

Study of Introducing Competition in Retail Supply of Electricity Across Developed Countries and its Framework for India

Prafulla Varhade,

Maharashtra Electricity Regulatory
Commission, India

Tarun Dhingra,

Department of Strategic Management,
University of Petroleum &
Energy Studies, India

Anil Kumar,

Department of Power & Infrastructure
Management, University of Petroleum &
Energy Studies, India

Prashant Navalkar,

Power Anser Labs Pvt. Ltd.,
India

ABSTRACT

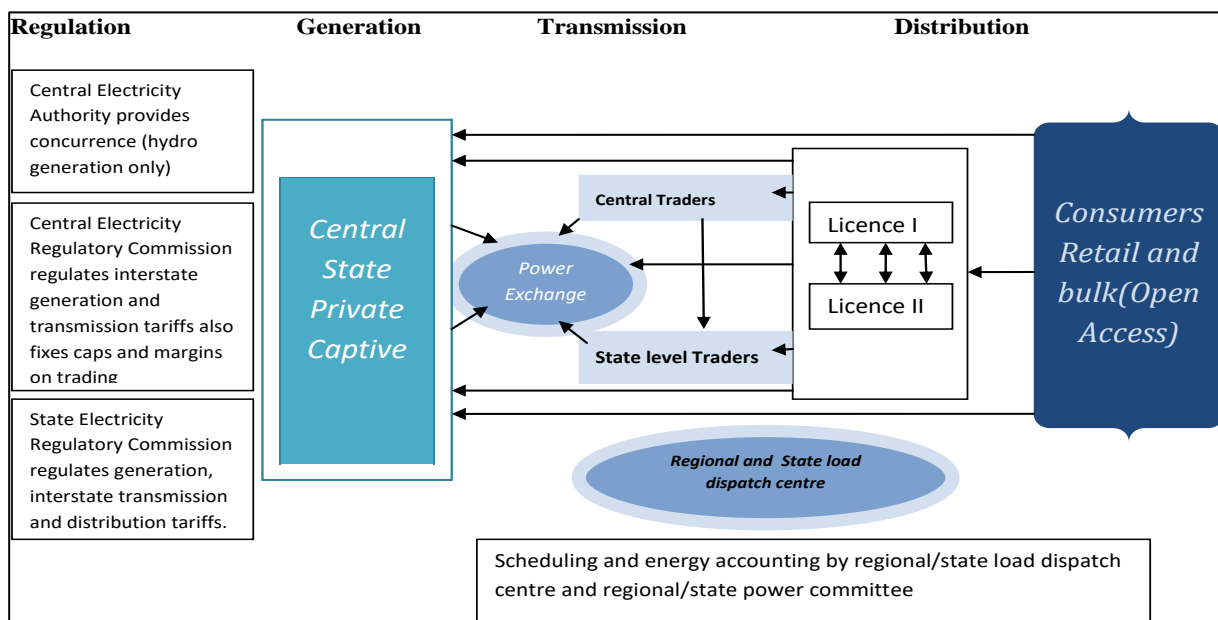
The Electricity Act 2003 in India brought a competition in generation segment resulting into a wholesale market. With the absence of segregation of wire and supply of Discoms in the existing policy for introducing competition in retail supply, a fair competition environment in distribution of electricity is yet to be flourished. An initiative of Government of India through Electricity (Amendment) Bill, 2014 advocated introduction of separation of wire and content of Discoms. In order to provide more clarity to various States of India for its implementation, Forum of Regulators developed a model rollout plan for introducing competition in retail sale of electricity. This paper evaluates a model rollout plan developed by Forum of Regulators vis-à-vis international experience on introducing competition in retail supply of electricity by method of separating wire from the content of supply in distribution of electricity. Five international experiences, viz. UK, Australia, Philippines, New Zealand and California were chosen for a detailed study of their electricity reform processes with criteria of segregating wire and supply functions of Discoms and having mixed experience of success and failures. Based on various international experiences on key issues of electricity retail supply competition, a framework for India as suggested by Forum of Regulators introducing competition in retail electricity supply have been analysed.

Keywords: Electricity Act 2003; Electricity Amendment Bill 2014; Distribution; Carriage; Content; Parallel Licensing; Mumbai; International experience on electricity retail competition; Document; Content analysis; Privatisation

INTRODUCTION:

The Electricity Act (EA), 2003 in India brought competition in the power sector by allowing open access to transmission and distribution network with generation as a delicensed activity and trading & supply of electricity as a licensed activity. It has unbundled and corporatized earlier electricity boards into generation, transmission and distribution companies (Discoms) and created electricity regulatory commissions (ERC) at the centre in addition to states (Mukherjee and Dhingra, 2016). The power sector industry of India after the enactment of EA 2003 is represented as below:

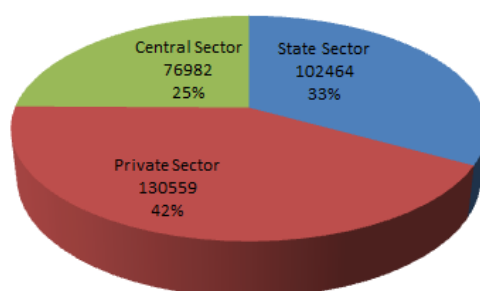
Figure 1.1: Power Sector Structure of India after the enactment of EA 2003



This framework has enabled bulk consumers (>1 Mega Watt loads) of Discoms to source their requirements directly from generators or suppliers by using open access to transmission and distribution network, which resulted a greater participation of private sector mainly confined to generation. Generating capacity which was 1362 Mega Watt (MW) in year 1947 has increased up to 3,10,005 MW in December 2016 (i.e. addition of 4473MW per year since 1947) with Centre 25%, States 33% and Private Sector 42% (increased from 4% from 2003), all pitching in.

