1998–99 to 1572 units per annum in 2002–03, which is a decline of a mere 2 %.
- 4.9.14 Clearly, the fall in consumption in the case of the poor consumers has been quite substantial. The difference between the consumption of the poor and other domestic consumers is also observed to be substantial. Given the large poor population in Orissa, this trend is certainly not positive and raises concerns about the willingness of the existing private players in addressing the electricity needs of the poor in the state.
- 4.9.15 To find out the correct reasons for this decline a thorough investigation is required. Some of the possible reasons for decline in the consumption levels of the poor consumers are outlined below:
- Cost of supplying electricity to the poor is high, whereas tariff is minimal and there is no incentive for the private utility to encourage sales in these areas
  - It may be possible that earlier the utility was over-estimating the consumption to hide the commercial losses. However, after the reform process the utility is making correct estimates (Figure 4).

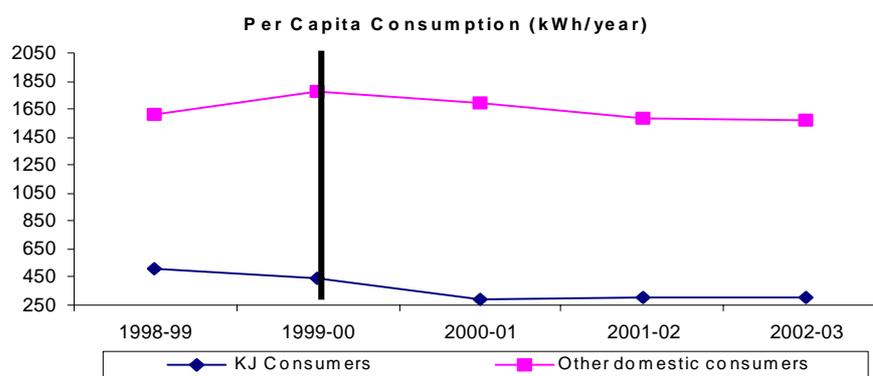


Figure 4: Electricity consumption

*Electricity tariff*

- 4.9.16 Over the years, the poor consumer in Orissa has had to pay a fixed charge per month irrespective of the consumption. The disadvantage of this approach is that the consumer pays the same amount for consuming 10 units per month and 50 units per month (61.78 cents per month). Therefore, one can infer that the poor consumers consume less electricity and pay more per unit than the consumers who are wealthier and consume more electricity. This example reiterates the need for 100% metering and two-part tariffs.
- 4.9.17 Tariff for other consumers has increased from 2.74 cents per unit in 1997–98 to 4.20 cents per unit in 2001–02 (Table 8).

**Table 8 Tariff for the poor and non-poor**

|         | Per unit charge for other domestic consumers (cents per unit) | Access charge per month for Kutir Jyothi 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)

- 4.9.18 The following observations are made with regard to the tariff structure in the electricity industry in Orissa.
- The tariff structure needs to be rationalized. The present structure is clearly distorted. With the access charge for the poor consumers being fixed on a monthly basis irrespective of the actual level of consumption.
  - On an average, the cost of supply to the poor consumers is high, whereas tariff is the bare minimum and is subsidized.

*Subsidy and cross-subsidy*

- 4.9.19 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<sup>17</sup>.

4.9.20 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<sup>18</sup> has increased, which is an unhealthy trend for the overall sector oral reform (Table 9).

**Table 9 Increase in tariff (cents/unit)**

|         | HT(high tension)-<br>Industry | LT-(Low Tension)<br>Domestic | Average tariff |
|---------|-------------------------------|------------------------------|----------------|
| 1998-99 | 6.58                          | 3.48                         | 6.33           |
| 1999-00 | 7.03                          | 3.33                         | 5.93           |
| 2000-01 | 7.42                          | 3.29                         | 6.18           |

4.9.21 It is evident from the Table 18 that the average realization from domestic consumers has declined by 6%, whereas industrial tariff has increased by 13%. The possible reasons for the increase in cross-subsidy could be as follows:

- Cost of supply has increased because of over-valuation of assets and right estimation of T&D losses (underestimated earlier).
- Government support through subsidy has stopped<sup>19</sup> with the initiation of the reform process in Orissa.
- Due to political compulsions and pressures from the government, the tariff could not be increased for domestic consumers (primarily the non-poor) and therefore industry and commercial consumers have to face the brunt of tariff hike

## Conclusion

4.9.22 Although the overall electrification level in Orissa has increased, over the years the electrification level for the poor has shown a considerable decline. With the advent of the reform process, electrification rates for

<sup>17</sup> This has been estimated by assuming government subvention of 4.62 billion rupees per year. This annual amount was provided by Government of Orissa prior to reform.

<sup>18</sup> Due to lack of data we were not able to derive the CI index

<sup>19</sup> This hands-off approach of the government is often criticized by many power sector experts. As 82% of the population is the rural poor, government support and subsidy is imperative for the success of the reform process.

the poor consumers have gone down, whereas for other domestic consumer electrification rates have risen. Further, the per capita consumption for the KJ consumers has shown a sharp decline. Given the large rural population in Orissa, this raises concerns about the willingness and effectiveness of the existing private utilities in addressing the consumption needs of the poor in the state.

4.9.23 Electricity distribution to the poor consumers is one of the weakest links in the chain, due to its geographical dispersion, low-energy demand, high losses, and poor revenue collection. The experience of privatizing the power distribution in Orissa shows that rural electrification has unintentionally become the worst casualty (Kanungo 2001). This is evident from the following:

- There hasn't been any new proposal either by the distribution companies or by the state government for rural electrification funding since 2000.
- Electrification rates and consumption by the poor consumers have declined<sup>20</sup>.
- No department within the state is responsible for planning, promoting or monitoring rural electrification.

4.9.24 Electricity reforms in Orissa (rather in India) have invariably neglected rural electrification, which in turn has had adverse impacts on the consumption needs of the poor in the state. There is need for clear policy directions as reforms act does not explicitly make any provision for serving the electricity needs of the poor.

4.9.25 The private companies on their own would neither be willing nor be able to improve access and would, therefore require clear policies regarding lifeline rates and subsidy from the government. Some incentive-based mechanism needs to be developed to encourage private operators to supply electricity to the poor.

4.9.26 Another important issue, which needs to be addressed with regards to the reform process in Orissa, is the existing tariff structure. As stated earlier, the poor consumer has to pay a fixed charge per month irrespective of his consumption, as against the other domestic consumers who have to pay in proportion to their consumption. This anomaly needs to be looked into for the tariff structure to be more equitable.

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<sup>20</sup> The reasons for this need further research.

- 4.9.27 Further, the state government is not providing any subsidy and at the same time is less reluctant to increase the tariff for the subsidized consumers. Therefore, the commission had no option but to increase tariff for industrial and other HT (high tension) consumers. This practice of cross-subsidy may not be sustainable for long.
- 4.9.28 In the light of the above observations, it is clear that the reform process in Orissa has not been very effective and beneficial, as far as its impact on the poor is concerned. There is need to thoroughly investigate the reasons for this in the second phase of the study.

## **4.10 Case 2: Karnataka**

### *Description of the reform process*

- 4.10.1 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.
- 4.10.2 The Act also provided for the setting up of an independent regulatory commission, that would introduce necessary modifications in the tariff structure, so as to progressively reduce cross-subsidies and ultimately eliminate them. 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. Since its inception, KERC has issued three tariff orders.
- 4.10.3 The government further notified a second transfer scheme, effective from June 2002, in which transmission was separated from the distribution business, which in turn was vested in four separate distribution companies. The government 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.

### *Identification of the reforms steps*

4.10.4 The following reform process can be identified(Box 3):

- Establishment of an independent regulatory commission and issuing of three tariff orders.
- Corporatization of the electricity board.
- Vertical unbundling into separate generation, transmission, and distribution companies.

#### **Box 3 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       | Privatization strategy paper prepared   |
| May 2002           | Second tariff order issued  |
| October-March 2003 | Four separate distribution companies operationalized.<br>BESCO (Bangalore Electricity Supply Company Ltd)<br>MESCOM (Mangalore Electricity Supply Company Ltd)<br>HESCOM (Hubli Electricity Supply Company Ltd)<br>GESCOM(Gulbarga Electricity Supply Company Ltd )   |
| March 2003         | Third tariff order issued   |

The authors have selected the Karnataka Electricity Reform Act<sup>21</sup> (1999), as the most applicable reform option for this study. So the period 2000–2003 would be considered as the post - reform period.

### **Definition of poor and policy context**

4.10.5 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 and there are 17 919 858 urban dwellers. During the liberalization period (that is post-1991), the rural population declined by 3%.

