

# A Review of Indian Power Sector Pre and Post-Reforms

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## ABSTRACT

*Power sector plays an essential part in the economic progress of a nation and it is important to provide for sufficient electricity to provide for appropriate growth outcomes. Power sector in India in the pre-independence period was plagued with operational deficiencies like shortages in peak demands of electricity and improper planning of available resources. As a result, there were certain initiatives by the government post-independence to revive the dwindling sector but results were not up to the mark. There were a set of reforms post 1990s again which were implemented with a vision to achieve the required results but to no avail. Reasons behind the apparent failure of reforms have been cited as poor design of reforms and improper allocation of responsibilities. The paper here attempts to review the existing literature and looks at the need of power sector reforms and the path of unfolding of those reforms in India. It further explains the relevant structure of a reform process and why most of the initiatives undertaken did not yield the much awaited outcomes.*

## Keywords

*Electricity, plant load factor (PLF), power sector, sustainability, Transmission and Distribution (T&D) losses.*

## 1. INTRODUCTION

Power sector in developing countries in general and India, in particular is deeply linked to the opportunities available in the sphere of private investment. The performance of power sector pre-reforms was in a very bad condition with dwindling access to electricity and increasing peak demand shortages. With the advent of deterioration of Indian power sector, the reforms were introduced in 1990s with an aim to revive the sector. They were introduced to make sure that the working of power sector becomes more organized and its share in the total output of the country increases to some extent. The reforms though did not serve the required and desired results. The major issue with the

reforms has been an implementation issue which is that the policies were not applied as they were supposed to when they were introduced. The gaps in implementation are due to the rampant power thefts and loss of power during transmission and distribution. The “transmission and distribution (T&D) losses” very well indicate the lack of quality of power due to the inherent unwillingness of the politicians to implement laws and policies. Along with implementation, there are issues with institutional framework where the reforms were not perceived beneficial by the public because there were no visible positive impacts. During the 1990s, India was in a severe condition of political instability and power sector being under the control of state, politicians took away the major chunk of benefits accrued from reforms directly or indirectly leaving very little for the general public [1]. This paper is divided into six sections. It begins with providing the review of existing studies on Indian power sector reforms. Section 3 explains the trends in power sector during the pre-reforms period and defines the need of reforms. Section 4 explains the important elements in a reform model which is that any reform process should strive to offer economic viability, political and social acceptability along with taking care of the environmental aftermaths of the reform and further section 5 describes the evidences of the failure of reforms giving the possible reasons of the deterioration of the Indian power sector. Section 6 concludes the paper followed by the future scope and references.

## 2. REVIEW OF STUDIES CONDUCTED IN CONTEXT OF POWER SECTOR REFORMS

Table 1 depicts a review of existing relevant literature regarding the Indian power sector performance pre and post-reforms.

**Table 1: Review of work done on the Indian power sector performance**

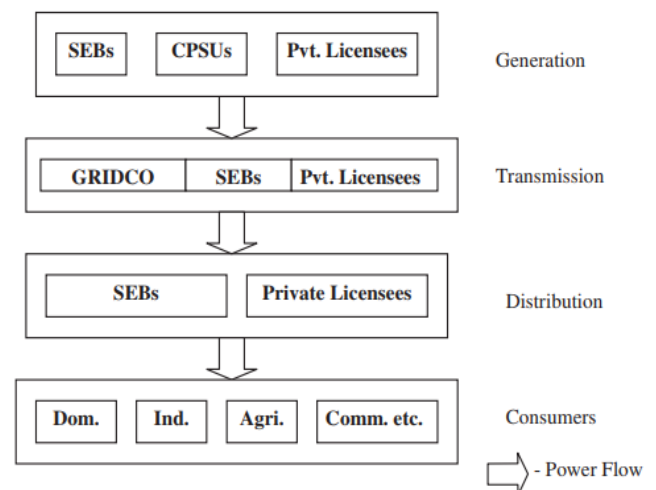
| Paper                     | Theme   | Limitations   |
|---------------------------|---|---|
| Zhang et al 2008 [2]      | <ul style="list-style-type: none"> <li>Looks at the impact of power sector reforms on labor productivity and capacity generation.</li> <li>Gives competition as solution to enhance electricity generation through econometric analysis.</li> </ul> | The paper presents competition as a solution of our problem but transparent and healthy competitive markets cannot be achieved by regulation schemes which are not specified in the paper.  |
| Singh 2006 [3]            | <ul style="list-style-type: none"> <li>Depicts power sector reforms in a positive light because they increased access for private investors as well.</li> </ul>   | Does not mention the sustainability of reforms, considering energy sector has the highest share in pollutants emission. Private sector participation leads to increased fuel imports hence foreign exchange risks.                  |
| Bhattacharya 2007 [4]     | <ul style="list-style-type: none"> <li>The poor performance of reforms has been gauged in this paper where reasons cited are poor implementation and designing</li> </ul>   | Does not discuss the bad effects of shifting investments from public to private where private investment is a voluntary phenomenon.   |
| Srivastava et al 2017 [5] | <ul style="list-style-type: none"> <li>Compares the power sector policies undertaken in USA, Latin America, New Zealand, South Africa etc. and provides the Indian experience for the same.</li> </ul>  | It does not take into account the fact that copying lessons from developed countries may not be a sure solution for India. Proper enforcement of reforms requires correct steps along with acceptance of the reforms by the public. |

