

CHAPTER 2

OVERVIEW OF POWER SECTOR AND OPEN ACCESS IN INDIA

2.1 OVERVIEW OF POWER SECTOR

2.1.1 GENERATION

Electricity generation takes place from various sources of primary energy in India like coal, natural gas and diesel, nuclear and hydro power, (figure 1 in Appendix). Objective is to ensure generation sources adequately to address the growing demand. In keeping with this, the 12th Five year plan (FYP) proposed a target of 88,425 MW generation of electricity. A greater production capacity of non-fossil fuels is emphasized to reduce carbon emission. Apart from its own generation capacity, India imports 1200MW of hydro power from Bhutan. Nationwide plant load factor has deteriorated from 77.5% in 2009-2010 to 61.89% in 2015-2016. Low PLF is partly caused by unscheduled breakdown of ageing plants paucity of fuel, and the delayed operational stabilization of new plants. (CEA, 2016)

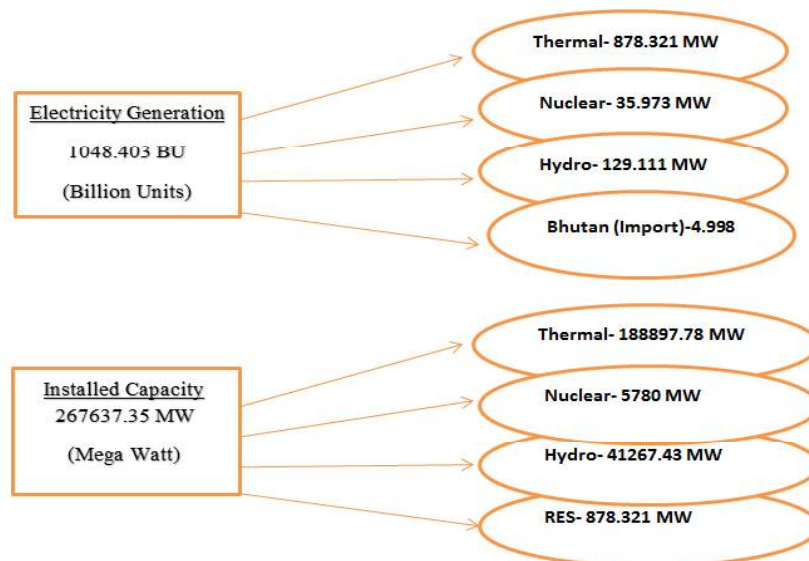


Fig 2.1: Source: Executive Summary of Power Sector Feb-15, CEA, Delhi

2.1.2 Transmission

Only an efficient transmission capacity can help to transfer power from generating stations to distribution networks. Earlier, electricity was transmitted from generating to the load centers, but over time, the state grids were built to ensure reliability in power supply. Given the rising demands from the different regions especially when resources were confined to only a few parts, a decision to build regional grids was taken. The regional grid interconnected regions and implemented the transfer of energy through inter regional transmission capacity.

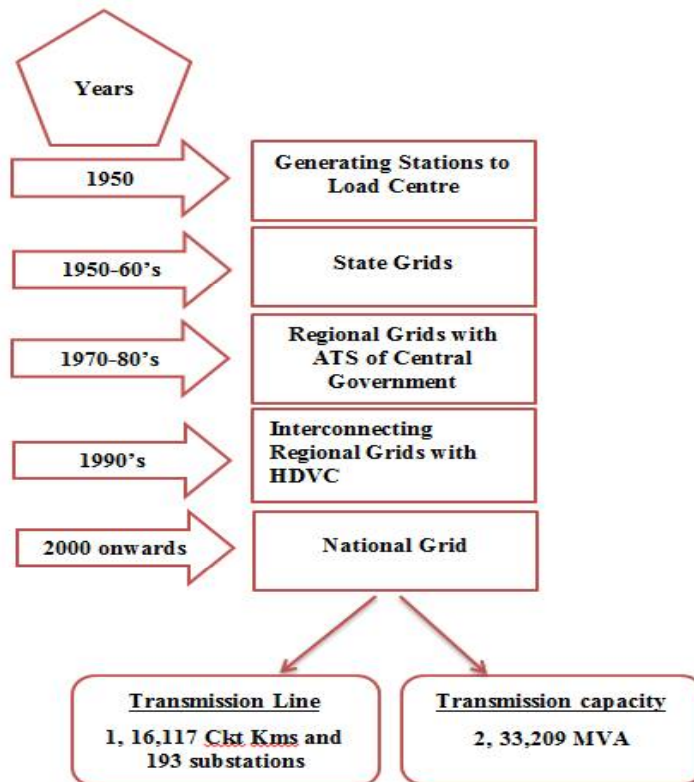


Fig 2.2: Source: - PGCIL, 30 Apr. 2015

Key challenges of the sector are:

- Concept to Commissioning takes 5-6 years, much longer than global standards.
- Promotion of the Smart Grid technology
- Clearance process to encourage private participation

- Level playing field for private players. (FICCI Report-2015)

2.1.3 Wholesale Market

Electricity market initially had a vertically integrated structure that was monopolistic in nature. This later followed the process of unbundling and restructuring of SEBs, such that the function of generation, transmission and distribution were separated. The EA, 2003 abolished the monopolistic nature of bulk supply and retail supply.