Figure 1.2: Ownership wise generating capacity in India

Ownership wise Generating Capacity (MW) : India



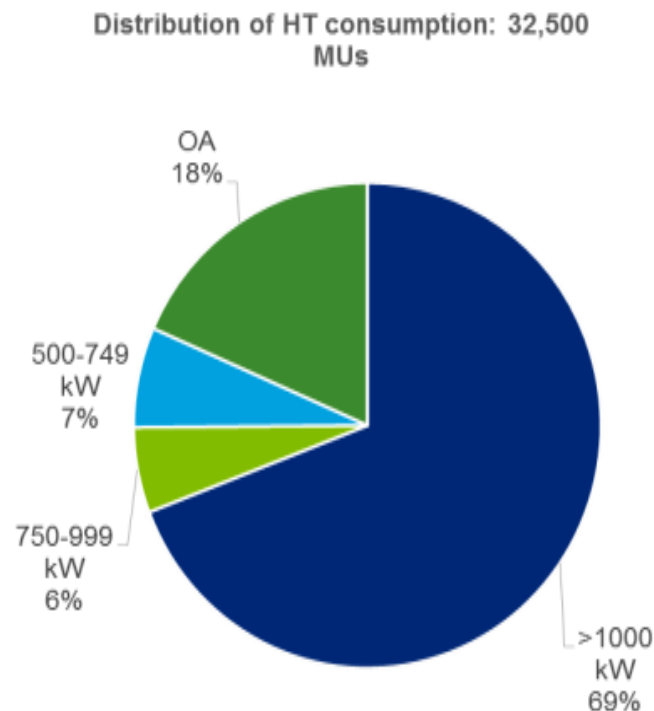
Total Capacity: 3,10,005 MW (as on 31 December, 2016)

Issues in Indian Power Sector:

- In order to provide level playing field to generators and suppliers, the Act prohibits transmission companies from engaging in trading or generation of electricity while Discoms are mandated to carry out dual functions of distribution wire and retail supply. The Act does not clearly identify the retail supply function of distribution as a distinct licensed activity. In order to enable fair competition by expediting non-discriminatory open access to the network, the wires function comprising transportation of electricity would need to be functionally separated from the supply business of distribution. Discoms in India are not only obligated to supply of electricity to all areas along with historical baggage of cross subsidy and distribution losses but also they are mandated to grant open access to distribution wires for bulk consumers. In granting open access and losing to bulk consumers, Discoms argue that they are not fully compensated for the losses they incur and hence the competition environment gets resisted. The following chart shows 18% of total

Maharashtra State Electricity Distribution Company (MSEDCL) HT consumption sought open access and balance 69% eligible open access consumers are yet to exercise the choice.

Figure 1.3: Eligible Open Access Consumption of MSEDCL



- ii. The Act also provides for multiple or parallel distribution networks to introduce competition in distribution of electricity. But, international experience shows that, in order to introduce competition in retail supply multiple suppliers are allowed to supply through a common distribution network instead of parallel networks, as it is economically unviable to duplicate the existing distribution network. Mumbai is the only electricity distribution area in India where two electricity Discoms operate in the common area and compete for consumers, and Mumbai consumers are exercising this choice through changeover via common distribution network or switchover via parallel distribution network. This Mumbai experience drives the point that parallel distribution network be avoided and segregation of distribution wire and retail supply business is a must to avoid any quarrel of interest of the network operator. In this context it becomes essential to separate retail supply from wire business of Discoms.
- iii. In a regulated regime, power purchase accounts for 70 – 80% of Discoms' expenses which largely depends on certainty of coal supplies to thermal generating plants. Little attention of ensuring coal supplies and larger time taken (about 15 years) in formulation of policy for allocation of coal to regulated thermal plants has completely flabbergasted the Discoms. High distribution losses and in-efficient operation of distribution business with regulatory disallowance reinforce revenue shortfall of Discoms which are public sector entities. With 100% ownership of State Government in the Discoms they are able to borrow from public-sector banks to cover the revenue shortfall. But over the period, this leads to the accumulation of huge debt with larger interest payments. Ultimately, State Discoms loses credibility as buyers of electricity driving the Government to come to their rescue. Due to poor financial health of State Discoms, unsatisfied demand for electricity is non-catered and generation capacity remains underutilized. Under such situation, Gencos refuse to sign long term power purchase agreements (PPAs) with the Discoms. Due to this, the State Discoms are unable to provide electricity even when customers are able and willing to pay for it. The root cause of repetitive incidents of State Discoms poor financial position is due to the absence of market pressure (Niti Aayog, 2017). The final solution to the given problem lies in ensuring that State Discom is subject to market pressure (Niti Aayog, 2017). Therefore, with plagued Discoms and various ills bleeding its finances, Discoms of India are in dire need of reforms.

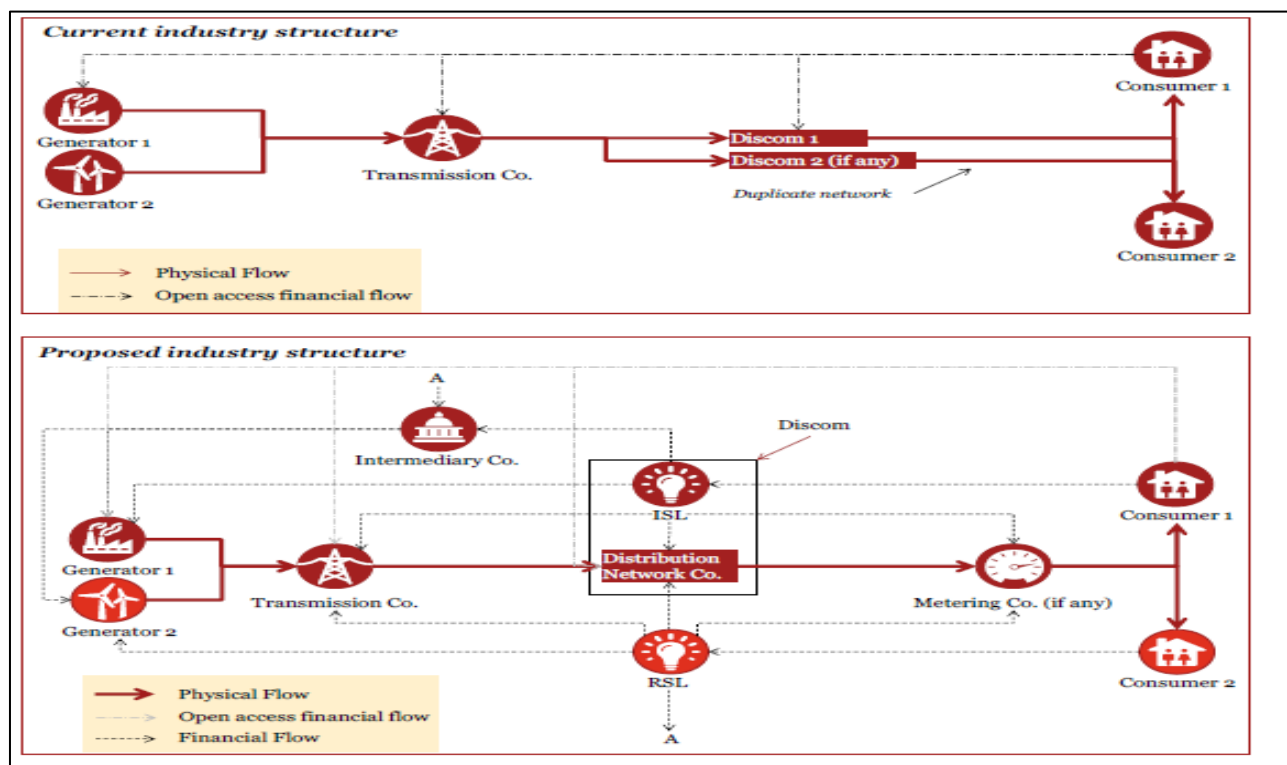
This can be accomplished by segregating the distribution of electricity from ownership of the distribution wire. Discoms would continue to own the wire while sale of electricity would pass on to retailers/separate supply licensee. The supply licensee would contract with Gencos to buy electricity for sale to its final customers. Electricity distributors will thus compete for customers. Retail competition is anticipated to improve operational