<sup>21</sup> The Karnataka Electricity Reform Act 1999

**Table 10 Population distribution in Karnataka**

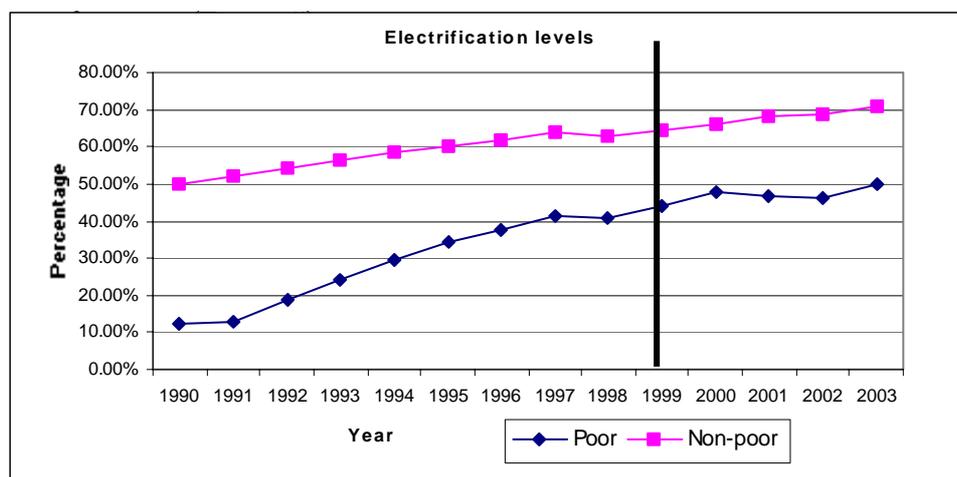
| Year | Urban % | Rural % |
|------|---------|---------|
| 1991 | 30.92%  | 69.08%  |
| 2001 | 33.98%  | 66.02%  |

4.10.6 A total 20.04% of the population lies below the poverty line<sup>22</sup>. 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<sup>23</sup> to the benefit the BPL families. In this study, households with BJ connection have been considered as poor consumers while others have been considered non-poor consumers of electricity.

## Assessment of the impact of the reforms option on the poor by using various indicators

### *Electrification levels*

4.10.7 While the electrification levels for the non-poor and the poor, before the reforms, were growing at a CAGR of 1.7% and 6.4% respectively, after the reforms the tempo for the electrification levels for the poor has gone down drastically (Table 11). On the other hand, the CAGR for the electrification levels for the non-poor has increased to 2.4% in the post-



<sup>22</sup> As per the Planning Commission, population persons earning less than 394 rupees (8.11 dollars) per month are considered below the poverty line.

<sup>23</sup> BJ is same as KJ programme except it includes the urban poor too.

**Figure 5: Electrification levels****Table 11. Compounded annual growth rates of electrification levels both in the pre-and post-reform era**

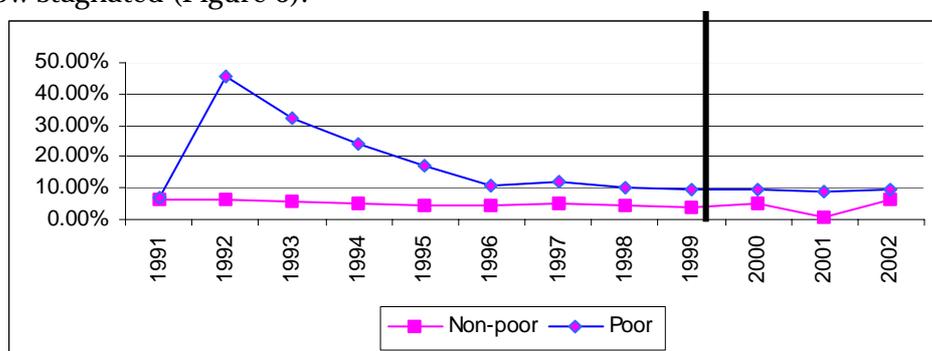
|          | Pre-reform(4 years prior to reforms) | Post-reform(4 years after reforms) |
|----------|--------------------------------------|------------------------------------|
| Poor     | 6.4%                                 | 3.00%                              |
| Non-poor | 1.7%                                 | 2.4%                               |

Source: Authors Compilation (Karnataka tariff orders)

4.10.8 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 lucrative areas.

### *Electrification rates*

4.10.9. At the beginning of the 1990s, the electrification rate for the poor in Karnataka was very high, however, it declined gradually. 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. During the post-reform period, the electrification rates for poor declined and have now stagnated (Figure 6).

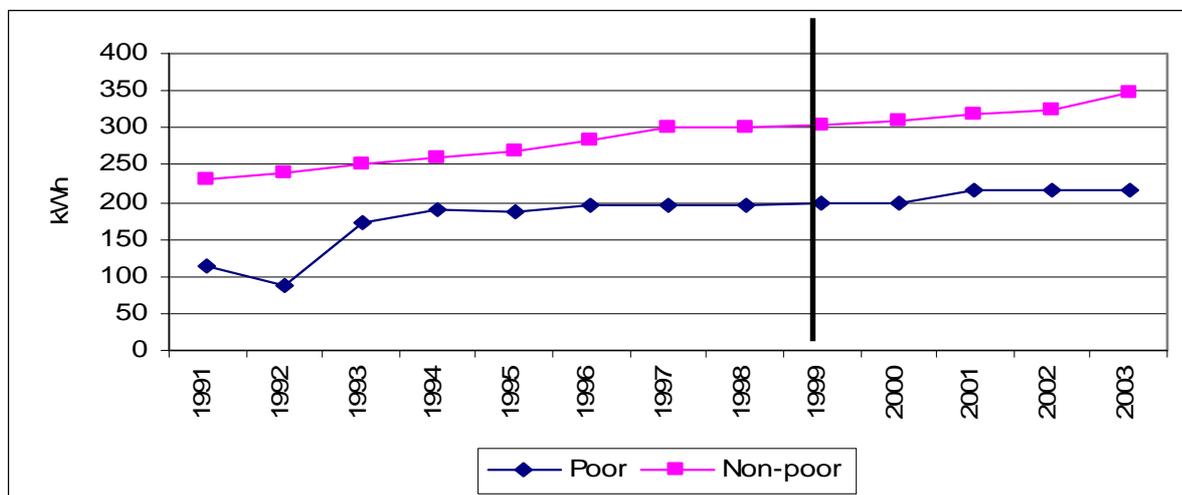
**Figure 6 Electrification rates**

Source: Authors Compilation (Karnataka tariff orders)

4.10.10 The electrification rates for the non-poor remained the same till 2000, however, in the year 2001, the rates declined. This anomalous decline can only be explained in terms of the rate of electrification falling below the growth rate of the population, that is the population (household) growth was more than the growth rate of the new connections. Nevertheless, electrification rates for the non-poor increased drastically in the year 2003.

## Electricity consumption

4.10.11 The per household electricity consumption is obtained using the data provided by the utility from which the estimates are derived by dividing the amount of electricity consumed by the number of electricity consumers.



**Figure 7 Electricity consumption per household per year**

Source: Authors compilation (Karnataka tariff orders)

4.10.12 Electricity consumption levels for non-poor households in Karnataka have increased more during the reform period as compared to the pre-reform period. As shown in Figure 7, electricity consumption during 1997–2000 increased by a CAGR of 0.99%, whereas in the post-reform era (2000–2003) it increased by a CAGR of 3.83%. In the last one year the electricity consumption has increased by over 7%.

4.10.13 However, the electricity consumption levels for the poor households stagnated to 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.

4.10.14 The actual consumption by this category is debatable. The utility in its tariff filing (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.

*Electricity tariff*

4.10.15 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. It is clear from Table 12, that the rates charged to the poor consumers were kept at very low levels till the advent of the reform process.