### 3. THE NEED OF REFORMS

Electricity just like any other infrastructure is a very vital component in augmenting economic growth of a country like India. There was an urgent need to reform because the performance of power sector was deteriorating day by day. The per capita electricity consumption in India was much lesser than other countries like USA. Peak demand shortages were faced along with operational inefficiencies especially in the “Transmission & Distribution System” [3].

The initial steps post-independence was coming up of the legislation which is “Indian Electricity Supply Act, 1948” that promoted a state owned structure for the electricity sector by creating the “State Electricity Boards (SEBs)”. Even though the situation improved but there were problems like huge energy deficiency, poor plant load factor (PLF) and bad condition of financial utilities [6].

Figure 1 describes the structure of Indian power sector before the reforms came up. The major generators of electricity were “State Electricity Boards (SEBs)”, “Central Public Sector Undertakings (CPSUs)” and others including those with private licenses. The implicit functioning of SEBs was plagued with inefficiencies like lack of proper planning and improper resource allocation due to the problem in the division of responsibility between the Centre and state governments [8].



**Figure 1. Indian power sector pre-reforms [7]**

### 4. ESSENTIAL ELEMENTS FOR LONGEVITY OF REFORM MODEL

Any reform process needs to be financially viable, socially and politically acceptable along with the capacity of being implemented practically for it to be sustainable in the long run as described in Figure 2.

