

UNBUNDLING AND COMPETITION IN INDIAN ELECTRICITY MARKET

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Abstract: The restructuring of electrical power industry has become a global trend. In electrical industry restructuring process, the main issue is to run the system in free and fair manner ensuring the desired quality of power to the consumer at most economical price through safe, secure and reliable operation of power system. The Electricity Act, 2003 tried to bring competition in Indian electricity industry by unbundling and trading into generation, transmission and distribution as a separate entities. In this paper a careful study to be carried out to analyze unbundling and competition in Indian power industry. Different models adopted by different countries and different states of India are also presented in this paper.
KeyTerms: Indian electricity market, restructuring, unbundling, competition.

I. INTRODUCTION

Restructuring of the power industry aim at abolishing the monopoly in the generation and trading sectors, thereby, introducing competition at various levels wherever it is possible [1]. Restructured electricity markets may provide opportunities for producers to exercise market power, maintaining prices in excess of competitive levels. In electric industry restructuring process, the main issue is to run the system in free and fair manner ensuring the desired quality of power to the consumers at most economical price through safe, secure and reliable operation of the power system [2]. Power development in India has been carried out predominantly by the State controlled electricity boards. Till 1990, the power sector in India was evolved as a public monopoly. The power sector was governed by the Indian Electricity Act 1910 and the Electricity Supply Act 1948. The Ministry of Power (MOP) has overall authority for power sector development. The activities of the MOP include formulating policies and plans, processing power projects for investment decisions, research and development, formulating legislation pertaining to power generation and supply, and providing the required linkages between other ministries and departments in the Central government, State governments and the planning commission. The Electricity Act, 2003, clearly focuses and calls for the deregulation of the electricity supply industry. The Electricity Act 2003 will ensure the competition in the electricity market at the wholesale level, i.e., the bulk consumers and distribution companies will now be permitted to buy power directly from any generating companies [3]. Almost all the countries are adopting deregulated industry structure [4] for better utilization of the resources and for providing choice & quality service to the consumers at economical prices resulting in transparent price discovery. Among the developing countries, the main issue

has been a high demand growth coupled with inefficient system management and irrational tariff policies, among others [5]. This has affected the availability of financial resources to support investments in augmenting generation and transmission capacities. In such circumstances, many utility are forced to restructure their power sector under pressure from international funding agencies. In developed countries, on the other hand, the driving force has been to provide customers with electricity at lower prices and to offer them a greater choice in purchasing economic energy.

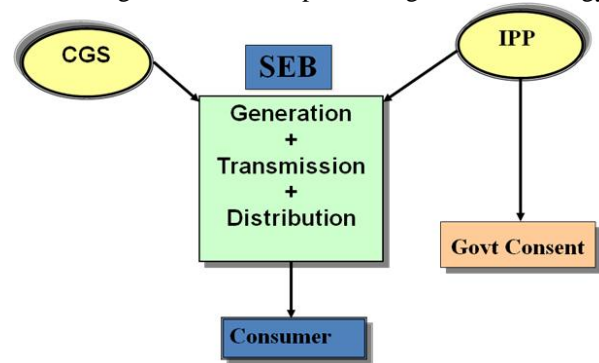


Fig1. Market structure before electricity act 2003
Reforms have been undertaken by introducing commercial incentives in generation, transmission, distribution and retailing of electricity, with, in many cases, large resultant efficiency gains. The electricity bills now reflect at least two components one from the distribution and transmission network operator responsible for the network and services, and the other from the company that generates the electrical energy.

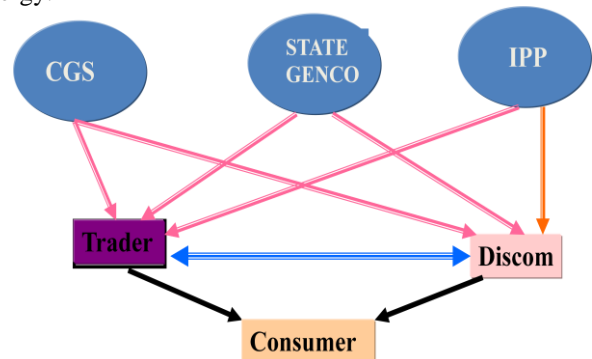
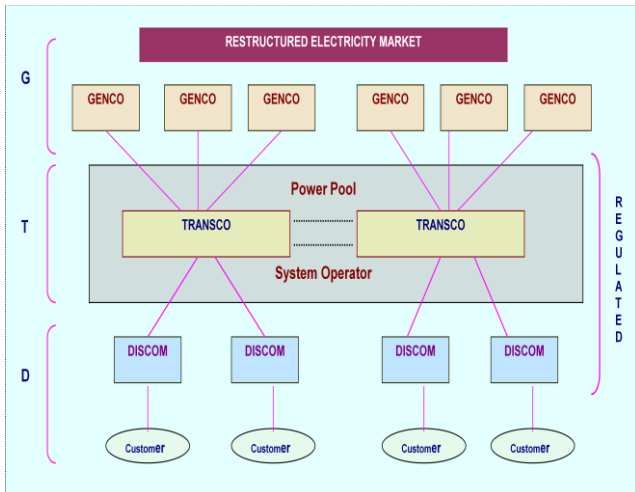