and cost efficiencies, and give an alternative of electricity supplier to their end consumer. Competitive supplier would buy electricity from generators or in the wholesale market and bundle it to meet varied consumer demands. Their financial viability would depend on their capability to meet consumer preferences and this is expected to result in lower retail prices and greater effort by competing suppliers on increasing efficiency and consumer welfare. Therefore, by introducing competition in retail electricity supply and ensuring the market functions well within the defined set of rules, the competition is expected to guarantee service quality as well as appropriate pricing (Niti Aayog, 2017).

Electricity (Amendment), Bill, 2014 and Forum of Regulator's model rollout plan:

Ministry of Power, Govt. of India has recently circulated Electricity (Amendment), Bill, 2014. The proposed industry structure by the Electricity (Amendment) Bill, 2014 is represented below:

Figure 1.4: Proposed industry structure in India by the Electricity (Amendment) Bill, 2014



The Bill advocates introduction of segregation of wire and supply business to enhance competition but it is silent about various aspects relating to rollout plans, and implementation of bifurcation and reorganisation of segregated businesses (Niti Aayog, 2017). To address the unclear areas of Bill 2014, the Ministry of Power, Government of India requested the Forum of Regulators (FOR) to evolve a model rollout plan and transfer scheme so as to bring the required clarity on the issues involved in implementing the framework by the States. Accordingly, FOR developed a model rollout plan for separation of carriage and content for implementation by the States in India. It has suggested the implementation in three stages viz., functional segregation of Discoms, preparation for competition and onset of competition, for smooth transition of electricity market into retail supply competition (Forum of Regulators, 2013 and 2015).

As electricity is a concurrent subject under the Indian Constitution, States are expected to put their Discoms on a fiscally sustainable path for power sector reforms designed by the Centre. However, these power sector reforms are being implemented unevenly by States, making distribution structure different for every State across India (Pargal and Ghosh, 2014). Accordingly, model framework suggested by FOR might not be workable across various States in India and would require detailed plan for the State factoring distribution preparedness and adequacy. Therefore, for introduction of competition in retail sale of electricity, several tasks would have to be performed and several issues that may arise while implementing these tasks need to be addressed.

This paper is an enquiry into international experiences in introducing competition in retail supply of electricity by separation of wire from the content of supply in distribution of electricity. This would enable to identify the

similarities in the process and obtain learnings for implementation by individual States/Countries. Internationally, the competitive retail supply model has been implemented in a full-fledged manner in the United Kingdom (UK), New Zealand, Singapore, Norway, Finland, Spain, Argentina, certain States of Australia and California State in the United States of America. It is currently under various stages of implementation in other countries such as the Philippines. Of these, the UK and the Australian State of Victoria are widely regarded as relevant models of implementation where introducing competition in retail electricity supply involved segregating distribution and supply functions as required in Indian context and resulted in lowering electricity prices for low end consumers. Five international experiences, viz. UK, Australia, Philippines, New Zealand and California, were chosen for a detailed study of their electricity reform processes, in particular criteria that required to be considered for introducing retail supply competition in India and also having mixed experience of success and failures. Based on various international experiences on key issues of electricity retail supply competition, a framework for India as suggested by Forum of Regulators have been analysed.

As an outcome, the paper provides a set of precise recommendations to develop a comprehensive framework for introducing retail supply competition in Indian power sector. For that reason, this paper also puts forward multiple recommendations on the key issues of the retail supply competition in electricity market as discussed in model framework developed by Forum of Regulators is not workable and thereby recommends necessary changes to improve the rollout and transfer schemes to be prepared by various States of India.

Section 2 of this paper elaborates the methodology followed in the research and question formulation. In Section 3, authors discuss the international experience on various parameters of introducing retail supply competition in electricity. The findings and discussions on the key issues that answer the research questions have been elaborated in Section 4. The paper is concluded in Section 5 with appropriate recommendations on introducing retail supply competition in electricity in India.

METHODOLOGY:

Systematic review of literature:

Systematic review of literature has been undertaken in this paper, with a thoroughgoing learning from international experiences in electricity retail supply competition and analyses similar rollout plan of introducing competition in retail supply of electricity and its framework for India. In a review, all articles pertaining to a particular research question are collected and analysed.

Question formulation:

The research question is formulated based on the researcher's interest to know introduction of electricity retail supply competition across developed countries with an objective of benefitting reduction of consumers' tariff due to wholesale market price discovery and to suggest its rollout and framework for India.

RQ: How competitions in retail supply of electricity has been introduced in developed countries and to analyse its framework for India.

The RQ requires us to study the international experience on electricity retail supply competition and its critical issues for separation of wire from contents of supply of distribution business.