**Table 12 Amount charged under the BJ (Bhagya Jyothi) scheme still the reform process**

|                        | Energy Charge<br>per month<br>(cents) | Fixed Charge per<br>month towards<br>investment<br>(cents) | Total amount<br>payable per<br>month (cents) |
|------------------------|---------------------------------------|--|--|
| 1979-Feb 1981          | 5.15                                  | 3.32   | 8.46   |
| Feb 1981-April<br>1981 | 4.43                                  | 3.32   | 7.74   |
| April 1981-Aug<br>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

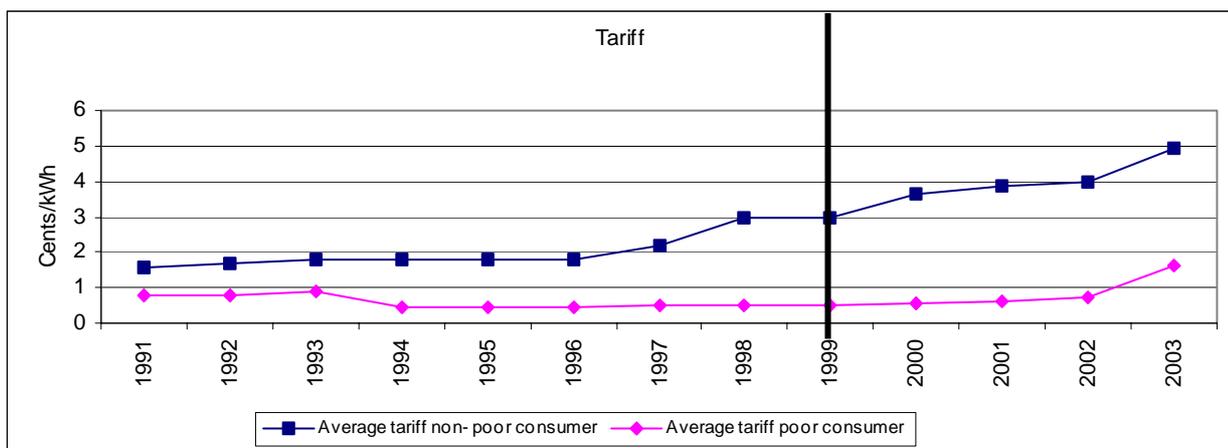
4.10.16 With the setting up of KERC, it was made mandatory for the utility to file a tariff petition and get approval from it. The commission in its first order (2000) mentioned that the rates charged to the poor consumers (BJ installations) had been kept very low. An amount of 2.50 rupees (5.15 cents) per month, in terms of the price levels of the year 1979, would work out to 11.84 rupees (24.39 cents) per month, merely adjusting the figure for the impact of inflation (4.74 times as per Wholesale Price Index).

4.10.17 Also, the Commission was of the opinion that as this category was not metered it was not possible to assess whether all the BJ consumers were in the need of continuing subsidies. Further, the Commission mentioned 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 all these facts the Commission increased the rate for poor consumers to a total amount of

10 rupees (20.6 cents) per month including recovery towards the capital loan portion.

4.10.18 The Commission mentioned that this tariff is only 19.4% of the average cost of supply and needs to be increased in the future tariff orders. In the subsequent tariff order, the Commission increased the rate to 61.8 cents per month.

4.10.19 For making tariffs for the poor and the non-poor consumers more comparable, the average realization is estimated by dividing revenue collected from the poor and the non-poor consumers with the number of units sold to the poor and the non-poor consumers (Figure 6).



**Figure 8: Average Realization from tariffs**

Source: Authors compilation (Karnataka tariff orders)

4.10.20 It is evident from Figure 8 that compared to the average tariff for the non-poor consumers; the tariff for the poor is substantially lower. However, the difference between the tariffs for the poor and the non-poor, which stood at 84% in the year 1999, has been reduced to 67% in the year 2003, which implies that the tariff for the poor has increased more than the non-poor tariff.

**Table 13 CAGR for tariff (pre-and post-reform)**

|                            | Non-poor domestic consumers | Poor domestic consumers |
|----------------------------|-----------------------------|-------------------------|
| Pre-reform era (1995-1999) | 14%                         | 2%                      |
| Post-reform (1999-2003)    | 13%                         | 35%                     |

4.10.21 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. It is, however,

not surprising that 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 9).

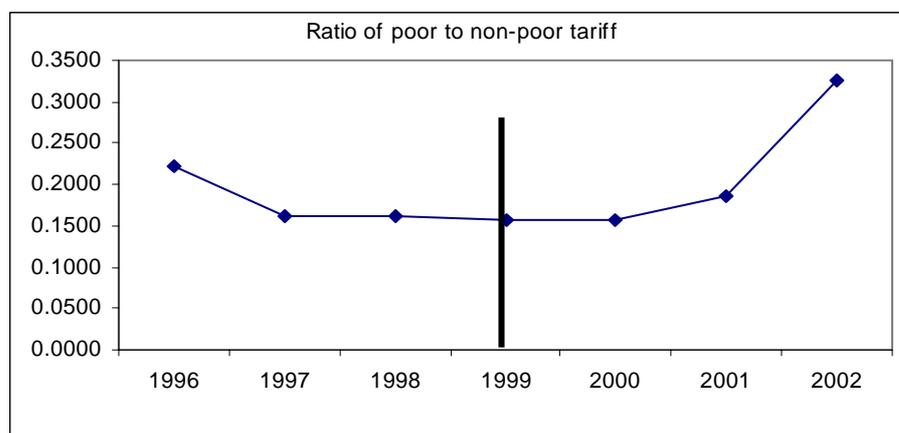


Figure 9: Ratio of poor to non-poor tariffs

Source: Authors compilation (Karnataka tariff orders)

### *Subsidy and Cross-subsidy*

#### **Cross-subsidy**

4.10.22 As discussed in the methodology, the CI indicator for reduction in cross-subsidy is used in the study for the analysis. 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 14).

**Table 14. CI (Convergence Index)**

| Description   |        |
|---------------|--------|
| CI in FY 2000 | 0.6236 |
| CI in FY 2003 | 0.4671 |

Source: Authors Analysis (Karnataka tariff orders)

Over the years in Karnataka, the CI index has gone down, which is reflective of a reduction in cross-subsidy in the tariff structure.

#### **b) Subsidy**

4.10.23 Two disturbing 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.

Some of the reasons for this trend could be as follows.

- Revenue gap of the utility has increased due to better estimation of T&D losses in the power system, thereby increasing the cost of power purchase and reduction in revenue collection.
- Tariffs for agricultural and residential consumers are still not aligned with the cost of supply.

**Table 15 Government support over the years**

| (dollar million) | Opening balance of subsidy due | Subsidy claimed | Subsidy released | Balance at the end |
|------------------|--------------------------------|-----------------|------------------|--------------------|
| 1997–98          | 35.21                          | 78.28           | 111.00           | 2.49               |
| 1998–99          | 2.49                           | 188.20          | 137.97           | 52.71              |
| 1999–2000        | 52.71                          | 249.81          | 158.34           | 143.98             |
| 2000–01          | 143.98                         | 374.96          | 256.68           | 262.27             |
| 2001–02          | 262.27                         | 459.49          | 385.50           | 336.26             |
| 2002–03          | 336.26                         | 652.26          | 575.72*          | 76.54*             |

\*Committed by the Government of Karnataka  
Authors Compilation (Tariff orders)

4.10.24 The second disturbing feature is the huge subsidy amount outstanding with the government of Karnataka. The subsidy amount due from the government 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. In this context, the Commission in its tariff order has mentioned that the government proposes to clear maximum outstanding dues this year (2002–03) through one lumpsum payment in March 2003. KERC has also 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<sup>24</sup>. The Commission has urged the government to release subsidy payments at least in equal quarterly instalments.

24 In fact, the utility in its tariff filing has stated that delayed payment of subsidies is a significant reason why payments to power suppliers get delayed thereby incurring heavy interest.

## Conclusion

- 4.10.25 It is observed that there has been a substantial decline in the growth of electrification levels for the poor in the post-reform era. The electrification rates for the poor have also declined during the post-reform period. In view of the fact that the Act makes no explicit commitment to the extension of electricity access for poor, this should not be surprising.
- 4.10.26 It is difficult to comment on the average consumption by poor households as the absence of 100% metering makes the current estimates of consumption unreliable. However, the increase in tariffs (as in the case of the post-reform era) may deteriorate the electricity consumption levels of the poor in the future.
- 4.10.27 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. In contrast to this, the Philippines Act clearly mandates the need and mechanism for subsidizing marginalized consumers. Further, to make the subsidy more targeted, 100% metering should be made mandatory and a two-part tariff should be introduced. The current practice of fixed charges per month is regressive in nature<sup>25</sup>.
- 4.10.28 It is not surprising that the government budgetary support has increased manifold during the reform period. Looking at the bad condition of the state finances, this may not be sustainable in the long run and therefore immediate efficiency improvements (like reduction in T&D losses) in the sector are required.
- 4.10.29 The Karnataka government is planning to privatize 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.

## 4.11 Case 3: Himachal Pradesh

### *Description of the reforms process*

4.11.1 In Himachal Pradesh reform steps were initiated with the establishment of an independent regulatory commission the HPERC (Himachal Pradesh Electricity Regulatory Commission) by the Government of Himachal Pradesh through a notification dated 30 December 2000. The Commission is a single-member regulatory authority assisted by technical and administrative staff. Its 's role is to regulate the working of the electricity industry in the state of Himachal Pradesh. It has been assigned the following mandatory functions under Section 22 (1) of the ERC Act.