Fig . 2. Market structure after electricity act 2003

II. REGULATED ELECTRICITY MARKET

Before the restructuring of the electricity market took place, a vertically integrated structure existed wherein the three elements / components, i.e., the generating companies



(Gencos), the transmitting companies (Transcos) and the distributing companies (Discoms) were integrated to form a single structure. This was formed with the concept that it was the moral responsibility of the Govt. to supply electricity to all but the industry had turned unviable. The Electricity Act 2003 tried to bring about a restructured electricity market. As per the restructured electricity market, the Gencos would be separate entities who would pool their power in the Transcos. The Transcos would be integrated and not allowed to trade power. The Discoms, like Gencos, would again be separate entities. As shown in the block diagram above, the Transcos and the Discoms would be regulated while the Gencos would be deregulated. The deregulation of Gencos would help in generating electricity at competitive rates as it would instill competition among them[6].

The restructured electricity market would comprise of the three stages (generation, transmission and distribution) as separate entities. This is referred to as unbundling of the vertically integrated units (SEBs). The major changes brought about by unbundling would be the increase in competition by ending the monopoly of SEBs and detection of the faults at various stages so that steps for improving the scenario can be taken. After unbundling it would be easier to monitor each stage separately so the losses can be detected at that very stage.

III. PROCESS OF RESTRUCTURING

There existed a natural monopoly in the electricity industry and it is only a recent phenomenon (1970s) that these unbundling is taking place[10]. This led Governments worldwide to adopt one of the two approaches to the electricity sector:

- Public owned integrated monopoly; or
- Privately owned regulated firms
- Regulatory reform is focused on functional separation of generation and transmission & Introduction of competition in generation.

Different entities in restructured electricity market:-

Generating companies:The generators[8] produce and sell electricity. This may refer either to individual generating units or more often to a group of generating units within a single company ownership structure with the sole objective of producing power, and commonly referred to as

Independent Power Producers (IPP).

Transmission companies:- The transmission companies are those entities, which own and operate the transmission wires their prime responsibility is to transport the electricity from the generators to consumers, and making available the transmission wires to all entities into the system. In transmission only one set of wires would run along the public right of way.due to high capital cost associated with transmission system is exhibits a natural monopoly characteristics.

Distribution companies:- The distribution companies are usually those entities owning and operate the local distribution network in an area.their main aim to supply electricity to local end use customers.

Customer: A customer is a entity who consumes electricity. In deregulated markets the customer has the option to buy the electricity directly from genco or disco or directly from the spot markets by bidding the same.

System and market operator :- It is an entity ensured with the responsibility of ensuring the security and reliability of the entire system. It is an independent body and does not participate in the electricity market trading. Whereas the market operator is responsible for the operation of electricity market trading.

IV. BENEFITS OF UNBUNDLING

The main benefits of unbundling are as follows[10]

Inherent nature of business segments in the industry

- Segments of the industry can be subjected to competition (generation, retail supply)
- Specialized technological advances – CCGT in Gen, HVDC in Trans, HVDS, CMS, etc. in Distribution
- Certain activities are natural monopoly in nature (Transmission/Distribution) & need to be regulated.

