

## Liberalized Power Sector

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**Abstract:** Laws and rules becomes a source of hindrance and compactness to the companies and customers when they start extending their work and requirements respectively. Hence to make a balance and good relation between en-powered authority and consumer it is necessary to make a transparent policies and system. Power industry is one of such hindrance. Hence reform in power industry becomes notable point for the government. Inefficient system management, irrational tariff policies and many other factors are responsible for such reforms. Some utility companies voluntarily welcomed and many utility companies are forced to adopt such reforms. The goal of changing, i.e. re-regulation, or open asses is to enhance competition and bring consumers new choices and economic benefits. Under liberalisation, the former vertically integrated utility, which performed all the functions involved in power, i.e. generation, transmission, distribution and retail sales, is disaggregated into separate companies devoted to each function. This not only provides benefit to the consumers but also makes the service and system reliable, efficient and fast. Thus in simple words open asses is to privatize the electric power industry so as to reduce government commitment and functions. In this regard, gencos, transcos, and discos are formed with competition introduced to gencos and discos to stimulate their incentives in efficiency improvement. When efficiency grows up and electricity price goes down, it can in turn promote GDP growth.

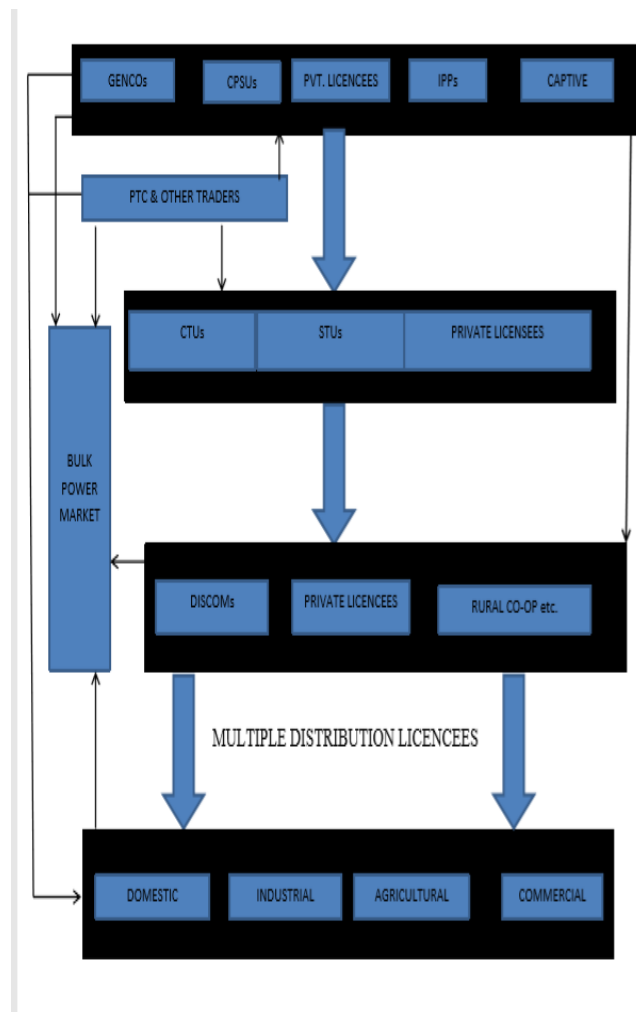
**Keywords:-** IRC(independent regulatory commission), IPP(independent power producer) Establishment of separate regulatory body (SRB).

### 1. INTRODUCTION

India is the world's sixth largest energy consumer, relying on coal as the primary energy source for over half of its total energy needs. Thermal power plants produce more than three quarters of India's electricity, taking advantage of India's position as the third largest producer of coal in the world. The electricity sector has long experienced capacity shortfalls, poor reliability and quality of electricity (voltage fluctuation, etc.) and frequent blackouts. Industry cites electricity supply as a major impediment to economic growth. Despite reforms introducing private participation during the 1990s, the India's electricity sector has remained dominated by the state since India's independence in 1947.

Then slew measures have been mandated through Electricity Act 2003; these includes (1) the establishment of state IRC's (2) unbundling and corporatisation of state-owned enterprises into companies for generation, transmission and distribution (3) tariff rationalisation (4) open asses to transmission and distribution networks for third party use (5) private participation in distribution. In addition, the prevalence of IPP's in generation supplements these measures. The combination of all above is meant to lead to a more competitive and efficient form of electricity provision, where prices equate or move closer to costs.