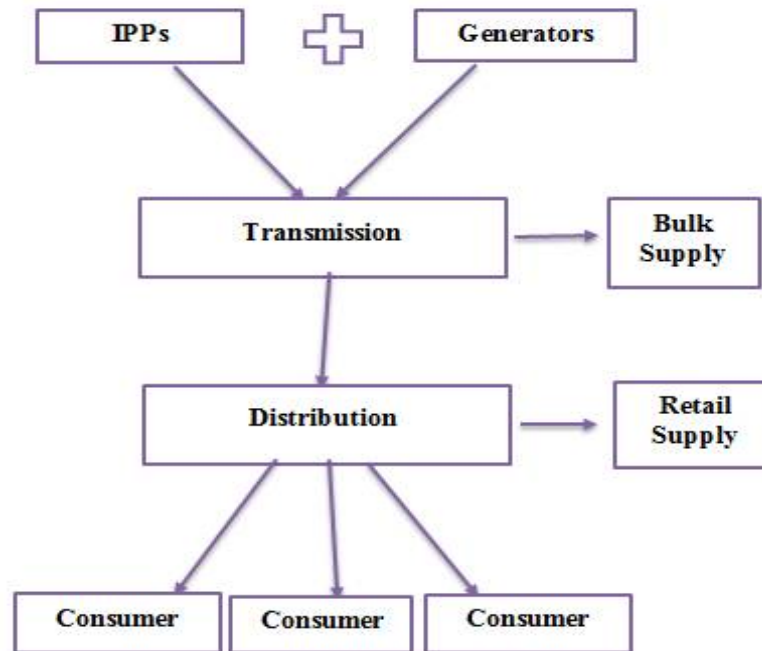


Fig 2.3: Source: - PGCIL, 30 Apr. 2015

De-licensing of generation including captive power generation, non-discriminatory OA of transmission network helped in the rudimentary development of bulk power market in the country. (PGCIL, 2015)

2.1.4. Distribution

It is the most critical segment that provides revenue for the entire value chain. 200 million consumers with a current load of about 400 GW, makes India one of the largest distribution system in the world. Distribution of the last leg in the electricity value chain of India, which holds immense importance as it connects the generators to the consumers, through the transmission system. The Distribution sector comprises of 5220446 ckm (TERI, 2015-16, P.6). According to PFC the energy billed by utilities across India is 27794 MU as of 2014 (PFC, 2014, P.117). There have been series of schemes to curb the financial burdens of the sector with the introduction of the APDRP, RAPDRP and now, UDAY. With the implementation of such programmes the AT&C losses have gone down below 23%.

This task of distribution is undertaken by 73 distribution utilities, 13 electricity departments, 17 private distribution companies, 41 cooperative distribution companies and 2 SEBs. State wise discoms are in Table 2.1.

Table 2.1: State wise Distribution Companies and their ownership

S.No	State	Distribution Companies		
		No Unbundling	State Owned	Private Owned
1.	Andhra Pradesh		APEPDCL APCPDCL APNPDCL APSPDCL	
2.	Arunachal Pradesh	Arunachal Pradesh Electricity Department		
3.	Assam		LAEDCL UAEDCL CAEDCL	
4.	Bihar		NBPDC SBPDC	
5.	Chhattisgarh		CSPDCL	
6.	Delhi		NDPL	BYPL BRPL

7.	Goa	Goa Electricity Department		
8.	Gujarat		MGVCL UGVCL PGVCL DGVCL	
9.	Haryana		DHBVNL UHBVNL	
10.	Himachal Pradesh		HPPCL	
11.	Jammu and Kashmir		JKPDD	
12.	Gujarat		MGVCL UGVCL PGVCL DGVCL	
13.	Haryana		DHBVNL UHBVNL	
14.	Himachal Pradesh		HPPCL	
15.	Jammu and Kashmir		JKPDD	
16.	Jharkhand			TPCL CESC
17.	Karnataka		BESCOM MESCOM HESCOM GESCOM CESCOM	
18.	Kerala	Kerala State Electricity Board Limited		
19.	Maharashtra		MahaVitran	BSES TPCL REL
20.	Madhya Pradesh		MPMKVVCL MPPKVVCL	
21.	Orissa		CESU NESCO SouthCO WesCO	
22.	Punjab		PSTCL	
23.	Rajasthan		AVVNL JVVNL JDVVNL	
24.	Tamil Nadu		TANGEDCO	
25.	Uttar Pradesh		KESCO NPCL	

			PVVNL PUVVNL DVVNL MVVNL	
26.	Uttarakhand		UPCL	
27.	West Bengal		WBSEDCL	CESC

The government has put major thrust on generation in order to meet the consumer demand. However, leakages occur in distribution sector resulting in poor operational and financial performance of the sector. This Research, therefore, proposes to probe the barriers coming in the way of implementation on the OA policy thereby, suggest an alternative framework. (IPS, 2014)

The Indian government's focus on reviving its power sector is evident in the recently launched UDAY 'Ujwal DISCOM Assurance Yojana', 2015 as well as the National Tariff Policy, 2015 (NTP). UDAY scheme aims to address the mounting debts of discoms by taking over a percentage of their debts as well as restricting banks and financial institutions from issuing short term advance. NTP aims at preventing future losses by revising the cross subsidy surcharge formula. OA can be the first step towards this revival. (Mercados EMI, 2012)

2.1.5 Power Trading

EA, 2003, made provisions for power trading. Power trading is basically, buying power for its resale purpose. Power Trade Corporation (PTC) established 1999, is the one of provider of power trading solutions to develop a commercially vibrant power market in the country. There are around 40 trading licensees. India has two power exchanges, PXIL (Power Exchange of India Limited) and IEX (Indian Energy Exchange). Currently, more than 3000 OA consumers are utilizing the power exchange platforms.