Document Analysis:

For systematic review of literature, document analysis research methodology was found most suitable. Document analysis is a systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material (Glenn A. Bowen, 2009). The process of document analysis followed in the current research involved formation of a conceptual framework with which Research Questions were framed and then a detailed analysis of various documents was conducted to locate the answers to the Research Questions.

In order to locate various documents on the subject matter, a thorough search was conducted across electronic databases such as EBSCO and Jstor and Emerald. A detailed study was also undertaken for the model framework on retail supply competition in electricity issued by the Forum of Regulators in India. Apart from that 'grey literature' such as reports, conference proceedings etc. was also explored as its importance was emphasised by Bryman (2012) and Petticrew and Roberts (2006).

The document analysis was conducted to obtain articles or previous research studies on international introduction of retail supply competition in five shortlisted countries with similarity of function required in Indian context and the criteria required to be considering for segregation of distribution and supply function for existing Discoms in India. The exhaustive list of documents explored for document analysis is as shown in Table 1.

Table 2.1: List of documents for analysis

Country	Total Number of Documents	Reference No.
United Kingdom	Six	Ref. Sr. No. 1, 4, 8, 10, 12 and 16
Victoria, Australia	Four	Ref. Sr. No.11, 13, 18 and 23
Philippines	One	Ref. Sr. No. 16
New Zealand	Two	Ref. Sr. No. 1 and 7
California	Two	Ref. Sr. No. 1 and 16
India –Suggested	Five	Reference Sr. No. 15, 16, 17, 20 and 21

Based on the literature review, the findings were categorized into;

- A. Analysis on critical issues of introducing competition in retail supply of electricity across developed countries and its framework for India
- B. Analysis on Indian specific critical issues of introducing competition in retail supply of electricity.

OVERVIEW OF INTERNATIONAL EXPERIENCE IN INTRODUCING COMPETITION IN RETAIL SUPPLY OF ELECTRICITY:

Internationally, the competitive retail supply model in electricity distribution has been implemented across various developed countries. The authors have selected five countries, such as UK, Australia, Philippines, New Zealand and California State of USA as these countries have undertaken the segregation of distribution and supply functions as also required in Indian context. Also, the authors, while reviewing the literature on these countries in introducing retail competition, have mainly focused on the criteria which are required to be considered for introducing retail supply competition in India. These criteria include, segregation of existing Discoms, segregating distribution and supply functions and ownership, structuring of power procurement from the wholesale market, tariff determination, reduction of cross subsidies built in the existing tariff, universal supply obligations, phasing of retail of competition, framework for consumer interfaces and up-gradation of metering infrastructure.

United Kingdom (UK):

The UK has created successful model of competition in the retail electricity sector, which started in late 1980s and seen several transformations before retail competition was introduced for end consumer's up till the household level (Forum of Regulators, 2015). The UK electricity structure prior to reforms was vertically integrated and state-owned Central Electricity Generating Board (CEGB) to look after generation and transmission of power and regional area boards used to distribute and supply power to respective geographical areas. Some of the major changes in the sector were as follows:

- All oil and coal-fired generating plants in England and Wales that had previously been under the control of the state-owned CEGB were allocated to two new companies, i.e., National Power and Powergen and one transmission company (National Grid Company, i.e., NGC);
- Regional area boards were replaced with 12 Regional Electricity Companies (RECs) and the local distribution systems were transferred to the RECs. In due course of time, the Government sold off all 12 RECs (Thomas, 2005; Pond 2006);
- Establishment of the electricity pool as a wholesale market mechanism through which electricity was traded in England and Wales. The Pool was set up to facilitate a competitive bidding process where generators quoted bid prices for electricity for each half hour of the day. The bids were ranked by price and the last unit required to meet demand set the clearing price for the system. Thus, the Pool acted as a clearinghouse between generators and wholesale consumers (primarily the RECs). The NGC operated the Pool and administered the settlement system on behalf of Pool members. The Pool was often subjected to regulatory interventions aimed at controlling monopolistic behaviour and preventing re-integration in the electricity industry (Pond, 2006; Newberry 1999);
- Abolition of the Electricity Council and creation of a system of independent regulation for regulating the newly privatised electricity industry (Forum of Regulators, 2015).

The retail market was opened up to competition in three phases, starting from April 1990 and culminating in May 1999. The Utilities Act 2000 mandated ownership separation of distribution (wire) and retail supply businesses. This Act has abolished the existing distribution/retail licences, and introduced a Great Britain-wide licence, allowing all suppliers to supply customers nationwide. The retail side of the market was divided into "franchise" and "non franchise" customers. Non franchise customers were given the option of choosing their

supplier from any of the 12 RECs or from the pool or from retailers (Forum of Regulators, 2015). With this legislation, a distribution network operator could no longer sell electricity as a retail supplier. This supported from the rationale that allowing Discoms to remain in retail supply may adversely affect market competition. These Discoms may have discriminated between their own consumers and those taking supply from competitors when it came to network-related service or they may have subsidized their own retail customers by using the wire tariff to cross-subsidise them. Therefore, the 2000 Act separated the competitive activity, i.e., retail supply from the inherently monopolistic distribution business, thereby eliminating conflict of interest.

The UK experience is highly encouraging for a nation considering the path of segregating electricity wire and retail supply businesses, and introducing retail competition. This experience tells us that the phased model of rolling out retail competition is necessary in order to allow the market, so far insular to competition under the control of a regulator, to evolve to competition-based price setting. An important feature of retail sector reforms in the UK was formation of a trading pool which was monitored, assessed and routinely modified through several review mechanisms to ensure proper functioning of trading arrangements by regulator. The wholesale market evolved into a highly developed mechanism with financial tools and instruments being devised for trading of power. This coupled with the energy surplus scenario was significant in assisting retail side reforms (Pond, 2006).

The reduction in retail electricity prices happened due to various reasons that complemented the benefits from retail competition, viz. wholesale market reforms and discovery of alternative source of energy (gas). The RECs were allowed to buy up to 15 per cent of their power from their owned plants. Thus the very principle of separation of generation and retail was compromised. Till 1998 the Generators were buying retail companies and retail companies were buying generators (Srivastava and Kathuria, 2017).