- To determine the tariff for wholesale, bulk, grid, or retail electricity.
- To determine the tariff payable for the use of the transmission facilities.
- Gradual phasing out of cross-subsidy.
- To regulate the power purchase and procurement process of the transmission and distribution utilities including the price at which the power shall be procured from the sources for transmission, sale, distribution, and supply in the state.
- To promote competition, efficiency, and economy in the activities of the electricity industry.

4.11.2 An MoU (memorandum of understanding) was signed between the Ministry of Power, Government of India, and the Government of Himachal Pradesh in March 2001. The aim of this MoU was to affirm the joint commitment of the two parties to reform the power sector in the state to set out the reform measures, which the State Government of Himachal Pradesh would implement, and the support that the Government of India would provide.

### *Identification of reform steps*

4.11.3 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 analyzed in the context of the role of the regulatory

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<sup>25</sup> Consumers consuming less units pay the same amount (per month) as those consuming more. In a way, the per unit cost for the lower electricity consumer would be more than the higher electricity consumer.

commission in making the subsidy better targeted for the poor, thereby improving electricity access for poor.

### *Definition of poor and policy context*

4.11.4 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 area 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 is the lowest % of urban population amongst all states in India (Table 16).

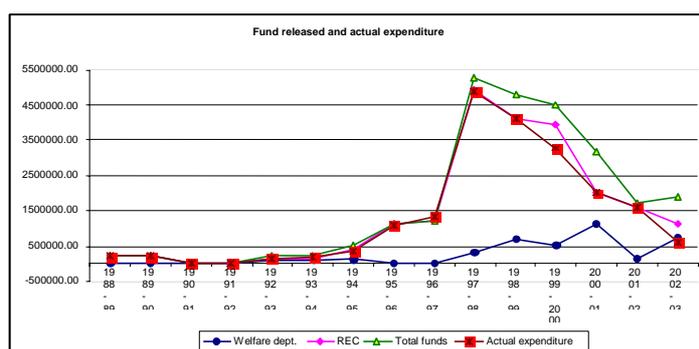
**Table 16 Rural/urban population**

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

- 4.11.5 Even with the highest proportion of rural population, only 7.63% of the population lies 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 (Box 4). 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.
- 4.11.6 The lowest slab of consumers in Himachal Pradesh consists of those consuming less than 45 units per month. Interestingly, 77% of the households electrified fall under this category. The flaw in this definition of the poor is that it need not be necessary that consumers falling in this category are income- poor. They may be consuming less electricity either because of the supply side constraint or due to low penetration of electric appliances. To overcome this flaw, the Commission came up with the approach of targeting subsidy for the poorest of the poor. This issue is dealt with in later sections.

#### Box 4: REC (Rural Electricity Corporation) and welfare department disbursement for electrification in Himachal Pradesh

HPSEB (Himachal Pradesh State Electricity Board) started availing the facility of funds from REC (Rural Electrification Corporation) of India from 1973. Under this scheme, REC provided soft loans with rates of interest varying from 5% to 8% for reimbursing the cost of service connection and single light wiring cost to the consumers belonging to the Scheduled Caste category and living below poverty line. From 1992-93, the State Welfare Department also started providing similar scheme. The funds provided for this purpose are limited and are provided on different rates from time to time. However, over the last five years budgetary support has considerably gone down (Figure 10).



**Figure 10: Fuel released and actual expenditure**

As reported by the, following two factors have undermined the importance of REC in the recent years:

- (i) There are other funding institutions such as PFC (Power Finance Corporation) the Government of India scheme under the APDRP (Accelerated Power Development and Reforms Programme). APDRP is available those states that are being a special category states. with 90% grant and 10% loan but the programmes has specified stringent requirements mostly linked to financial and technical improvements/ reforms.
- (ii) REC needs state government guarantee which is not available for the arrangements having already exceeded. Case for revolving guarantee is pending with the state government. Hence, the state government has a higher preference for APDRP and the flow of funds from the government of India is also significant.

**Source: HPSEB**

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

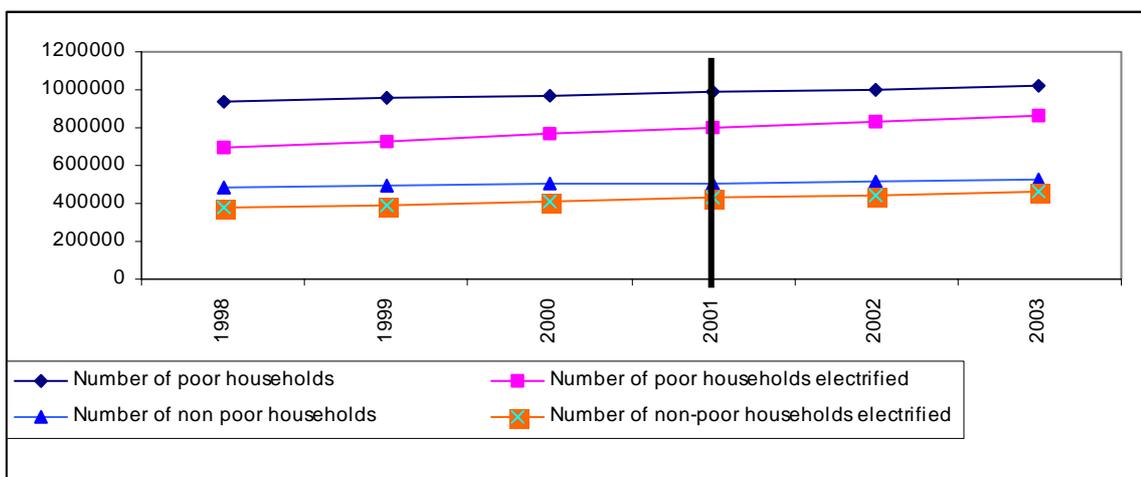
#### *Electrification levels*

4.11.5 Till 2000–01, the Board did not maintain any data on the category-wise number of consumers and their respective consumption levels. 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 the study).

4.11.6 However, with the setting up of the independent regulatory commission in 2001, the Board has maintained data on category-wise consumers and sales for the year 2001–02. For the purpose of our study, we have assumed the same proportion of consumers in the pre–and post–reform

era. This may not depict the precise picture but still serves as a proxy for electrification levels (Figure 11).

4.11.7 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. This trend seems to indicate that the setting up of the independent regulatory commission in 2000 has not had a significant impact on electrification levels.



**Figure 11: Electrification levels**

Source: Authors compilation (HPSEB)

**Table 17 CAGR (Compounded annual growth rates) of electrification levels in both the pre-and post-reform eras**

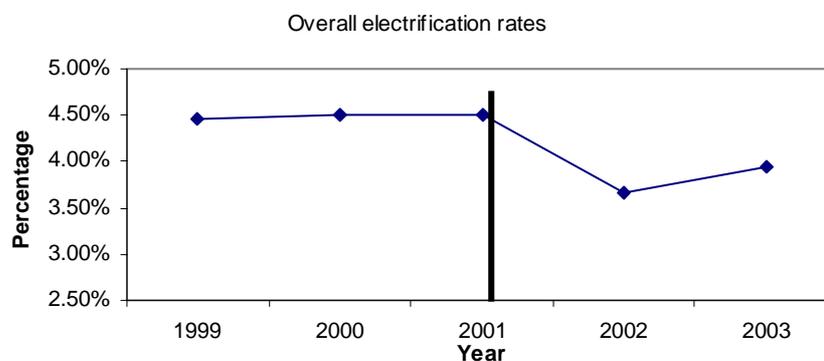
|      | Pre-reform (3 years prior to reform) | Post-reform (3 years after reform) |
|------|--------------------------------------|------------------------------------|
| Poor | 6.81%                                | 3.80%                              |

Source: Authors Compilation (Himachal Pradesh tariff order)

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.

### *Electrification rates*

4.11.8 As mentioned before, since the utility has not maintained a time series data on the number of consumers falling under the lowest category of consumption, it would not be possible to find out the electrification rate



**Figure 12: Overall electrification rates**

4.11.9 Nevertheless, if we analyze the overall electrification rate over the years, we find that it has gone down from 4.5% in 1999 to 3.6% in year 2002. It is important to mention that 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.