The basic requirements for a power trader as per CERC norms are:

- Demand should be atleast 1000KVAH
- Connected to atleast 11KV line
- Should have 0.2S class CT/PT

- Should have 0.2S class ABT meter
- Consent from DISCOMs/SLDC to trade power.

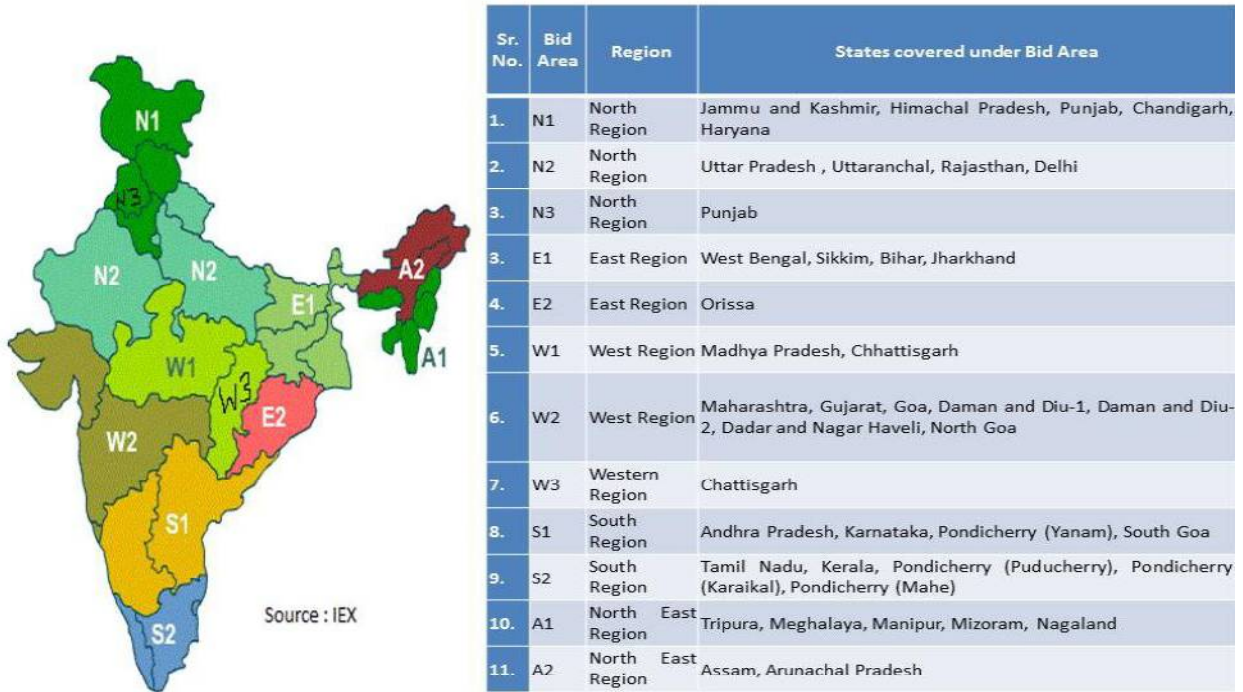


Fig 2.4: Bid Areas (Source: IEX)

Table 2.2: Categorization of Power Traders

Category of the Trading Licensee	Volume of electricity proposed to be traded in a year including intra- State trading, where applicable	Minimum Net Worth (USD in Million)
Category I	No Limit	7.5
Category II	Not more than 1500 MUs	2.27
Category III	Not more than 500 MUs	0.75
Category IV	Not more than 100 MUs	0.15

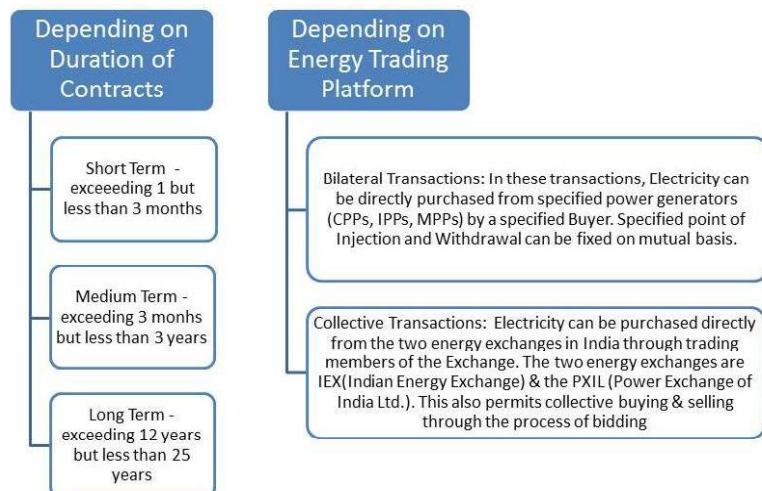


Fig 2.5: Power Market and its Features

The list of Power Traders as on 17.06.2015, with their respective categories is given in the table below:

Table 2.3: List of Power Traders as on 17.06.2015

S.N o.	Trading license No.	File/Petition No.	Name of Licensee	Date of grant of license	Present Category of License as on date
1	1	011/2004	Tata Power Trading Co. Ltd.	09.06.2004	I
2	2	022/2004	Adani Enterprises Ltd.	09.06.2004	I
3	3	020/2004	PTC India Ltd.	30.06.2004	I
4	4	024/2004	Reliance Energy Trading Ltd.	30.06.2004	I
5	6	026/2004	NTPC Vidhyut Vyapar Nigam Ltd.	23.07.2004	I
6	7	005/2004	National Energy Trading and Services Ltd.	23.07.2004	I
7	13	152/2004	Karam Chand Thapar & Bros(Coal sales) Ltd.	27.01.2005	I
8	17	015/2005	Instinct Infra & Power Ltd	07.09.2005	III
9	18	094/2005	Essar Electric Power Development Corp. Ltd.	14.12.2005	II
10	19	016/2005	Suryachakra Power Corp.LTD.	22.02.2006	IV
11	20	161/2005	JSW Power Trading Company	25.04.2006	I

			Ltd.		
12	23	017/2007	Visa Power Trading Company Limited	28.06.2007	IV
13	24	060/2007	Pune Power Development Pvt. Ltd.	12.07.2004	IV
14	27	061/2007	Greenko Energies Pvt. Limited	22.01.2008	IV
15	29	078/2007	Vandana Vidhyut Limited	03.04.2008	IV
16	30	112/2007	Indrajit Power Technology Pvt. Ltd.	16.05.2008	III
17	31	029/2008	Adhunik Alloys & Power Ltd.	26.06.2008	IV
18	32	013/2008	India Bulls Power Trading Limited	12.09.2008	IV
19	34	014/2008	Ambitious Power Trading Co. Ltd.	16.09.2008	IV
20	35	085/2008	RPG Power Trading Company Ltd.	23.09.2008	II
21	37	078/2008	GMR Energy Trading Co. Ltd.	14.10.2008	I
22	40	086/2008	Shyam Indus Power Solutions Pvt. Ltd.	11.11.2008	IV
23	41	031/2004	Global Energy Pvt. Limited	28.11.2008	I
24	42	111/2008	Knowledge Infrastructure Systems Pvt. Ltd.	18.12.2008	I
25	43	119/2008	Mittal Processors	12.02.2009	II

			Private Limited		
26	45	276/2009	Shree Cement Limited	16.03.2010	I
27	46	030/2010	PCM Power Trading Corporation Ltd.	24.08.2010	III
28	49	283/2010	Jaiprakash Associates Ltd.	23.03.2011	I
29	50	168/2010	My Home Power Pvt. Ltd.	26.04.2011	III
30	51	020/2011	Customized Energy Solutions India Pvt. Ltd.	08.06.2011	IV
31	56	214/TDL/2011	DLF Energy Pvt. Ltd.	07.03.2012	III
32	57	21/TDL/2012	Gemac Engineering Services Private Limited	21.06.2012	IV
33	58	115/TDL/2012	Statkraft Markets Private Limited (SN Power Markets Pvt. Ltd)	21.06.2012	I
34	59	135/2010	Manikaran Power Limited	29.06.2012	II
35	61	203/2009	Arunachal Pradesh Power Corporation Private Limited	11.09.2012	III
36	62	223/TDL/2012	Green Fields Power Services Pvt. Ltd.	08.02.2013	IV
37	63	116/TDL/2012	HMM Infra Limited	11.03.2013	III
38	64	192/TDL/2012	Newfields Advertising Private	30.04.2013	IV

			Limited		
39	65	88/TDL/20 13	Vedprakash Power Private Limited	19.08.2013	IV
40	66	009/TDL/2 013	PAN India Network Infravest Pvt. Ltd.	18.11.2013	I
41	67	294/TDL/2 013	Solar Energy Corporation of India	01.04.2014	III

2.1.6 Retail Market

India is yet to see progress in the field of retail competition, as there are no clear cut provisions made for individual power supply licenses at the retail level. Concept of a parallel licensee is contemplated under 6th proviso of Section 14 of EA, 2003. Appropriate Commission may grant a license to two or more persons for distribution of electricity through their own distribution system within the same area. Foundation for introducing competition at the consumer end through OA and provision for parallel Distribution licensees has been accordingly laid. However both these concepts have seen limited success. Each distribution licensee investing in its own network may not only lead to replication of network but, in the event of capital investment being a pass-through expense, also will pushup costs/tariffs for end consumers. OA too has seen lackluster operationalization due to factors like power deficit scenario, inadequate transmission/distribution facilities, high level of cross subsidy etc.

Retail supply business involves the **service side** of the business like purchase of electricity from generators, selling electricity to consumers, customer services, billing, and collection of charges from consumers. On the other hand, **Distribution** business involves the **technical side** of the business like setting up of physical network in order to wheel electricity to consumer premises. Thus, the distribution companies in India manage businesses of two different natures –carriage (distribution) business and content (retail supply) business. In a market structure wherein the carriage business as well as content business is handled by a single distribution company, the scope for introducing OA and

retail competition is ambiguous. Carriage business of the distribution company by nature is monopolistic and would deter (unless made neutral) open competition in content. (FOR, 2013).