### 2. STRUCTURE OF LIBERALIZED POWER NETWORK



### 3. ENTITIES TO LIBERALIZED MARKET

#### 1. Generator companies (GENCOS)

Generator companies produce and sell electricity. They may refer to individual generating units or to independent power producers.

#### 2. Transmission companies (TRANSCOS)

These are the companies which own and operate the transmission wires. Their prime responsibility is to transport the electricity from generators to the customer. They also make available the transmission wires to all entities in the system. They levy a transmission tariff for their services.

**3. Distribution companies (DISCOS)** This entity own and operate the local distribution network. They buy wholesale electricity either through spot-markets or through direct contracts with gencos and supply electricity to end-use customers.

#### 4. Customers

This entity consumes electricity. They buy electricity from the local distribution companies.

#### 5. Independent system operator

This entity ensures the reliability and security of the entire system. This entity is an independent authority and usually does not participate in the electricity market trades. Usually does not own generating resources, except for some reserve in certain cases. It procures various services such as supply of emergency reserves or reactive power from other entities in the system.

#### 6. Market operator

This entity is responsible for operation of electricity market trading. It receives bid offers from market participants and determines the market price based on certain criteria in accordance with the market structure. Different trading schemes are hourly trading for next day or for weeks, months or years etc.

### 4. DIFFERENT MODELS OF LIBERALISED SYSTEM

#### 1). Integrated Model

In this model, the generation and transmission functions are strongly coordinated on a long term basis. The generation and transmission entities are integrated or at least have cross ownership. The distribution can also be integrated to the generation-transmission utility. There exists a competitive integrated model where generation is open to competition, but independent power producers or Non-Utility Generators (NUG) have no access to the grid and can only sell to the utility to which they are connected on long-term contact basis. It is also termed as ‘purchasing agency model’. A single buyer (purchasing agency) chooses from a number of different generators to encourage competition in generation. Access to transmission is not permitted. Purchasing agency has monopoly on transmission network. A designated purchasing agency is allowed to buy from independent

power producers. This introduces competition in power generation. This model avoids some costs of deregulated system: transaction costs of spot markets and transmission access, increased cost of capital when generators bear technology risk. It usually requires long-term contracts between the buyer and the independent power producers.

#### 2). Open Access Model

In this, the integrated utilities exists but provision must be provided for grid access to independent power producer on non-utility generator either by wholesale wheeling where generators have a right to sell to other utilities (but not directly to consumers) generally on long term basis. This type of model is also termed as ‘wholesale competition model’. Distribution or retail companies buy electricity directly from producer and deliver it over a transmission network. Distribution and retail companies still have monopoly over final consumers. There is open access to transmission lines. Distribution and retail companies authorized to buy directly from competing generators, but retain local franchise over retail customers. Generators must have access to transmission network, requiring trading arrangements for the network. In a wholesale access system, the competition is expanded, where all generators can sell to many customers. More buyers make the market more competitive and dynamic.

#### 3). Retail Competition Model

This type of model is also called as ‘direct access model’, where all the customers can choose their own suppliers. There is open access to transmission and distribution lines. The distribution is separate from retail activity and later is competitive retail wheeling. Retail competition makes the most of competitive forces, by bringing all final consumers into the market. Retail competition also greatly increases transaction costs by requiring more complex trade arrangements and metering.

#### 4). Spot Market Model

In this model, the generation and transmission entities are separated, there exists a ‘spot market’ organized by the transmission or grid entity under certain regulations where generators and consumers can compare their offers and demands. Spot market is only short term (a day ahead generally), and generators and distributors can have long-term contracts with consumers to generate the stability of prices.

#### 5). Decentralized Generator Model

This model will come up in future with Decentralized Generation (DG) means (fuel cells, photovoltaic, wind, etc.), directly comes to distribution system or consumers. This model differs from each country depending upon objectives to fulfil, are: a) To lower electricity costs, b) To guarantee security and quality of power supply, c) To seek private investment, d) To limit environmental consequences, e) To contribute to social and political objectives.

## 5. ELECTRICITY PRICING IN LIBERALIZED MARKET

This tariff can be modelled as-

$P = \sum_n^N (C_c + C_m + C_{o+m} + C_f + C_{me+co})$  where N is number of years,  $C_c$ ,  $C_m$ ,  $C_{o+m}$ ,  $C_f$  and  $C_{me+co}$  are capacity, maintenance, operation and management, fuel and metering and connection charges respectively.