Efficiency/Inefficiency can be segregated at every stage and bring about competition

- Inefficiency in particular segment is not offset by efficiencies in other stages
- SEB's own cost of generation in comparison with IPPs, CGS etc. (e.g., Tanda / Talcher Power Station costs under NTPC compared with costs under SEB ownership)

Changes in the policy environment

- Universal obligation to offer transmission and distribution facility; E Act mandated separations.
- To take advantage of the policy changes such as the IPP policy of GOI in 1991 (GEB promoted an IPP to add new capacity)

Harness Private Sector Participation

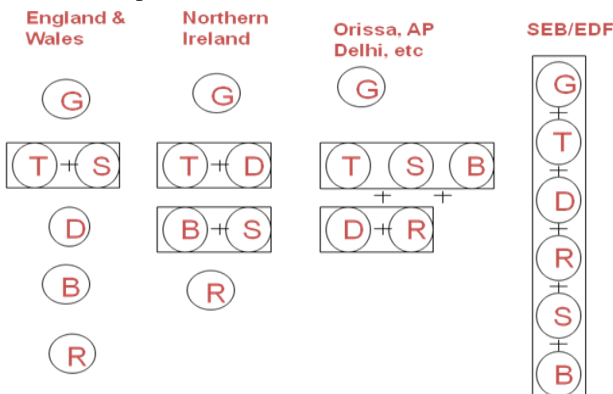
- The STU necessarily to be a Government company
- Focus on the distribution privatisation and private participation in generation

Different electricity model

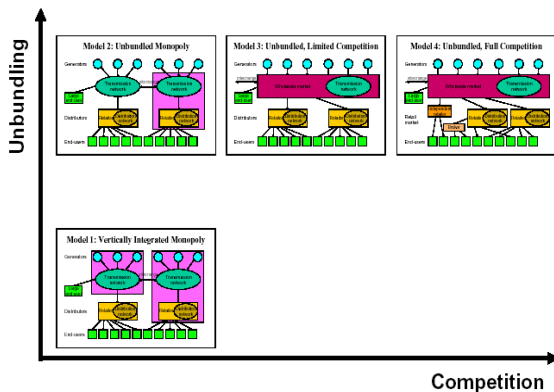
- Different models adopted by different countries and different states of India are being shown as follows as examples[10]:

As shown in the diagram, Transmission and System Planning Operations are integrated while the other entities are not integrated in countries like England and Wales. But there is no particular path that is followed, like the Bulk Power Market can directly source its power from the Generators or from the Distributors. The retailers can purchase electricity from the distributors or from the bulk power market.

- In Northern Ireland, the Transmission and Distribution are integrated together, the Bulk Power Market and System Planning Operations are integrated together while the other entities are separate.
- Similarly in some states of India like Orissa, Delhi and Andhra Pradesh, where reforms have taken place, the Transmission, System Planning Operations and Bulk Power Market are integrated together and Distribution and Retail Sale are integrated together while Generators are separate entities. The SEBs and EDFs are vertically integrated structures in which restructuring has not yet taken place. Unbundling is being carried out to do away with these structures or remodel them to make them viable, reduce losses and increase competition



Unbundling and competition:- If we plot competition on the X axis and unbundling on the Y Axis, we get the categories as shown below.



Vertically integrated monopolies result in low/no unbundling and low/no competitiveness, as shown in the diagram. If these units are unbundled or the degree of unbundling is raised with competitiveness remaining the same, it would result in unbundled monopoly. Then, the degree of competitiveness may be increased to make unbundled companies with limited competitiveness, thus ending the monopoly which restricts competition. Finally, these unbundled structures may be further improved and their competitiveness may be increased to the maximum to form unbundled Gencos, Transcos or Discoms with full competition.

V. KEY MARKET ISSUE

There is no standard model for restructuring that is being followed worldwide but there are certain factors that are common among these, like:

- Regulatory regime promoting competition and regulating the natural monopolies
- Privately owned and competing generating companies either bidding into a power pool or operating in an allocated cost market—either single buyer or multi buyer—multiple players in generation
- Transmission and distribution network having provision for open access
- All or part of retail market open to competition

VI. CONCLUSION

This paper addresses unbundling and competition in Indian electricity market .The different entities and models used in deregulated electricity market are presented .The benefits of unbundling are considered in the paper. The key issues relating to the restructuring and competitive electricity markets are also critically examined. This paper could guide market researchers to promote the trading in electricity power market and bring the more competition in the market. This paper may be helpful for electricity market transparency.

ABBREVIATIONS:

- CGS-central generating sector
- IPP-Independent power producers
- G-Generation
- T-Transmission
- D-Distribution
- S-System planning operation
- B-Bulk power market
- R-Retail sale
- SEB-State Electricity Boards

VII. ACKNOWLEDGMENT

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