Fig 2.6: Source: Shakti, Sustainable Energy Foundation Report, 2013

2.2 Scope of OA

OA means the non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission, u/s 2(47) of the EA, 2003 (Sarkar, 2011).

The idea of ‘OA’ has its genesis in the concept of the difference between electricity generation as a product vis-à-vis its transmission and distribution as a service. (Hindu, 2004).

Open access*, in its simplest form, can be thought of as an arrangement wherein any party selling or buying electricity can connect to the transmission and distribution systems†, irrespective of the power grid operator or the owner. An introduction of open access could, therefore, lead to consumers choosing their electricity provider, similar to the way they now choose their preferred telecom service provider. (World Bank Report, 2013)

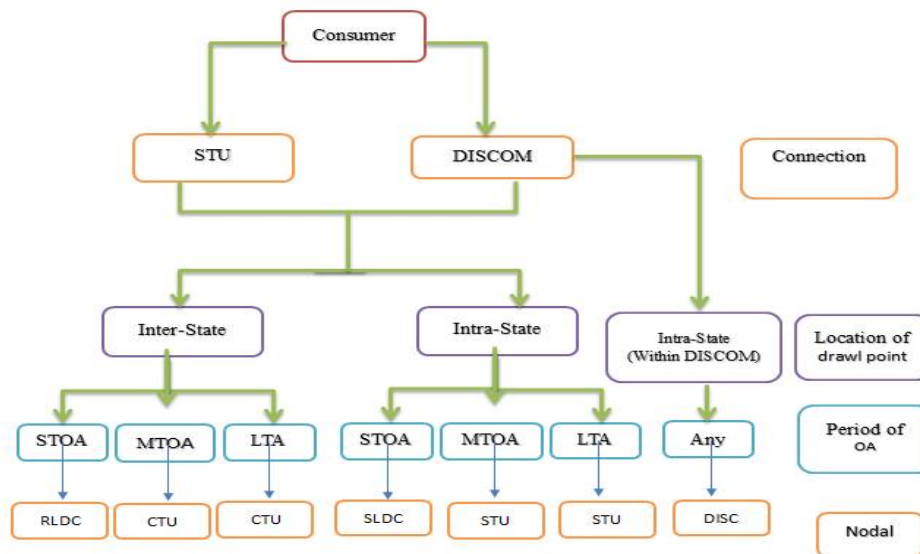


Fig 2.7: Source: NLDC Report, 2011

Electricity generation, as a factor, is widely accepted as an indicator having a positive correlation with GDP. In India, it has the highest weightage among the eight core parameters in the Index of Industrial Production (IIP).(Economic Survey, 2016)

As India strides towards its path of development, its energy sector is undergoing through tremendous, both in terms of the total energy production as well as the per capita consumption. Ministry of Power reports through ‘Growth of Electricity Sector in India from 1947-2015’ Report, the installed electricity capacity in India grew from a meager 1362 MW after independence to more than 2,70,000 MW by March 2015 whereas the per capita consumption from 16.3 kWh in 1947 to 1010 kWh in 2015. (MOP Report, 2015)

In many locations, the Discom, have been denying the right to get supply from an alternative source through OA though the Electricity Act, 2003 (EA) provides this option. (Sarkar, 2011).Regulatory and structural changes are imperative for a growing nation to cope up with such level of huge demand and growth. India has, accordingly, taken various measures and policy initiatives at various intervals to respond to these demands. One of such reforms was EA, 2003, which was believed to be a watershed event for the

sector to move towards enhanced competition, accountability and commercial viability. One of the key provisions of this landmark act was the policy of ‘Open Access’ which allowed industrial and commercial consumers with an electricity load above 1 MW to procure electricity directly from electricity markets. (Economic Survey, 2016).

*Open access allows large users of power — typically having connected load of 1 Mega Watt (MW) and above — to buy cheaper power from the open market.

†Distribution system means the system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and the point of connection to the installation of the consumers u/s Section 2 (19) of EA, 2003

India’s power sector is characterized by inadequate and unreliable power supply. Chronic load shedding and poor quality of power coupled with high tariffs is hindering India’s growth, inclusion, job creation and aspirations. It is leading to a situation wherein the industrial electricity purchases from utilities is showing a southward movement signifying a gradual transition towards captive power generation¹. World Economic Forum - Global Competitiveness Report (2015-16), on ‘quality of electricity supplied’ ranks India at 98 out of a total of 140 countries surveyed. (WEF, 2016).