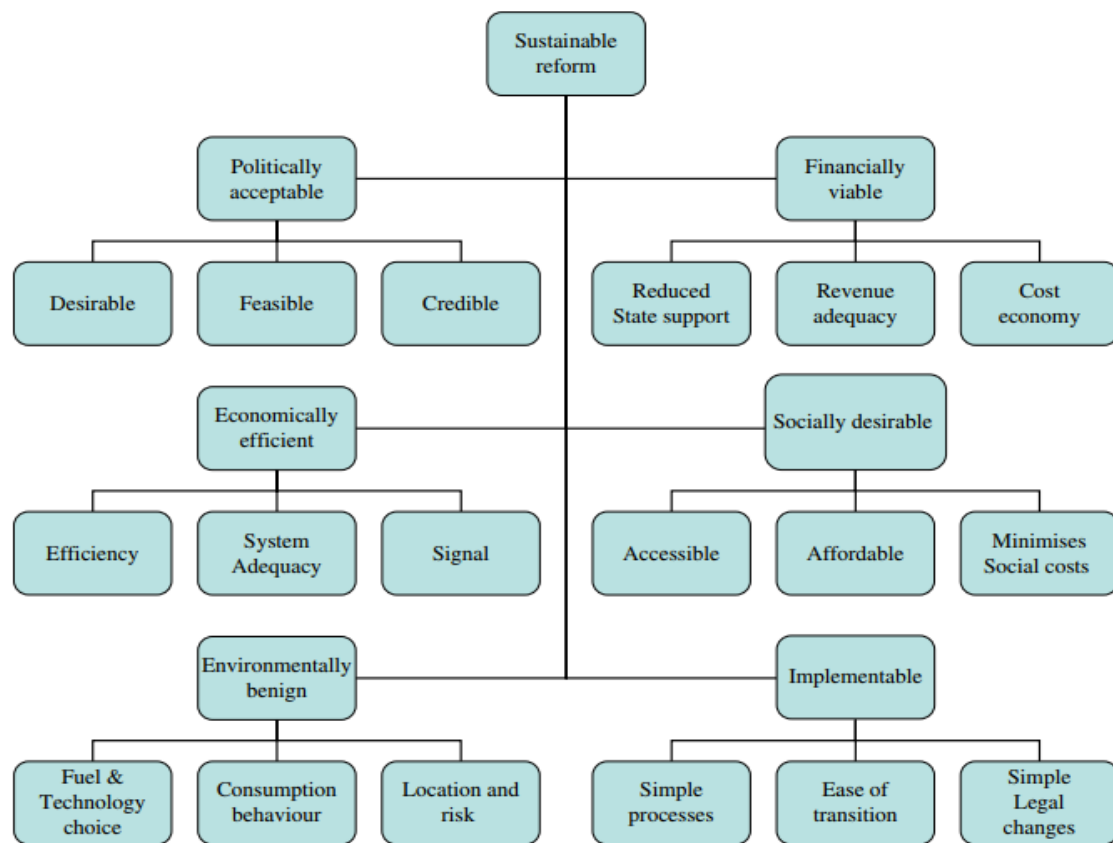


Figure 2. Conditions for reform process to work in the long run [6]

The required conditions for longevity of reform process in the case of power sector goes as follow:

**4.1. Economic viability**

The main issue to be resolved by the reforms was the improvement of financial utilities and reducing system losses especially in the states of Orissa and Haryana but nothing like that happened because the tariff fixed by regulators was as against the T&D losses of 30% whereas the actual losses were around 50% and hence the utilities had to bear the increased burden.

**4.2. Political and social acceptability**

The acceptability of reforms in a political sphere was affected by the uncertainty in the government matters during 1990s. With the entry of “independent power producers (IPPs)”, the sector was open for private investment and there was lack of political cohesion at the base level. Providing subsidized electricity to the rural households was one of the thought-process in the reform cycle but the major hurdle faced was the lack of funds to be provided to the electricity suppliers. Without those

funds, such a subsidy burden will no longer be acceptable [6].

**4.3. Environmental sustainability**

There has not been ample evidence of environmental benefits from the power sector reforms in India. The introduction of “independent power producers (IPPs)” was with an intention to look after the environmental aspect of the reforms but since the reach of IPPs has been very low, no evident impacts are there. Also, people majorly are dependent on coal for combustion which is poor in energy intensity [6].

**5. SCENARIO OF INDIAN POWER SECTOR REFORMS**

The reforms in power sector were many and they began from the year 1990 when it was realized that the earlier interventions had not gained fruit. There have been major reforms but no significant results were observed. As a part of the reforms “Indian Electricity Act 1910” was amended to invite greater investment in power generation. Another important decision to improve the financial status of the

“State Electricity Boards (SEBs)” was the coming up of a regulatory framework. “Power Trading Corporation (PTC)” was set up in 1995 and it served the purpose of a negotiator between buyers and sellers (SEBs and handlers of mega projects). “State Electricity Regulatory Commissions (SERCs)” have been set up in around 22 states in India and “Central Electricity Regulatory Commission (CERC)” was set up whose main function is to regulate the tariffs of any kind of power generating companies. A competitive work arena along with a sense of transparency is required for a well- developed power sector. Distributional efficiencies were taken care of by the “Accelerated Power Development and Reform Programme (APDRP)” introduced by the union government in 2001.”The Electricity Bill 2003” was an important milestone as it gave way to more liberal laws related to generation, transmission and distribution of power for example there was a special provision of generation of license-free power in rural areas and hence major hurdles in distributive power projects were abandoned. This phase provided open access which is very crucial for the development of power sector but it comes with its own issues of pricing. Multi-year tariffs increase the cost borne by the consumers and it invites public resistance. The overall reform process has been both good and bad encompassing short term and long term gains. Figure 3 depicts how the structure of Indian power sector changed after coming up of reforms. While operational inefficiencies were treated, the electricity tariffs continued to remain high. “The Electricity Act 2003” has been the most crucial step in reforming the power sector but still it is not the answer to all the ills. Transmission flexibility alongside proper pricing is as important as any other issue of power supply and the long term sustainability depends on how fast this sector is disengaged from politics [3].