### *Electricity Consumption*

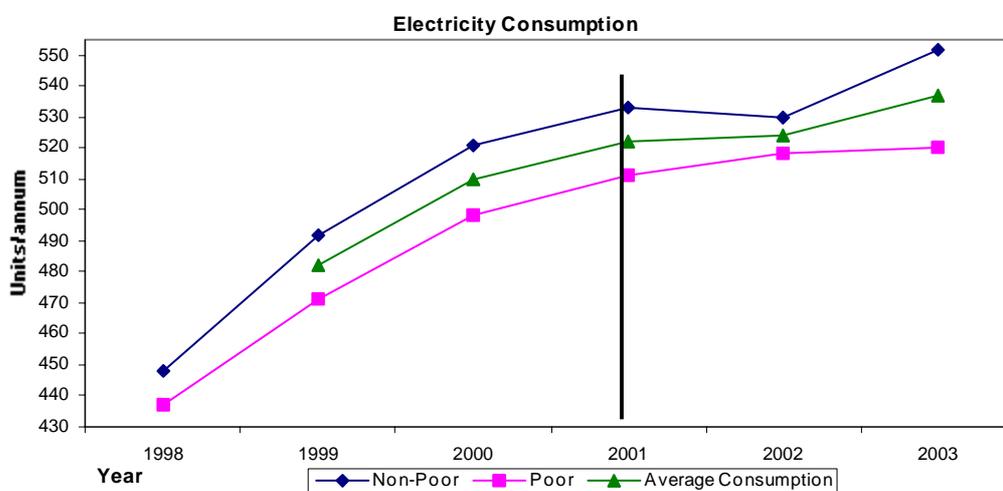
4.11.10 Electricity Consumption per household electricity consumption is obtained using data provided by the utility from which the estimates are derived by dividing the amount of electricity consumed by the number of electricity consumers. In other words, these estimates give us the average consumption per household.

4.11.11 It is evident from Figure 13 that the consumption per household for the non-poor has risen more than 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). This obviously indicates a decline in the

growth rate of the electricity consumption per household during the post-reform period.

- 4.11.12 The deterioration in the electricity consumption of the poor after the establishment of the regulatory commission could be linked to the decrease in the supply from the Board. The fact that the consumers falling under the lowest slab pay less for the electricity (as compared to the non-poor and the cost of supply) essentially implies that the utility tries to minimize the revenue loss by selling less to the poor.

### *Electricity tariff*



**Figure 13 Electricity Consumption for the year 98-03**

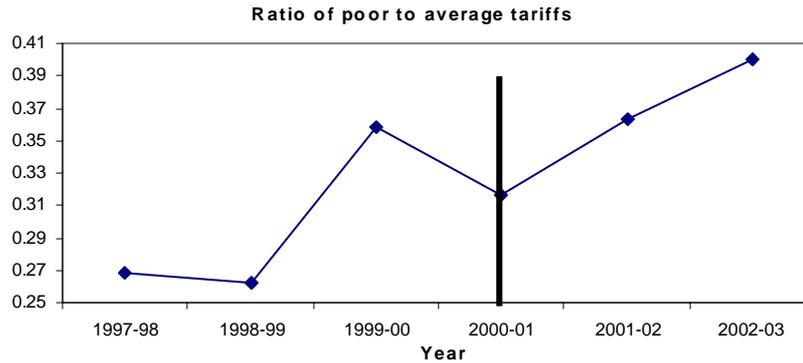
- 4.11.13 Electricity tariffs can be used as an indicator for the affordability of electricity for various income groups. As discussed earlier, the lowest band of consumers paying the lowest tariffs are considered poor in the study. However, the Commission was of the opinion that currently 77% of the household consumers fall under this category and it is not necessary that all the consumers cannot afford the true cost of electricity. Therefore, the Commission in its first tariff order has introduced a separate lifeline slab for families identified under the AAY (Antyodaya Anna Yojna) scheme<sup>26</sup> of the Government of Himachal Pradesh within the domestic category.

<sup>26</sup> A National Sample Survey exercise reveals that about 5% of the total population in India sleeps without two square meals a day. This section of the population can be called 'hungry'. In order to make the (Public Distribution System) more focused and targeted towards this category of

- 4.11.14 The Commission was of the belief that under the existing system put in place by the Government of Himachal Pradesh to identify the underprivileged classes, the families have been properly targeted and deserve sympathetic consideration. So, the benefit of the concessional tariff will 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.
- 4.11.15 However, following pressure from the state government the new tariff slab was withdrawn and the old slab reintroduced. The government's reluctance to increase the tariff (to reflect the cost of supply) for the non-poor implies political favouritism towards them.
- 4.11.16 Further, in conformity with the reform mandate, the Commission has increased the tariff for the poor (as per our definition, consumers consuming less than 45 units per month) 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 14).

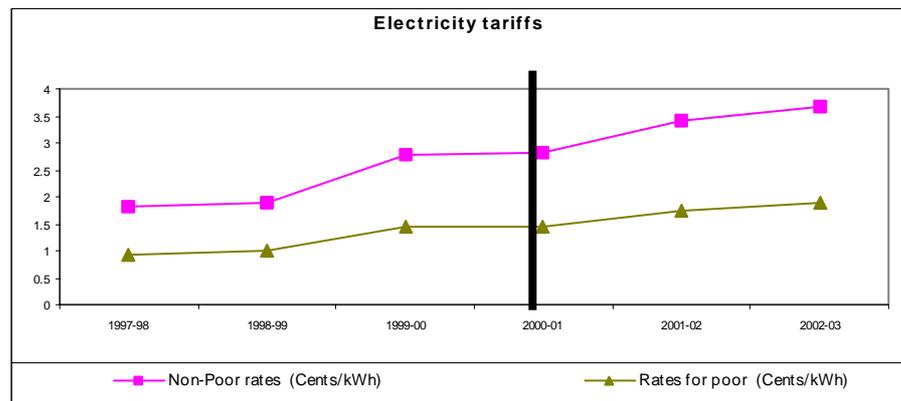
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population, the prime minister launched the AAY on 25 December 2000. PDS has always been supplemental in nature and has never met the full requirements of any section of the people. Thus, the benefits of subsidy have to be thinly spread among 65.2 million BPL families on the basis of the projected population, as on 1 March 2000. AAY contemplates identification of 10 million of the poorest families out of a total of 65.2 million BPL families covered under PDS. These identified families are currently being provided 35 kilogrammes food grains per family per month at highly subsidized rates of 2 rupees per kilogramme for wheat and 3 per kilogramme for rice. Detailed guidelines were issued to the states/ for the Union Territories identification of the Antyodaya families and implementation of the scheme and AAY has been implemented in all states/Union Territories in the country.



**Figure 14: Ratio of tariffs**  
Source: Authors analysis (HPERC 2001)

4.11.17 However, it would be inappropriate to conclude that the poor (as per our definition) cannot afford the current tariff. As of now, neither the Commission nor the utility has conducted any study on the affordability or the willingness to pay. So it would be difficult to conclude that the increase in tariff for the poor will hamper electricity access as tariff for the poor is still less than the average and non-poor tariff (Figure 15).



**Figure 15 Electricity tariffs (average realisation per kWh)**

Source: Authors analysis (HPERC 2001)

## Subsidy and cross-subsidy

4.11.18 The Commission in its tariff order has recognized that the burden of high tariffs for industrial consumers has led to a shutting down of industries and this 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 18).

**Table 18 Convergence Index**

| Description           |         |
|-----------------------|---------|
| CI at existing tariff | 0.08672 |
| CI at revised tariff  | 0.08515 |

- 4.11.19 However, the tariff revision for residential consumers (other than the consumers under AAY) was withdrawn after pressure from the state government as government was reluctant to scrap the lifeline rates for consumers other than Antyodya families. This reflects the government's ignorance in targeting subsidy for the poor because of the political bias for non-poor consumers.
- 4.11.20 Further, the government 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.
- 4.11.21 The net impact of this rollback on HPSEB's finances was around 1.07 dollars million<sup>27</sup>. This amount could have been utilized for providing the additional 28 831 connections to the poor households<sup>28</sup>.
- 4.11.22 It can be concluded that the government has not extended any direct subsidy to the marginal consumers. However, the government has mentioned, in one of its correspondences with the Commission, that it is already providing an indirect subsidy of 38.71 million dollars. This comprises 7.41 million dollars worth of 12% royalty being waived for hydro projects under the control of the Board, a subsidy of 8.65 million dollars on account of lower rate's being charged for free power being made available from other hydro projects, and an interest subsidy to the tune of 22.65 million dollars.
- 4.11.23 This indirect form of subsidy is not specifically targeted at the poor as the benefits go to the non-poor too. This practice should be discouraged and clearly defined policies for the poor should be introduced in the state.

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<sup>27</sup>This amount is the difference between revenue from the Commission approved tariff and revenue from the actual tariff.