There is also wide variation in industrial tariffs within India. Many firms throughout the country identify electricity as a major constraint². For the country as a whole, it is greater than 20 percent of the firms, for some states like Uttarakhand, Uttar Pradesh, Tamil Nadu, Andhra Pradesh, and Kerala; it is as high as 40 percent. (Economic Survey, 2016)

Open access, if truly embraced, can lead to a commercial orientation as well as better delivery of services. Competition between suppliers encourages cost cutting through improved efficiency. Thus, it leads to better price discovery

benefitting the consumer as well as minimal regulation benefitting the seller. (AERC, 2007)

World Bank's Enterprise Survey of Industries 2013-14 reports that, about 47 percent of individual entities use generator to protect themselves against erratic power supply. Electricity generation from captive power is bound to increase considering the decline in the oil prices and the higher cost of renewable energy alternatives. Captive producers, however, are reluctant to sell their excess energy to the lone buyer in the State at a price dictated by the State Electricity Boards, which is often not very attractive or reasonable. OA would however change this as the suppliers would be able to sell it to the buyer paying the best price. This will ensure level playing field and acts as a price discovery mechanism for the seller as well. It also, thus will lead to effective utilization of capacity of captive power generators. OA for transmission and distribution, thus, aims at creating a conducive environment in which generators are able to sell to the highest bidder and consumers are able to buy from the most economical source. (Economic Survey, 2016)

India has a goal of universal energy access by 2019. To achieve this target, billions of dollars of financial investment needs to pour in. India's power sector, at present, however, is ridden with enormous debt. In terms of power generation and transmission, the country has made significant progress, however, in terms of distribution; the segment is incurring losses, due to various reasons, which in turn affects the entire value chain. As per a World Bank Report, by 2011, the sector's total debt had reached a staggering US\$ 77 billion-equivalent to 5% of India's GDP. Effective implementation of OA can increase competition thus leading to increased investments bringing some relief to the mounting debts of the sector.(WB Report, 2014)

Cheap power supply has the potential to be a game-changer for the energy intensive industries in India especially the textiles, pulp and paper, cement, fertilizers, iron and steel and aluminum sectors. Electricity cost is one of the highest input costs in many of these industries. OA may be exploited by many

of such sick industries by taking into consideration the factors like load, time and locational differences for finalizing the power supply contracts to suit their requirements. With OA, these customers can switch between grids at different voltage levels thereby reducing cost and increasing the quality of service. These contracts can gradually lead to investments in generation and grid infrastructure, resulting in introduction of new products and services. (W B Report , 2009)

Reliability of power supply in these energy intensive industries improves with OA, wherein an incumbent utility cannot ensure an uninterrupted power supply. For such an industrial consumer, whose entire revenue and profit margin depend on an uninterrupted power supply, getting assured power can make the business more competitive as demonstrated by the Case Study of Manesar in State of Haryana. (HERC, 2012)

A number of countries around the world have implemented OA. Principles followed for successful implementation in some of these countries like US, UK, Brazil, Peru, Turkey etc. can be studied to learn positives as well as the shortcomings for taking into consideration in designing and evolving the final model for OA in India. (World Bank Report, 2013)

Competition means attracting consumers in the presence of rivalry for supplying commodities or providing services in an industry. In 1991, a step was taken in India to transform the monopolistic system into a competitive system. Finally, the Electricity Act 2003 superseded the other electricity reforms of India.

With the introduction of competition in retail market the state distribution companies can attract the consumers and can compete with each other. This can result in cost minimization, increased efficiency, and advancement in technology and tariff rationalization. Even consumer will get more suppliers to choose from which will automatically increase consumer welfare.

Despite of all the efforts of stakeholders for proper implementation of Open Access in electricity market and increasing competition the current status of open access is quite stagnant.

Many states like Karnataka, Tamil Nadu, Chhattisgarh and Orissa has violated the Open Access regulations and barred the entry of private utilities and captive plants from selling the energy to other states. This was resulted in discouraging the potential investors and affected the competition market. It was observed by CERC and Planning Commission of India that the poor status of competition in the power sector was because of regulators impediments, unconsidered interest of end users and lack of opportunity for private producer to sell power to other states.

The following table shows the enforcement of regulations on Open Access. From table 2.4 we can clearly observed that out of 23 selected states, 21 states have enforced regulations on Open Access and specified surcharges and wheeling charges.

Table 2.4: Enforcement of OA Regulations

S. No.	SERC	Notification of OA Regulations	Determination of Surcharge	Determination of Wheeling Charges	Determination of Transmission Charges
1	APERC	Yes	Yes	Yes	Yes
2	AERC	Yes	Yes	Yes	Yes
3	BERC	Yes	Yes	Yes	Yes
4	CSERC	Yes	Yes	Yes	Yes
5	DERC	Yes	Yes	Yes	Yes
6	GERC	Yes	Yes	Yes	Yes
7	HERC	Yes	No	Yes	Yes
8	HPERC	Yes	Yes	Yes	Yes
9	J&KSERC	Yes	Yes	No	Yes
10	JSERC	Yes	Yes	Yes	Yes
11	KERC	Yes	Yes	Yes	Yes
12	KSERC	Yes	Yes	No	Yes
13	MPERC	Yes	Yes	NA	Yes
14	MERC	Yes	Yes	Yes	Yes
15	MSERC	Yes	No	No	Yes

16	OERC	Yes	Yes	Yes	Yes
17	PSERC	Yes	Yes	Yes	Yes
18	RERC	Yes	Yes	Yes	Yes
19	TNERC	Yes	Yes	Yes	Yes
20	TERC	No	No	No	No
21	UPERC	Yes	Yes	Yes	Yes
22	UERC	Yes	Yes	Case to case basis	Yes
23	WBERC	Yes	Yes	Yes	Yes
24	JERC-M&M	No	No	No	No
25	JERC-Uts	No	No	No	No
TOTAL		22	20	17	22