## 6. EXPECTATIONS FROM LIBERALIZATION

There are several expectations from the power markets in a deregulated environment. This includes real time pricing, elasticity of demand signal for market clearing case, the demand is not responsive to price in most of the markets because of the whole sales fluctuations are not passed on to the retail market. Often the retail challenges of liberalisation of Electric Power Sector in a Third World Economy market has remained under some kind of regulation which has to do with slow implementation of real time pricing. In the case of industrial and commercial loads, they face time-of-use pricing or demand charges, in such a case, the time-of-use price is expected to be high due to the fact that demand is high at such time. Weather-driven pricing and demand should well in advance be prepared for in a deregulated market due to the fact that the electricity market is volatile and thus special attention should be paid to the weather condition and season ahead provision should be made for it so as to avoid energy demanded but not supplied.

## 7. LIBERALIZATION IN VARIOUS SECTORS

### 1) Generation

Generation is an important part of power sector hence re-regulation policies in such a sector must be perfectly framed. It includes following advantages and disadvantages:-

#### 1.1) Advantage

- 1) Reduces the power tariff in a particular locality.
- 2) Supplying power directly from local generating stations reduces the cost of transmission.
- 3) It provides a great impact on the operation of the wholesale market.
- 4) Captive generation increases.
- 5) More players are attracted towards generation.

#### 1.2) Disadvantages

- 1) In case of long distance power supply genscos need transcos. Any conflict between them causes heavy power and capital loss.
- 2) Generating company own or operates or intends to operate a generating station in the state. In case of local distribution, extra risk and staff for return of energy cost is required.

### 2) Transmission

There two types of transmission viz., inter-state and intra-state.

### 3) Distribution

The distribution segment was not given more consideration in the earlier regulations, which lay more emphasis on the power generation segment instead. It was considered that by increasing power generation, the demand for power could be met to some extent, but the industry suffered huge losses (T&D and financial) on the distribution side. SEBs, the main bodies involved in power distribution segment, was in bad financial shape, which made it difficult for them to pay the generator for the electricity supply. The risk of defaults from the SEBs worried generators and hindered new players from entering the industry. The Electricity Act 2003 came up with measures that could improve the performance of the distribution sector on almost all fronts.

#### 3.1) Advantages

- 1) In liberalized system, there is a choice for customers to choose the supplier.
- 2) If choices are available, energy cost reduces naturally due to competitive environment.
- 3) Distribution losses get reduced.
- 4) Equal benefit to all.
- 5) Uninterrupted power supply increases the tariff collection.

#### 3.2) Disadvantages:-

- 1) Financial stable enterprise can over-rule the system. Hence there is a risk of one man domination.
- 2) Sharing of same distribution line by different enterprises without any conflict is quite difficult task.

## 8. SOME SOURCES OF RISKS IN ELECTRICITY MARKET

### 1) Supply shortage

A supply shortage due to generation outages can cause electricity prices to shoot up drastically.

### 2) Defaults

The default of the participant to complete the transaction can raise the issue of credit worthiness and this may lead to price hikes.

**3) Transmission constraints:** A constrained situation could reduce the ability of transmission provides to transfer power, which in turn could force market participants to request more power from the hourly spot market, and contribute to price spikes.

### 4) Lack of Experience

Market participants lack of experience with hedging tools could be another source of risks in electricity markets.

### 5) Price Information

Inadequacy in realistic and timely price information is another source of risk in electricity markets, especially at times when markets have major events such as outages of large generation units, defaults and other factors that could cause price spikes.

## 9. SECTORS TO BE PONDERED

Crux of section (7)

- 1) Unbundling and corporatization of state electricity boards (SEB).
- 2) Privatization of generation, grid-corporation and distribution.
- 3) Creating competition for new generation capacity.
- 4) Establishment of separate regulatory body (SRB).
- 5) Tariff reforms:-
  - Regulatory Commission to determine tariff for supply of electricity by generating co. on long/medium term contracts.
  - No tariff fixation by regulatory commission if tariff is determined through competitive bidding or where consumers, on being allowed open access enter into agreement with generators/traders.
  - Regulatory Commission to look at the costs of generation, transmission and distribution separately.

## 10. CONCLUSION

The electricity market is indicating that electricity is becoming more and more costly in its nature. The criteria to maintain the market design is very tough. However there are a lot of benefits to achieve from electricity liberalised power sector if the stake holders can give it the necessary impetus that it requires to take off. It is going to improve service and help to improve economy of any developing nation that takes part in it.

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