<sup>28</sup> Assuming cost per connection as 1800 rupees (37 dollars)

## Conclusion

- 4.11.24 Post-reforms, it is observed that 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 and 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 clear government policy regarding subsidy is the need of the hour. This becomes more important in view of the fact that the current form of indirect subsidy will benefit the non-poor more than the poor.
- 4.11.25 Linking lifeline rates with the income-poor was an innovative concept that helped in targeting subsidy (in this case cross-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. The above incident suffices to prove that the regulatory functioning is by no means sabotage-proof. The threat of yielding to pressures political accommodation remains.

## 4.12 Indian summary and Conclusion

- 4.12.1 In India, the reform process was adopted without any provisions for enhancing electricity access for the poor. Neither the central Act (ERC Act [1998]) nor the individual state reform act/policy has explicitly mentioned the universal service obligation of electricity.
- 4.12.2 It is evident from the Orissa case that electricity access for the poor has declined after the privatization of electricity distribution. The policy has ignored to provide incentives to the private utility to supply electricity to the poor and at the same time no government support was provided to enhance access to electricity.
- 4.12.3 In the case of Karnataka, the regulatory commission is following the mandate of aligning tariff with the cost of supply and the reduction of cross-subsidy. The budgetary support from the state government has increased in the post-reform era. The State Government of Karnataka is planning to privatise the electricity distribution business. Some lessons

from Orissa (and The Philippines) can be learnt before going ahead with privatization.

- 4.12.4 In Himachal Pradesh there has been no identification of the poor, and the non-poor consumers also enjoy the benefits of cross-subsidy. This case also reflects the issue of the lack of independence of the regulatory commission. This is evident from the rollback of tariff increase for the non-BPL consumers and because of this the utility has suffered financial losses.
- 4.12.5 In the Philippines, the case is entirely different. The Act clearly defines marginalized consumers (poor consumers) and need for lifeline rates. Similarly, the Act clearly mandates a rural electrification programme, which is discussed in the following.

# 5 Assessment of selected reform option: The Philippines case study

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## 5.1. Description of the reform process

- 5.1.1 Electricity was first introduced in the Philippines in 1890. In the decades that followed, private companies were largely responsible for the development and control of electricity supply, while the government regulated installation. In 1936, the NPC (National Power Corporation) was created to develop the country's hydroelectric resources.
- 5.1.2 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.
- 5.1.3 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.
- 5.1.4 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.
- 5.1.5 The Philippines sustained severe power outages and burnouts during 1992–93, compelling the government to look again at the power sector reform. In response to this crisis, BOO (build-own-operate) or BoT (build-own-transfer) contracts were signed between NPC (National Power Corporation) and IPPs (Independent Power Producers). It was envisaged that this would permit quick expansion of power generation capacity and improve the reliability and 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.

- 5.1.6 Subsequently, two major reforms were envisaged in late 1990's— the restructuring of the electricity supply industry and the privatization 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.
- 5.1.7 After six years of debate, the EIRA (Electric Industry Reform Act) was passed in 2001. The Act mandates restructuring of the electric power industry and the privatization of the state-owned NPC. The legislation was also designed to prevent the creation of a private monopoly by capping the maximum market share for any one generator and limiting self-dealing between distribution utilities and their affiliated generation companies. It also opened wholesale spot market for generators. EIRA aimed to also 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 also enabled the creation of an independent regulator in 2001.

### *Rural Electrification Co-operatives in the Philippines*

- 5.1.8 Total electrification of the country was declared a national policy objective by the Philippines government in 1960 and thereby the EA (Electrification Administration) was created. To encourage private sector participation, the government awarded private companies franchises to set up local distribution systems in rural areas. These private companies sourced power either by generating their own or by making bulk purchases from NPC.
- 5.1.9 By 1969, EA had helped to establish 217 small systems, each with fewer than 500 kW (kilowatts) of capacity throughout the country. However, technical and financial problems caused many of these systems to shut down (ESMAP 2002) <sup>29</sup>. By the early 1970s, only about 18% of the Philippines population had access to electricity.

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<sup>29</sup>A joint study was conducted by UNDP (United Nations Development Programme)/World Bank ESMAP (Energy Sector Management Assistance Programme) on 'Rural electrification and development in the Philippines: measuring the social and economic benefits'.

- 5.1.10 Thereafter, NEA (National Electrification Administration) Act was passed in 1969, which designated RECs (Rural Electrification Corporations) as the country's primary electricity distribution system and NEA, which replaced EA, was set up as the implementing agency. RECs were to act as self-governing distribution agencies operated by buying bulk electricity from NPC. NEA was granted power to establish and oversee RECs, to make loans, acquire physical property and franchise rights of existing suppliers, and borrow funds to implement national electrification.
- 5.1.11 Involvement of local communities was a key element in the planned rural electrification programme. By using the co-operative approach, the programme could devolve management to the local level, whereby local communities could actively participate in the system. RECs were responsible for running, maintaining, and expanding the local electricity system. The tariffs they collected were to cover all operational costs and loan repayments to NEA.
- 5.1.12 During the 1970s, the rural electrification programme expanded quickly as a result of strong government support and financial assistance from international banks and donor agencies. By 1980, 120 RECs had been established, servicing more than one million customers
- 5.1.13 However, with such rapid expansion, major problems soon emerged and began to escalate (ESMAP 2002). Many RECs were established in non-viable areas and were managed within a culture of political patronage and political pressure. Unrealistically low tariffs, poor payment collection levels, and poor electricity systems were other problems affecting the ailing system. These problems continued and worsened during the 1980s.
- 5.1.14 A crisis ensued with a decline in international-agency grants and loans and substantial financial losses for both NEA and RECs. Co-operative customers began to default on their REC loans. In turn, the failure of RECs to repay their NEA loans became widespread, as a result of which NEA went bankrupt in 1989.<sup>30</sup>

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<sup>30</sup> The ESMAP study also refers to another study conducted by the World Bank in 1989 (World Bank 1989). This assessment found that most RECs faced operational and financial challenges. Only 22 (18.8%) of the 117 RECs were categorized as well-managed and commercially viable; 24 (20.5%) as within the reach of commercial viability; and the remaining 71 (60.7%) as needing substantial remedial action or beyond rescue. The World Bank report concluded that the problems are so pervasive that they cannot be addressed by simple solutions rather the government will need to implement an integrated programme to revitalize the sector. That programme should have three essential components: (a) a comprehensive restructuring of the sector's core institution— the National Electrification Administration; (b) a broad programme of institutional reform featuring

- 5.1.15 To overcome this crisis, the government and NEA introduced financial restructuring of the sub-sector, institutional and policy reforms, and stricter accountability for RECs. Major steps were taken to reorganize and de-politicize RECs. Some RECs merged to become more viable organizations and in 1990, a new tariff formula was introduced to make the RECs financially more viable. Despite such reforms, several RECs continue to face financial problems due to non-lucrative tariffs (ESMAP 2002).
- 5.1.16 Subsequently, the government of the Philippines passed the Electric Industry Reform Act (The Republic Act [9136]) in June 2001. The new legislation laid down 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.
- 5.1.17 More recently, the government of the Philippines has aimed for the total electrification of all villages by the year 2006. The government 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 law Programme,<sup>31</sup>' the programme consolidates the regular programmes undertaken by NEA/electric co-operatives, NPC SPUG, and DoE and other agencies of the government with a complementary programme, which seeks to maximize participation of the private sector in rural electrification projects. 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.

**Box 5. Chronology of events in the Philippines power sector reforms**

|       |  |
|-------|--|
| 1900s | Integrated electric utilities  |
| 1936  | NPC (National Power Corporation) created   |
| 1970  | Electric co-operatives created<br>NPC develops nationwide grid<br>Generation nationalized to NPC |

some financial restructuring of the 117 RECs that are responsible for distributing electricity to smaller urban centres, towns, villages, and rural areas nationwide; and (c) a thorough refocusing of operational practice and investment priorities.