Source: FOR Report, 2011

OA is the mechanism crafted to usher in competition and choice as well as, to facilitate investment, and protect the interests of the consumers. Slow progress in implementation of OA has led to a-blame game and is often criticized by comparing with the success the telecom sector. Although OA simply means a right to non-discriminatory use of transmission and distribution networks, its importance lies in the fact that it gives right to generating companies to choose their customers (distribution licensees or individual consumers) and a similar right to customers to choose their suppliers. (Hindu, 2004) In Transmission and distribution segments the wires business component is internationally recognized as having the characteristics of a natural monopoly. This business brings in its inherent difficulties in going beyond regulated returns on the basis of scrutiny of costs. Generation and Retail distribution have features of competition. (Bhattacharyya, 2011).

- Distribution system means the system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and the point of connection to the installation of the consumers u/s Section 2(19) of the Electricity Act 2003 (Sarkar, 2011).

OA was thought as the stepping stone towards introduction of private competition in the distribution sector. It has to be implemented in the short term as well as the long term. All OA transactions that get completed within

the time period of 01 year falls in short term category. Under short term, power trading comprises of bilateral transactions and collective transactions through power exchanges. The salient features of short term OA are advanced scheduling up to 3 months, first cum first served basis trading, day ahead and intra-day transactions. (FOR, 2014)

As Power purchase cost constitutes the largest cost element for distribution licensees. Competitive procurement of electricity by the distribution licensees will reduce the overall cost of procurement of power and facilitate development of power markets. Internationally, competition in wholesale electricity markets has led to reduction in prices of electricity resulting in significant benefits for consumers. (FOR, 2013)

States have decided that OA would be available to consumers in the prescribed time frame. Regulators have initiated determination of the OA charges, to be recovered from customer in its Tariff Orders. These charges include Transmission Charge/Wheeling Charge, Surcharge, Additional Surcharge, Scheduling Charge (payable to State Load Dispatch Centre), Unscheduled Interchange (UI) Charge, Reactive Energy Charge and some other charges, as the Commissions may determine from time to time as a part of the tariff under section 61, 62 and 86 of EA, 2003. While determining the various charges, the Commissions are aware of the fact that there is a need for balancing the interests of the consumers of the Licensees and OA customers in view of the universal service obligation cast on the Licensees which includes supply to subsidized categories of consumers as well. The charges so decided should provide some economic incentive to the customers availing OA and at the same time it should not burden the other consumers by way of a higher tariff. (NEP, 2007).

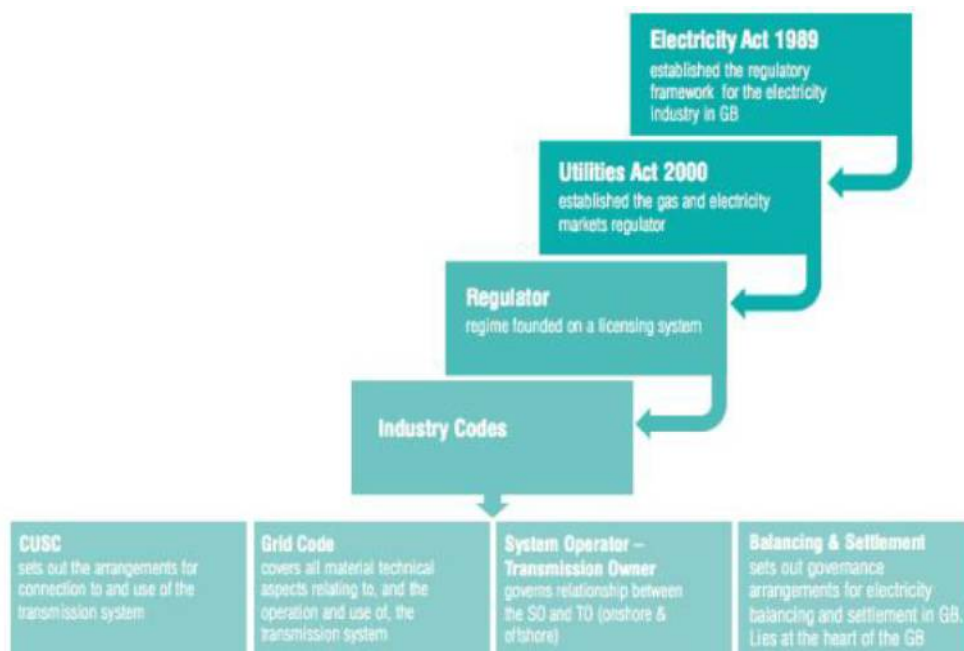
In India the price of the electricity for the consumer not just fixed by the market forces alone, but are also affected by other extraneous factors and this also constitute an important factor for severe financial obstacles being faced by the distribution sector. It has been laid down that the State Commissions

shall provide OA to all consumers with load exceeding 1MW. The Ministry of Power and Ministry of Law in its latest interpretation on 30.11.2011 has articulated that Section 42 of the Act makes it mandatory for all consumers with load exceeding 1 MW to be OA consumers and that the tariffs for such consumers shall not be regulated by SERCs. (FOR, 2012) OA, in its simplest form is an arrangement wherein any party selling or buying electricity can connect to the transmission and distribution systems, irrespective of the power grid operator or the owner. Consumers choosing their electricity provider will be similar to the way we now choose their preferred telecom service provider.