The RECs were asked to make the accounting separation between their distribution and retailing business. Initially they were protected from takeover by the golden shares requirement for 5 years (i.e. at least 51% of voting rights at all time with the company). The regulator's concern was to eliminate any possibility to subsidize the retail business from the competition chocking off in the distribution business (Thomas, 2005). By 2004 the distribution of half of the region of England, Wales and Scotland were owned by companies other than the owners of retail business. EDF, Scottish Power, Power Gen and Scottish and Southern operate in both distribution and retail. In 1990 the priority of the Government was to ensure that transmission should not be owned by the generator to avoid possibility of unfair network access. The Government was successful in achieving this objective by creating National Grid Transco in 2003 (Thomas, 2005).

The Government decision to allow integration of generation and retailing means that originally planned fully competitive structure is not workable. Of the six integrated companies the parent companies of three foreign companies are much larger than the three British owned companies (Srivastava and Kathuria, 2017).

Another area of learning from the UK is the way consumer interest was safeguarded and their electricity supply made secure by way of the universal service obligation wherein Last Resort Supply direction was given to the incumbent distribution licensee under certain conditions. Moreover, the distribution network operator has the "Duty to Connect" i.e. make available the distribution network on request, whereas the incumbent licensees as well as competitive retailer(s) both have the "Duty to Supply" i.e. to meet all reasonable demands for supply of electricity made by customers within their supply areas on reasonable/approved terms (Forum of Regulators, 2015).

Victoria, Australia:

Retail competition is introduced in Australia gradually with Victoria being the first State as Victoria is largest electricity market in Australia with 2.1 million residential customers and 300,000 business customers. The objective to restructure Australia's electric power industry to a more competition-based market was to improve Australia's economic efficiency and international competitiveness, and for reducing state and national debt. The anticipated result was lower prices and improved services. Reforms took place over a period of 25 years beginning from 1980. The salient features of the electricity industry's restructuring were as follows:

- Commercialization of state-owned electric organization through privatization and through corporatization into separate governmental business units;
- Structural unbundling of generation, transmission, retailing, and distribution functions (and assets) to achieve vertical and horizontal disaggregation of the electricity industry;
- Creation of a National Electricity Market organized as a centralized, market-based trading pool for buying and selling electricity; and
- Establishment of appropriate regulatory regimes terms (Parliament of Australia, 1997; Forum of Regulators, 2015).

In 2004, after the preparation of 24 years, full retail competition was introduced across Victoria and at present there are 5 electricity networks (called distributors) in operation. These distributors own and maintain the

electricity networks in different geographical areas. The retail market being fully deregulated, power companies are able to set their own retail prices. As at November 2012, there were 14 main retailers retailing electricity to households in Victoria. The phasing of introducing competition was extremely circumspect in Victoria, with the first phase targeting, with progressively bigger (in terms of number of consumers affected) segments being deregulated over time. Significantly, the Maximum Uniform Tariff (MUT) regime implemented by Victoria was an effective step towards guaranteeing real reductions in electricity prices for the end consumer. However, policymakers must be circumspect about implementing such a step as the drawback of a fixed retail tariff regime can be felt in case prices rise unexpectedly in the generation/wholesale market without any corresponding adjustment in the specified retail tariffs/MUT, since retail companies would have to take a severe hit in such scenarios. A variant of such a scenario was witnessed to disastrous consequences in California, as discussed later in this section (Essential Services Commission, 2013; Australian Energy Market Commission, 2014; Australian Energy Regulator, 2017).

Philippines:

The Philippines introduced the Retail Competition and Open Access regime through the mandates of the Electric Power Industry Reform Act of 2001 (EPIRA). The EPIRA is aimed at making electricity markets competitive in recognition of the fact that the electricity industry, as it was organised in the Philippines, had become unsustainable and was functioning less than efficiently. The electricity regulator began the process of introducing retail competition by clearly announcing that the competition would be ushered into the market after the pre-conditions set in the EPIRA are met and when the regulator declares it. When this happens, electricity consumers can choose their own Retail Electricity Supplier, with commercial and industrial customers being the first ones opened up to competition. The EPIRA mandates that all types of cross subsidies be phased out within a specified period. Pending the complete removal of cross subsidies, each cross subsidy rate level is to be shown as a separate item in customer billing statements. It was mandated to establish a Universal Charge(UC) to be recovered from all electricity end-users to account for – among other factors – all forms of cross subsidies that remain during the phase out period(Forum of Regulators, 2015).

New Zealand:

New Zealand is the only country in the world which has implemented forced ownership unbundling of distribution from rest of the electricity supply industry. Under ownership unbundling a separate company owns and operates the network assets. This company is not allowed to own the non-regulated generation and/or retail activities(Srivastava, 2017).

The actual liberalization and deregulation of New Zealand electricity market began in 1992 with Energy companies act. The Discoms called Electricity Supply Authorities (ESAs) were offered deregulation and self-regulation regimes. The government followed up the 1992 bill by another Electricity Industry reforms act in 1998 to take care some of problems observed during the 1992-98 period such as bringing more competition in generation by further splitting the existing large company ECNZ and forcing the industry to facilitate the switching of suppliers by the customer at their choice.

It is observed that commercial electricity prices have fallen, the industrial prices have remained flat and the residential prices have increased. In turn the average electricity prices have remained same. It appears that for large commercial customers the competition has increased but average electricity prices have remained same. The price cost margin too, after declining between, 1997-2001, have steadily increased. Number of participants in the competition fell from 43 to 22 suggesting more concentration and lesser competition (Forum of Regulators, 2015). The effect of ownership unbundling on retail competition has been mixed. After a dropping price-cost characteristic suggesting increased competition, the competition has reduced. The quality of networks has been better following unbundling and there is a substantial operational cost saving (Nillesen, 2011).

California:

The California experience remains the most momentous cautionary tale on the subject of electricity sector reforms. Within the period of a few years, restructuring of the industry and reforms aimed at deregulation and enhanced competition went so awry that the results left the California electricity sector as well as public exchequer in a mess (Srivastava, 2017).