<sup>31</sup>The Programme started in 1999 with the mandate of rural electrification but took off actively in 2000.

|               |  |
|---------------|--|
| 1980s         | National Electricity Administration created to control rural co-operatives<br>Massive blackouts in late 1980s  |
| 1990s         | BOT (build-operate-transfer) law passed<br>Luzan and Visayas created<br>IPPs negotiated  |
| 2001          | Power Reform Act passed <ul style="list-style-type: none"> <li>• Creation of National Transmission Company</li> <li>• Creation of Power Sector Asset and Liabilities Management Corporation</li> <li>• Creation of WESM (Wholesale Electricity Spot Market)</li> <li>• Privatization of the NPC</li> <li>• Open access subject to pre-conditions</li> <li>• Creation of a new energy regulatory commission</li> <li>• Competitive generation through creation of several generating companies</li> </ul> |
| February 2002 | <ul style="list-style-type: none"> <li>• Regulated transmission and distribution: unbundling of electricity rates for transparency</li> </ul>  |
| June          | <ul style="list-style-type: none"> <li>• Competitive retail electricity providers through opening up of high voltage transmission for easy access of distributors and large consumers</li> </ul>   |
| June 2002     | <ul style="list-style-type: none"> <li>• End-users: open access of distribution lines for competitive consumers</li> <li>• Promulgation of WESM rules</li> </ul>   |

## 5.2. Reform Mandate

### *Cost of supply and cross-subsidy*

5.2.1 The Act mandates that the rates determined are to be free from all inter-grid and intra-grid subsidies in the case of NPC and all inter-class subsidies<sup>32</sup> in the case of the distribution utilities. In other words, the rate structure shall reflect the true cost (free of subsidies) of serving each customer class. It shall be done gradually (three years) to lessen its impact on the consumers. It may inflate or reduce the electricity bill of consumers because the subsidy costs will be shifted from one customer to another. Subsidized consumers will bear the brunt of the increase in rates as the subsidizing consumers will be relieved from the cross-subsidies.

5.2.2 However, the Act provides for lifeline rates<sup>33</sup> for low-income end-users to balance the social impact of the rates on the marginalized sections of

<sup>32</sup> As per section 74 of Republic Act (9136) 'cross subsidies – cross subsidies within a grid, between grids, and/or classes of customers shall be phased out in a period not exceeding three (3) years from the establishment by the ERC of a universal charge, which shall be collected from all electricity end-users. Such level of cross-subsidies shall be made transparent and identified separately in the billing statements provided to end-users by the supplies rupees.

<sup>33</sup> As per Section 73 of Republic Act (9136) 'Lifeline Rate – A socialized pricing mechanism called a lifeline rate for the marginalized end-users shall be set by the ERC, which shall be exempted from the cross subsidy phase-out under this Act for a period often (10) years,

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<sup>34</sup> to other consumers. This fund will be used for subsidizing the lifeline rates and the extension of electricity services to remote and un-electrified areas.

### *Efficiency improvement and government's role*

- 5.2.3 Under this 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 including operating expenses and rate base so that the required transparent retail rates can be determined for each category of service and each customer class. 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 Cents /kWh for residential consumers.
- 5.2.4 Further, the Philippines legislation mandates that the system losses of the utilities are maintained and capped as prescribed in the earlier Act.<sup>35</sup> The Act provides power to the ERC to monitor the costs and to assure that expenses like operation and maintenance, wage adjustment clause, and allowances are prudent such that productivity and efficiency in the system increases.
- 5.2.5 The reform act also mandates expansion and upgradation of electrification in the Philippines.<sup>36</sup> 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

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unless extended by law. The level of consumption and the rate shall be determined by the ERC after due notice and hearing.'

<sup>34</sup> Section 35 (b) and (e) of 9136 Act states 'Universal Charge. – Within one (1) year from the affectivity of this Act, a universal charge to be determined, fixed and approved by the ERC., shall be imposed on all electricity end-users for the following purposes:

(b) Missionary electrification (rural electrification);

(e) A charge to account for all forms of cross-subsidies for a period not exceeding three (3) years'

<sup>35</sup> Electric co-operatives are allowed to recover only up to 14% system loss and up to 1% of company use. The Commission emphasized, however, that company use should not include the personal use of its board of directors, officers, and staff.

<sup>36</sup> The ERC Decision on 4 Co-operatives Unbundling grants a provision for reinvestment, equivalent to 5% of the gross revenue which shall be used by ECs to finance expansion and rehabilitation/upgrading of its existing electric power systems. This fund, however, will be closely monitored so that it is used only for capital expenditures and not for operating expenses.

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.

- 5.2.6 The legislation further mandates the National Electricity Administration to develop and implement the following programmes.
- To prepare electric co-operatives to operate and compete under the deregulated electric market within five years from implementing of this Act, specifically in an environment of open access and retail wheeling.
  - To strengthen the technical capability and financial viability of rural electric co-operatives.
  - To review and upgrade regulatory policies with a view to enhance the viability of rural electric co-operatives as electric utilities.
- 5.2.7 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).

### **5.3. Assessment of the impact of reform option on the poor by using various indicators**

#### *Definition of poor and policy context*

- 5.3.1 For the purpose of the study, the marginalized end-users are considered the poor consumers. These consumers are referred to as 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.
- 5.3.2 Further, 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

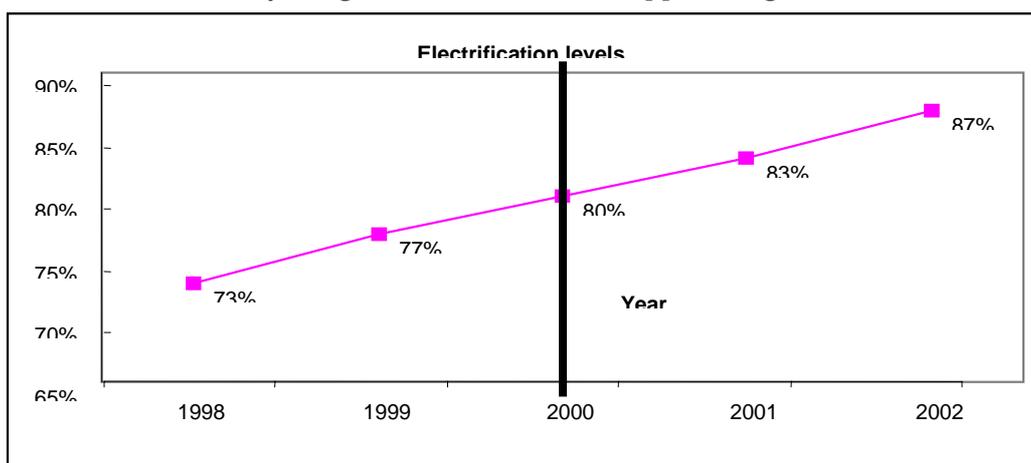
levels of electricity. It is the responsibility of the ERC to monitor the compliance to specific guidelines and the implementation of lifeline rate. As per the guidelines laid down in the act:

- The lifeline rate shall be exempt from the cross-subsidy removal under the Act for a period of 10 years, unless extended by law.
- Each distribution utility shall file a petition with the ERC recommending the level of consumption (kWh per month) to be qualified for the Lifeline Rate.
- The ERC will determine and approve different levels of consumption and cross- subsidy support for each distribution utility or classification of distribution utilities.

### *Electrification levels and rates*

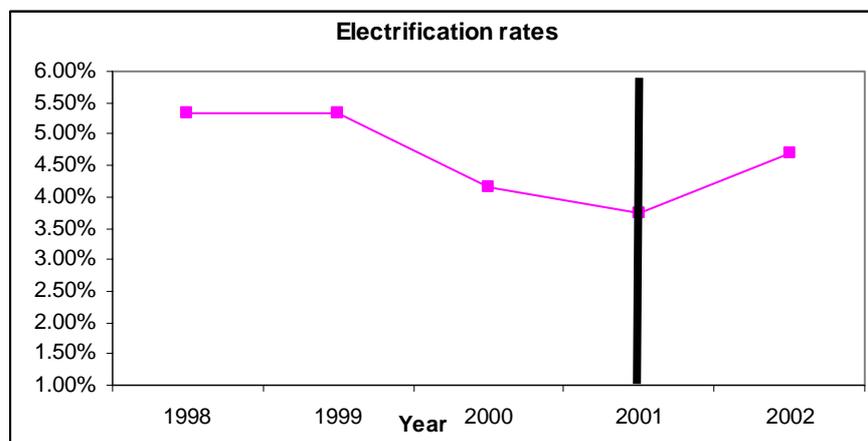
5.3.3 Ideally, to assess the impact of reforms on the electrification levels of the poor, one should observe the pre-and post-reforms levels of electrification of marginalized end users. However, due to limited time and budget constraints, we were not able to gather the time series data on the marginalized consumers and other residential consumers in the Philippines. Thus, in this phase of the study, we are considering the electrification level of barangays (villages) as a proxy to access the impact of reforms on the poor.

5.3.4 It is seen that the barangay electrification level 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 clearly illustrates the positive impact of the Accelerated Rural Electrification Programme undertaken by the government of the Philippine (Figure 16).



**Figure 16 Overall Electrification levels in the barangays**

5.3.5 Similarly, the electrification rates in the pre-and post- reform period increase exhibiting almost similar trend, except for 2001 where there is a dip (Figure 17).



**Figure 17 Overall Electrification rates in Barangays**

5.3.6 Further, as mentioned earlier, the O-I Law Programme has set specific targets for rural electrification till the year 2006 (Table 19).