Privatization was done in the name of reforms without thinking about the institutional framework for the country. The exit of government led to funding problems. Though India has a high ranking in terms of power generation yet rural areas are far from electrification. Reforms have been in areas of attracting foreign capital and reducing state dependence but the progress in reforms has been miniscule in terms of gains. The first phase of reforms started with the coming up of “independent power producers (IPPs)” during a crucial political crisis and there was a movement of IPPs towards better SEBs. There was a lot of corruption and malpractices with high tariffs during this phase. The next phase had the “single buyer model (SBM)” which initiated in Haryana and then in Orissa. A central legislation was set up to guide other states into an agenda of reformed power sector. The change of government in Delhi in the year 2004 slowed the reform process and the growth was quite limited. There was a lot of political instability during the time of reforms. Due to the change in government various amendments were made to the reform model. Any kind of reform has a transition period and acceptance is required for it which was very low during the power sector reforms. The success factor of major reforms rests on the amount of political stability and acceptance. Prices were highly volatile and remained high [6]. Reforms is concentrated around coming up of private investments, various regulatory outlines and competitive environment. Studies indicate that shifting the ownership from state to private firms does not guarantee gains and success depends on the structure of social norms in a society. Privatization in turn depends on the effects of competition and regulation. Private investment is done only when the investor finds it lucrative and that happens if the sector is well regulated which is better access to money or organized management [2]. An individual is more likely to invest in the electricity sector if there is an independent regulating agency within a competitive environment. Also, private investment does not have a significant share behind increase in labor productivity or capacity utilization. Competition is the most crucial link to increased electricity generation and if competition is weak then there needs to be an independent regulatory agency which was absent in the Indian case [2]. Problems elevated for state utilities and the future of power sector remained quite uncertain [6].

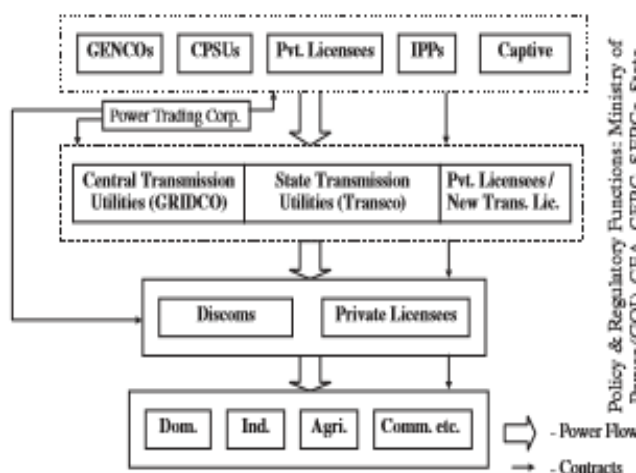


Figure 3- Indian power sector current scene [7]

There is a relationship between the state governance and power losses which affects the domestic product of the state and India. The probable reasons behind such a failure of India power sector reforms can be widespread instability during 90s which led to personal profit seeking behavioral trends in politicians that caused opportunism in the power related matters and rampant corruption [6].

Table 2. Indian power sector indicators, 1991-2002

| Year      | Plant load factor (PLF) | T&D losses | % share of power sector in GDP |
|-----------|-------------------------|------------|--------------------------------|
| 1991-1992 | 55.30                   | 22.81      | 2.50                           |
| 1992-1993 | 57.10                   | 21.81      | 2.59                           |
| 1993-1994 | 61.10                   | 21.41      | 2.43                           |
| 1994-1995 | 60.20                   | 21.13      | 2.48                           |
| 1995-1996 | 63.30                   | 22.27      | 2.47                           |
| 1996-1997 | 64.41                   | 24.53      | 2.41                           |
| 1997-1998 | 64.70                   | 24.79      | 2.48                           |
| 1998-1999 | 64.60                   | 26.45      | 2.49                           |
| 1999-2000 | 67.30                   | 31.44      | 2.49                           |
| 2000-2001 | 69.10                   | 29.90      | 2.55                           |
| 2001-2002 | 69.30                   | 28.80      | 2.53                           |

Source: [9]

The entry of IPPs is also linked with a spurt in corruption cases in power sector. The variables like T&D losses and the share of power in total GDP indicate the present instability in the power sector as shown in Table 2. The share of the power sector in gross domestic product has been very low since years and the same trend continued post reforms as well because the gains were utilized by the few powerful people of the population.

## 6. CONCLUSION AND FUTURE SCOPE

Power sector reforms in India were introduced with an intention to improve the earlier condition of the sector but the results show that there has not been any evident change. The major characteristics for a successful reform process were not satisfied by the power sector reforms. Even after imitating the other developed countries to achieve sufficiency in electricity, we continued to face high amount of corruption and technical losses which indicate the underlying political situations. The paper shows that simply implementing reforms is not the answer to the problem, it is important to implement reforms in the presence of political soundness and acceptability by general public. Every nation has a diverse structure and topography which accrues for different solutions for the same problem and similarly, to correct the institutional issues in the reforms, it is important to look for local solutions which will be in synchronization with the country. Future scope of the study of Indian power sector reforms is quite vast considering the after effects of reforms have just started to pour in even though in little amount. The full potential can be achieved only if policymakers realize that every nation requires a unique

solution to tackle the inefficiencies present in a sector and especially for a sector as important as power sector.

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