As documented in various reports, between the year 1999 and 2000, prices in California's competitive wholesale electricity market increased by 500%, and for the first four months of 2001, wholesale spot prices were almost ten times what they were in 1998 and 1999. However, retail tariffs, being fixed by the regulator

until 2001, could not keep up with this dramatic rise in wholesale prices and consequently, California's two largest utilities became insolvent by 2001 as they were paying far more for wholesale power than the retail prices. Ultimately, the State of California had to step in and state funds were used to tide over the severe crisis (Forum of Regulators, 2015).

Prior to 1994, California's electricity industry was served by three Investor-Owned Utilities (IOUs) which were in the nature of strictly regulated vertically integrated monopolies. These IOUs owned and operated generation, transmission and distribution functions to cater to consumers in their exclusive franchise areas. Their tariffs, costs, performance as well as service obligations were regulated by the California Public Utilities Commission (CPUC). In April 1994, the CPUC embarked upon a radical reform program which articulated a new industry structure in which the production of electricity from existing as well as new generating plants would be deregulated and the power sold in a new competitive wholesale market. Retail consumers could choose to obtain "direct access" to these competitive wholesale markets by using only the wires system of their local utility, or continue to receive power from their local utility at regulated default service rates with the default service pricing formula which effectively capped the retail prices for up to four years.

From 1998 onwards, all retail customers were given the ability to choose a competitive electricity service provider (ESP) to provide them with generation services. If they did not choose an ESP they could continue to receive "default service" from their local utility Discom at the fixed default service rates. It was expected that most retail customers would gradually migrate to ESPs during the four-year transition period. However, contrary to earlier predictions, only a tiny fraction of consumers (not more than 12% of retail demand) migrated to ESPs (Forum of Regulators, 2015).

FINDINGS AND DISCUSSIONS:

Analysis on critical issues of introducing competition in retail supply of electricity across developed countries and its framework for India:

Functional segregation of Discoms and its structure:

International experiences in functional segregation of Discoms have been majorly led by the segregating wire and retail supply business by the incumbent governments for separating competitive segment from monopoly segment. The research of best international practices suggested that the Governments in UK, Australia and Philippines have adopted a phase by phase approach for introduction of competition in electricity retail supply whereas in New Zealand, unbundling of distribution from rest of the electricity supply industry was accomplished forcefully. International experiences have also suggested that the fundamental measure for functional segregation of Discoms has been the introduction of a sturdy and competitive wholesale market.

The second stage, in most of the international cases, was ring fencing of the distribution wire and retail supply business by creation of network operators and separation of duties between distributor and retailer. The next stage in functional separation of Discoms was introduction of retail supply competition to certain set of consumer viz. franchise and non-franchise consumer.

In India, Bill, 2014 provides that the existing Distribution Licensee will be trifurcated into:

- (1) Incumbent Supply Licensee (ISL) for providing retail supply to consumers;
- (2) Intermediary Company (IC) which will be inheritors/repository of existing PPAs between Distribution Licensees and Generators;
- (3) The reorganised Distribution Licensee (DL) dealing only with the wires.

Forum of Regulators (FOR) of India suggested that the new DL could be further broken down into Distribution Network Operations (DNO), Distribution Planning Operations (DPO), Distribution System Operations (DSO) and Distribution Market Operations (DMO). These functions would be allocated to separate entities for ensuring no conflict of interest and focused operations/investment in each function. However, in the initial stages of retail supply competition, the functions of DNO and DPO could be given to a DL while the functions of DSO and DMO could be given to State Load Despatch Centre (SLDC) or IC. Since many of the current Discoms do not have Supervisory Control and Data Acquisition (SCADA) installed, therefore the installation of SCADA is essential to be installed for DSO before the introduction of retail supply competition.

With regard to ownership, FOR suggested that the erstwhile Discoms would be separated into functions – the distribution and retail supply in the first stage and in the later stage, the State Government could either disinvest their ISL or continue as a separate entity but with a separate ownership controlled by the Government.

The framework suggested by FOR has not addressed the concern of eliminating any possibility to subsidize the retail business from the competition choking off in the distribution business. Further, the framework has failed to suggest any measure regarding integration of generation and retailing as has been observed in the best international practices.

On the basis of various findings during the research and following best international practices, it is recommended that India must move away from the concept of integration of generators and retailers. This will prevent the retailers from circumventing the competition by signing long term PPAs with their own generators (e.g. Tata Power, Reliance Infrastructure, Torrent Power, RPG Group) when the lesser cost power is available in the market thereby, compromising the wholesale market as well. There are some examples in India wherein one group company holding both generation and distribution portfolio is selling power from its generator to distribution business which prevents the competition and encourages monopolistic behaviours.

Further, it is recommended that Discoms must be completely separated from the distribution wire business for eliminating any possibility to subsidize the retail business from the competition choking off in the distribution business. If a Discom remains in retail sale of electricity, it may discriminate between their own consumers and those taking supply from competitors when it came to network-related services, or it may subsidize their own retail customers by using the wire tariff to cross-subsidise them.

Power procurement mechanism and wholesale market:

International experience suggests that a strong wholesale market for purchase of electricity (usually a spot market and in time a secondary futures market in hedge contracts) is required to be established before introducing competition in retail supply of electricity. The best international experiences, be it UK, Philippines or Australia, all have established that a national level energy pool or a strong competitive wholesale market along with power surplus scenario is a must for retail supply competition in electricity, which helps in power procurement by retailer at competitive market prices. The fall in electricity prices in Victoria, Australia has been widely attributed to a successful power pool.

FOR framework suggested that the existing PPAs of the incumbent Discoms would be transferred to IC and the State Governments could explore the possibility if some PPAs or a certain part of all PPAs could be shifted to wholesale market. The IC would allocate these PPAs between various Retail Supply Companies (RSCs) based on their power requirements. The framework further suggests that in cases where the quantum of PPAs with the current Discoms is more than the power requirement of the area of supply, the IC could be left with excess PPAs after meeting the requirements of the retail suppliers. Also it is possible that power is available in the market at rates cheaper than the PPAs. In such situation, the RSCs would want to not accept power from the IC and purchase power from the market instead. However, since the IC does not have assets or sufficient revenue sources to take on financial losses due to un-allocated PPAs, FOR suggested that the RSCs mandatorily accept all the power allocated by the IC and then approach the market for any additional requirement that they may have.