**Table 19 Performance and implementation schedule for O-I Law programme during 1999-2006**

| Year          | Annual target | Cumulative number of barangays | Barangay Elect. level |
|---------------|---------------|--------------------------------|-----------------------|
| 1999 (actual) | 755           | 32281                          | 76.9%                 |
| 2000 (actual) | 1366          | 33647                          | 80.1%                 |
| 2001 (actual) | 1253          | 34900                          | 83.1%                 |
| 2002          | 1636          | 36536                          | 87.0%                 |
| 2003          | 1665          | 38200                          | 91.0%                 |
| 2004          | 1700          | 39900                          | 95.0%                 |
| 2005          | 1095          | 40995                          | 97.6%                 |
| 2006          | 1000          | 41995                          | 100.0%                |
| Total         | 7095          | -                              | -                     |

Source: Department of Energy, The Philippines

5.3.7 Since the inception of the programme in 1999, the O-I law Programme has been able to energize barangays at the rate of 1000 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).<sup>37</sup>

### *Per capita consumption*

- 5.3.8 To access the impact of electricity reform on the poor, one would require pre-and post-reform data on the per capita consumption. However, data for the pre-reform era is currently not available in the required format. This gap could be filled in the next phase of the study. Meanwhile, for the pre-reform period we have used the results of the survey carried out in six barangays in the Philippine's largest distribution company Manila Power Corporation (Meralco). The survey results pointed out that the average electricity consumption was 891.6 kWh/ annum (or 75 kWh/month) in 2000.
- 5.3.9 During the post-reform era, the per capita consumption by the poor is 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 (Table 20).

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<sup>37</sup>A group of socially responsible chief executive officers of leading business firms in the country.

**Table 20 Electricity consumption per household per month (kWh) in the year 2002-03**

|           | Marginalized consumers | Non-marginalized consumers | Average consumption |
|-----------|------------------------|----------------------------|---------------------|
| MERALCO   | 24.0                   | 235.5                      | 200.2               |
| VECO      | 27.6                   | 216.5                      | 157.6               |
| SORECO I  | 9.7                    | 68.1                       | 48.4                |
| PANELCO I | 11.6                   | 77.6                       | 60.7                |
| PELCO I   | 13.1                   | 124.9                      | 106.6               |
| CEBECO II | 13.7                   | 86.5                       | 64.8                |
| BATELEC I | 10.9                   | 96.2                       | 80.7                |
| SIARELCO  | 11.3                   | 64.7                       | 44.6                |
| ZANECO    | 10.7                   | 153.8                      | 123.5               |
| QUIRELCO  | 20.8                   | 74.5                       | 55.8                |
| Total     | 19.7                   | 205.3                      | 169.2               |

- 5.3.10 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.
- 5.3.11 Further, comparing the pre-and post-reform scenario, average per household consumption in the Meralco area, would indicate that the average consumption level has increased substantially during the post-reform era. We can conclude that during the post-reform era the overall consumption level has increased in The Philippines.

### *Electricity tariff*

- 5.3.12 In determining the lifeline level of consumption for the marginalized end-users in the electric co-operatives area, the Commission calculated 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. Further, the number of hours of electricity supplied varies across the areas and accordingly the marginalized consumption level varies in these areas.
- 5.3.13 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 21).

**Table 21 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%         |

5.3.14 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. The consumption levels and discounts offered to the consumers are shown Table 20.

**Table 22. 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%    |

5.3.15 For the above utilities, the time series 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.

5.3.16 The average rate for the Meralco area has increased from 10.73 cents per kWh in December 2001 to 12.12 cents per kWh in June 2003 (Table 23).

**Table 23 Average rate for the Meralco area**

|         | ERC order<br>2001 | ERC order<br>2003 | % increase |
|---------|-------------------|-------------------|------------|
| MERALCO | 10.73             | 12.12             | 12.88%     |

| Consumption | Lifeline |
|-------------|----------|
|-------------|----------|

| block  | discounts |
|--------|-----------|
| 0-50   | 50%       |
| 51-70  | 35%       |
| 71-100 | 20%       |

- 5.3.17 Despite the average increase in tariff, there is a reduction in the tariff for residential consumers. The Commission in the tariff order (ERC 2003) has 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.
- 5.3.18 Further, in March and May 2003, the ERC (Energy Regulatory Commission) has issued provisional authorities to 17 rural electric co-operatives directing them to reduce the rates being charged to all customer classes. The Commission mentioned in the tariff orders (ERC May 2003) that, under Republic Act No. 9136, ERC is mandated to ensure a reduction in the rates of electric co-operatives commensurate with the resulting savings due to the condonation of their loans. Therefore, we can conclude that during the post-reform era the electricity tariffs for the poor have gone down.

## **6** Summary and recommendations

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### **6.0 Summary and recommendations**

- 6.0.1 The Indian economy has undergone a structural change over the past decade with a liberalized policy for many sectors. Liberalization also 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.
- 6.0.2 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 the provisions for the extension of electricity services to the poor and the need and mechanism for subsidizing marginalized consumers. The Indian Reform Act does not even contemplate rural electrification and upgradation of systems.<sup>38</sup> This forms a major lacuna in the Indian reform model and there is a need to make appropriate policy and legislative changes to address the electricity needs of the large poor population of the country.
- 6.0.3 Further, in India, the agricultural and poor residential consumers (falling in the lowest band of consumption) are not metered and very often, the consumption by these categories is inflated to show lower commercial losses. This means the 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 (transmission & distribution) losses but does not prescribe the means for achieving this reduction. For example, the legislation does not mandate 100% metering and curbing of thefts and pilferage. Once all the consumers are metered

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<sup>38</sup> In Orissa, rural electrification and services to existing rural areas were neglected after the privatization of distribution.

it would be possible to separate T&D losses and actual consumption by unmetered categories.

- 6.0.4 In contrast to the Indian reform legislation, the Philippines legislation clearly consumers, provision of lifeline rates for poor and treatment towards 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.
- 6.0.5 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 embarked on an electrification plan, which aims to utilize new and renewable energy to bring electricity to remote and relatively inaccessible barangays. Dubbed as 'O-I Law Programme'<sup>39</sup> the programme consolidates the regular programmes undertaken by NEA (National Electrification Administration)/electric co-operatives, NPC (National Power Corporation) SPUG (Small Power Utilities Group) and DOE (Department of Energy) and other agencies of the government with a complementary programme, which seeks to maximize the participation of the private sector in rural electrification projects.
- 6.0.6 Indian policy-makers can draw useful lessons from the Philippines experience to enhance electricity access in the country. There is need to have a proactive legislation that addresses issues linked to 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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<sup>39</sup> The Programme started in 1999 with a mandate of rural electrification but kicked off more in 2000.

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## List of Acronyms and Abbreviations

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|         |  |
|---------|--|
| BESCOM  | Bangalore Electricity Supply Company Ltd                 |
| BJ      | Bhagya Jyothi (consumers)                                |
| BOO     | Build-Own-Operate  |
| BOT     | Build-Operate-Transfer                                   |
| BPL     | Below Poverty Line                                       |
| CAGR    | Compounded Annual Growth Rates                           |
| CEA     | Central Electricity Authority                            |
| CERC    | Central Electricity Regulatory Commission                |
| CI      | Convergence Index  |
| DOE     | Department of Energy                                     |
| ERC     | Energy Regulatory Commission                             |
| ESCOMs  | Electricity Supply Companies                             |
| GESCOM  | Gulbarga Electricity Supply Company                      |
| GRIDCO  | Grid Corporation of Orissa Limited                       |
| HESCOM  | Hubli Electricity Supply Company                         |
| HPSEB   | Himachal Pradesh State Electricity Board                 |
| KERC    | Karnataka Electricity Regulatory Authority               |
| KJP     | Kutir Jyothi Programme                                   |
| KRC     | Karnataka Regulatory Commission                          |
| kWh     | Kilo Watt Hour   |
| Meralco | Manila Electric Company                                  |
| MESCOM  | Mangalore Electricity Supply Company                     |
| MPCE    | Monthly Per Capita Expenditure                           |
| NEA     | National Electrification Association                     |
| NPC     | National Power Corporation                               |
| NRECA   | National Rural Electrification Co-operatives Association |
| OERC    | Orissa State Electricity Commission                      |
| OPGC    | Orissa Power Generation Corporation                      |
| OSEB    | Orissa State Electricity Board                           |
| PSALM   | Power Sector Assets and Liabilities Management Corp.     |
| REC     | Rural Electrification Corporation                        |
| SEB     | State Electricity Board                                  |
| SERC    | State Electricity Regulatory Commission                  |
| SPUG    | Small Power Utilities Group                              |



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