OA REGULATIONS

United Kingdom started the process of unbundling in the 1990s. Ever since, the country has transcended to have one of the most successful power markets in the world. The Utilities Act 2000 established the Great Britain gas and electricity markets regulator, i.e. OFGEM, which is responsible for the economic regulation of the gas and electricity industries and is monitored by the Gas and Electricity Markets Authority (GEMA), which determines OFGEM's strategies for governance, sets policy priorities and takes long term decisions.

UK has had a very healthy regulatory environment. The liberalization of the electricity industry was implemented in packages starting as early as 1990s when the process of unbundling was initiated. Figure shows the chronological transition of the regulatory and commercial environment. (Source: Publication



on the website of the Scottish Government, July 2014)

The wholesale electricity market of Great Britain has been functioning since 2005 under the British Electricity Trading and Transmission Arrangements (BETTA). The wholesale market comprises of three markets which are as follows:

- **Bilateral Market:** The contracts in this market are customized and function up to the point of ‘gate closure’ which is one hour from the point of delivery and comprises of the spot and day ahead markets
- **Balancing Mechanism:** The mechanism is run by Great Britain system operators that involve payments to generators with flexible generation who can vary their output based on requirement. These payments for are the ancillary services.
- **Imbalance Settlement Process:** This is the balancing mechanism taken care of by the Great Britain system operators in real time, minute by minute basis.

The Electricity Market Regulations were proposed in 2011 and under which the Electricity and Gas (Internal Market) Regulations, 2011 was passed. The Electricity and Gas (Internal Market) Regulations, 2011 was introduced in order to ensure the continuance of the relevance of third party access in the UK.

The regulations are applicable for gas and electricity markets. It has ten parts and seven schedules. They pertain to provisions, transmission and operation of inter connectors, consumer protection, distribution, licence exemptions, regulatory authority, enforcement, licence modification procedure. Prior to the enforcement of these regulations, landlords of multi tenanted buildings gave no choice to the tenants for the source of electricity. They were charged a service charge based on the consumption calculated with the help of electricity meters. But with the advent of the 2011 regulations, multiple tenants in a building would have the choice of electricity suppliers they wished to access power from, instead of the one chosen by the landlord. The cost of physically

changing the cabling system is borne by the tenant or the electricity company. These regulations enabled tenants to obtain better deals for electricity in comparison to their corresponding landlords. For the want of competition a lot of infrastructural changes were expected to be invested into by the landlords. The regulation aimed at two aspects:

- Promotion of competitive energy markets
- Increase in security of supply

However the biggest change it brought on was the extension of third party access through the license exemption of owners to the network. This implies that independent distribution network operators are exempted from obtaining licenses for providing third party access. Not only was the further unbundling at the retail level a breakthrough but also fast tracked to as quick as three weeks for those consumers willing to change their electricity suppliers.

The regulation also emphasized on the separation of ownership of transmission systems and interconnectors to ensure elimination of clash of interests. However OFGEM offers alternative ownership business models for unbundling if companies fulfil certain criteria. This would provide a lot of flexibility in businesses.

The regulations strictly prohibit the generation of electricity by distribution utilities and create a monopolistic market structure. This would also ensure avoiding the conflicts of interest in investment decisions and promoting transparency.

India saw the Electricity Act being introduced in 2003, which for the first time mentioned promotion of competitive supply of electricity. This saw the advent of Open Access, with Central Electricity Regulatory coming out with the Open Access Regulations in 2008. In India, the Transmission regulations for Open Access are drafted by CERC while the Open Access in the distribution sector regulations are drafted by the respective State Commissions. The model regulations were used by respective state commissions to draft their open access in distribution regulations with timely modifications.

Maharashtra came up with the MERC (Distribution Open Access) Regulations, 2016 which brought some very key changes since the draft regulations of 2015. Section 11 of the EA 2003 was used by MERC to dissuade open access transactions at inter-state level. However the new regulations have allowed power to be sourced from multiple sources including the power exchanges IEX and PXIL. Also, although the draft regulations had the contract demand for eligibility for OA would be 500 kW, it was fixed at 1MW in the final regulations. Hence the retail market is far from flourishing. This is where a difference in structures of OA in UK and India can be seen. The probable reason for this difference can be iterated as the lack of infrastructural developments in India. While balancing and ancillary services function in the real time at minute by minute basis in the UK, India has primary, secondary and tertiary balancing services. However the services are yet to reach an intricate level of minute by minute balancing. The main reason for this is the organizational structure of system operators at the distribution level.

Hence analysis of the Electricity and Gas (Internal Market) Regulations, 2011 and the MERC (Distribution Open Access) Regulations, 2016 can bring forth the stark differences in the structure of the framework of third party access in both countries.

Reforms have delivered on generation. Distribution market is still plagued with several issues including lack of competition. Creation of power exchanges has led to setting up of an elementary competitive market through power trading. OA has thus, evolved imperfectly and consumers continue to get sub-optimal value. There is no guarantee that an approach that works in one state will necessarily work in another. Regulators also face the challenges of information asymmetry. The study of diverse factors affecting implementation of OA across various Indian states, therefore, becomes essential.(ERR,2009)