The FOR suggested framework has not put forward a framework for development of national level wholesale market mechanism for retail supply competition and instead it has devised a mechanism for shifting of PPAs. It is recommended that wholesale market mechanism in India must be relooked and seller or buyer dominance must be put to an end. This could be achieved by designing the market in such a way that;

- (1) Short term market which currently is limited to around 5-10% of total power sale across the country, is increased immensely and RSCs should be able to buy its requirement at competitive prices;
- (2) National level pool or market i.e., State Gencos which are contracted to State Discoms should be opened to market in phases and policy in this regard must be introduced;
- (3) Market dominance of monopolistic generators that own enough generation capacity to influence the market must be curtailed and regulated.

Upgradation of infrastructure and metering:

Best international practices suggest that unlike the traditional mechanism of integrated metering department, original metering business be segregated from their corporate companies by creation of independent metering company.

This is achieved by multi-level segregation strategy, i.e., third party arrangements for following functions:

- (1) Procurement, asset management and tracking, fault triage, warranty claim management;
- (2) Installation, operation and maintenance of meters.

Further, in most of the international cases advanced metering infrastructure were introduced as a pre-condition for introduction of retail supply competition. This is because; it will complement the choice of customers to shift to different retail suppliers without installing new meters and duplication of assets. In some international cases, it was observed that Discoms still hold the responsibilities for provision, installation and maintenance of metering systems. In most cases the development of metering infrastructure involves introduction of new metering technologies such as Time-of-Use meters, prepaid metering, etc. which have encouraged retail supply competition and have also helped in asset management, proper billing and collection.

FOR framework suggested that the metering activity relating to reading can be given to RSC as the responsibility to reduce collection inefficiency losses would lie with the retail suppliers. However, the metering activity relating to meter installation/replacement, ownership of meters, meter operation and testing would be decided to be given to Distribution or RSC or 3rd Party Company based on the approach taken towards loss allocation.

In respect of up-gradation of existing meters, FOR framework suggested that the existing meters need to be replaced with advanced/smart meters which would be capable for recording consumption for every 15 minutes so as to allow accurate measurement of losses in area of supply and calculation of actual power purchased and sold by each RSC and determination of deviation settlement for each RSC. To address the issue with respect to cross-verification of meter reading data by a Discom, it is suggested that the meters used by consumers should have data transfer/download capability and the responsibility of energy accounting, meter installation, and operation and maintenance of meters should be open to competitive services (i.e. 3rd Party) rather than keeping it regulated (i.e. Discom).

Framework for consumer interface and grievance mechanism:

In most of the international cases it was observed that distribution and the retail supply businesses have separate consumer interface to deal with consumer complaints or queries or requests. If a consumer is dissatisfied from the solution to complaint then the consumer can go to Ombudsman. Ombudsman investigates complaints from domestic and micro business consumers that the energy company cannot resolve (after eight weeks or deadlock). Ombudsman has given powers to correct the problem, apologise, and explain what happened, and makes a financial award. Ombudsman recovers case fee from the company and service is free for consumers. In case of issues such as failure of power lines the RSCs and the relevant Discoms are required to agree on a protocol regarding the steps to be taken in addressing the issue and the information dissemination program of such to the affected customers. In case a customer has an unresolved dispute, provision to file a complaint with the ERC also exist.

FOR suggested that the RSC should offer a single window interface for all types of consumer complaints/queries/requests. Also a two layered Consumer Grievance Redressal Mechanism should also be developed consisting single grievance forum for all entities (Distribution, RSC and Metering if any) and independent ombudsman.

The consumer complaint and grievance resolution mechanism has already been addressed in the EA, 2003 to a greater extent and as also pointed out in the FOR framework both distribution and RSC should establish a single window interface for all consumer complaints and requests. However, FOR framework does not address the issue of a mechanism in case of an emergency situation and distortion of power supply lines and required coordination between RSCs and Discom. It is suggested that a protocol in this regard must be considered so as to address such kind of exigencies and proper information dissemination.

Tariff setting mechanism:

International experience suggests that the retail supply market is a competitive market with no price control on retail tariff. In the competitive market, electricity retailers are able to offer supply of electricity to all consumers, including those on regulated prices. Consumers taking up such an offer are transferred from the regulated price to the market contract price they have accepted from the retailer. However, regulated electricity prices remain an important feature particularly when, customers not offered a market contract, or choose not to accept an offer, remain on a regulated price. In addition, small consumers who accept a market contract may revert to a non-market contract at the regulated price in the future, subject to any contractual conditions that may apply to their market contract. In effect, the regulated price sets a ceiling on the basic price that consumers are required to pay. As such, it is important that regulated prices adequately reflect the costs and risks assumed by electricity retailers.

FOR framework suggested that the State ERC (SERC) will have to determine unbundled tariff individually for distribution business and retail supply business. For the distribution business, the SERC would determine a regulated tariff. Till the time consumers are not open up for competition, the SERCs would determine a regulated tariff for all the consumers of incumbent RSC. However, after the introduction of new RSCs, the SERCs would have to determine two separate tariffs for the RSCs – a regulated tariff for the non-contestable consumers and a ceiling tariff for the contestable consumers. The RSCs would have to mandatorily offer a standard tariff plan charging ceiling tariff along with its offer. Since incumbent RSC would have both contestable and non-contestable consumers they would have to maintain separate financial accounts for the non-contestable and the contestable consumers.

The pricing/ tariff determination mechanism as pointed out in the FOR framework appears to be in line with the best international practices, to the most part. In case of Mumbai parallel licensing operation experience

establishes that fixing ceiling tariff in retail supply competition would require homogeneous sales and revenue mix of the Licensees for whom ceiling needs to be fixed. Hence, introduction of ceiling tariff would need to be addressed into greater details and it is suggested that a deliberate measures addressing Mumbai experience, must be developed for encouraging retail competition.

Further, the California experience depicts a scenario when the retail prices were given a ceiling and have remained fixed while wholesale prices have increased substantially which resulted into insolvency of California's two largest utilities and consequently failed the retail supply competition model. It is recommended that measures addressing California's failures must be developed for India in the FOR suggestive framework.

Universal Service Obligation (USO) and creation of Supplier of Last Resort (SOLR):

Internationally, provisions of USO relate to duty to connect and duty to supply and are created so that no customer remains affected without any electricity connection. In international experiences, if an energy retailer fails due to reasons such as revocation of licence, suspension of rights to buy electricity from the wholesale market, etc., all of its customers will be automatically transferred to the SOLR with no loss of connection and if one local retailer fails, its customers will be transferred to the remaining local retailers. Internationally, terms and conditions applicable to the supply of power through SOLR are regulated by the Electricity Regulatory Commission. The SOLR rate is the higher of applicable whole sale electricity spot market ex-ante nodal energy price and bilateral contract price entered into by the SOLR plus a 10% premium.

FOR framework recommended that the responsibility of USO for connecting the network to the consumers as 'Duty to Connect' would be given to Discom and the responsibility for supplying electricity to consumers would be given initially to incumbent RSC. After the new RSC comes into the market, the duty to supply would be extended to them as well. If the RSC fails to supply electricity to its consumers in case the supplier goes insolvent or has insufficient power available, FOR suggested that the responsibility of supplying power to such consumers would fall upon the ISL. It suggested that the transfer scheme and the roll out plan of State would have to detail whether the supplier of last resort i.e. the ISL would be compensated based on the tariff charged to the consumer by failed RSC, competitive tariff, ceiling tariff or actual cost pass through to the consumers.

The FOR suggested framework for USO and creation of SOLR appears to be in line with the best international practices and may be adopted.

Reduction of cross -subsidies:

International experiences suggest that before the commencement of retail supply competition, removal or phasing of cross subsidies built in tariff must be considered. In most of the international cases it was observed that all types of cross subsidies were phased out within a specified period before the introduction of complete retail supply competition. If the cross subsidy levels were persisting even after the introduction of retail supply competition, the ERCs were mandated to establish a UC which was to be recovered from all electricity end-users to account for all forms of cross subsidies that remain during the phase out period.

FOR framework established that keeping in mind high level of cross subsidies for some categories in certain States, the approach of 'Year on Year tariff hikes' could lead to tariff shocks. Also the wheeling charges may not be sufficient to subsume the high level of cross subsidies. Therefore, FOR suggested either approach of UC fund or approach of Direct Subsidy from Govt. could be adopted to reduce cross subsidies.

It is suggested that all the ERCs are required to follow a strict mechanism for determination of UCs for compensating cross subsidy and to remove any regulatory uncertainty before and after the introduction of retail supply competition.

Phasing of retail supply competition:

International experience suggests that the retail competition can be introduced in phases, where in each phase, the new retail supply companies would be allowed to supply electricity to a certain section of consumers. Phasing is important because it allows a pilot study by introducing competition in a smaller section of consumers first. Further phasing allows new players time to ramp up their resources gradually and acclimatise down to new regulations and industry structure. Phasing can be done based on connected load of consumer, energy consumption of consumer, area of supply or consumer category. Further the phasing can be done in an increasing or decreasing fashion based on these factors.

FOR framework suggested that phasing could be either decreasing connected load or increasing connected load of consumers. In the decreasing connected load approach, the consumers with higher connected load would be open for competition first and in later phase, threshold limit can be reduced further. In the increasing consumer

load approach, the consumers with lower connected load will be allowed to select their RSC. In the later approach as majority of these consumers are connected at lower voltage, where majority of distribution losses incur, the loss reduction opportunity will be higher, however, the scale of operation required, will be a big challenge and may act as an entry barrier for new players and result in non- starter of the entire reform process.

Analysis on Indianspecific critical issues of introducing competition in retail supply of electricity:

Allocation of Technical and Commercial losses between distribution and supply companies:

FOR has discussed following three options for allocation of the losses between segregated distribution and supply companies:

- 1) Collection losses to RSC and remaining losses to Discom;
- 2) Technical loss and hooking loss to Discom and remaining losses to RSC;
- 3) All commercial losses to RSC and technical losses to Discom.

While the Technical and hooking losses should be allocated to Distribution business, as these losses are related to physical network, it is difficult to measure and differentiate between these losses. Therefore, except collection inefficiency and technical losses (which can be measured), all the other losses would be allocated to a single entity. This translates to adopting either approach 1 or 3 of loss allocation.

In licence areas where the current level of losses is high, entire commercial losses could be allocated to the retail supply business to attract investment, improve metering and faster reduction of losses. This translates to approach 3 of loss allocation.

In licence areas where the current level of losses is on the lower side, the commercial losses other than collection inefficiency could be allocated to the distribution business. This translates to approach 1 of loss allocation.

Therefore, FOR framework suggested that based on the current level of distribution losses (AT&C loss less collection efficiency) in the State, either approach 1 or approach 3 of loss allocation could be adopted.

Balance sheet segregation of current Distribution business among new entities:

FOR framework suggested following:

Allocation of assets:

The fixed assets before the meter would be allocated to the Discom, while the fixed assets beyond meter would be given to the RSC. The metering assets would be given to either Discom or RSC depending upon who gets the responsibility of other metering related activities (meter installation/replacement, ownership of metering assets, meter operations and testing). Receivables due from the retail consumers could be allocated to the IC. These assets can be used by the IC to service its liabilities. The consumer security deposits would be given to the RSC based on the number and type of consumer under each of the companies. The guarantee amounts submitted by various contractors of current Discom will be allocated between Distribution and Supply businesses based on the Fixed Assets allocated between them.

Allocation of liabilities:

Based on the fixed assets allocation between individual businesses, the liabilities attached to them will also have to be allocated to the Distribution and Supply companies respectively. The current liabilities related to power purchase will be transferred to IC. The IC would then further collect these from the incumbent RSC. Liabilities related to contractor's payments will be allocated between the Discom and RSCs based on the activities and asset allocation between the two.

Treatment of existing financial losses:

FOR framework suggested that the existing recognised regulatory assets of current Discoms would be transferred to IC and it would then amortize these assets by either collecting a UC or through financial support from State Government. Unrecognised financial losses on the balance sheets of the Discoms, formed due to either dis-allowance of certain costs by the ERC or due to imprudent costs, would either be allocated to existing companies or support may be sought from State Government for cleaning up the balance sheets.

Consumer switching mechanism:

FOR framework suggested that shifting of consumers from one retail supplier to another would need deliberation on following changeover activities.

- (1) Recovery of stranded costs like past revenue gaps or regulatory assets from consumers;

- (2) Recovery of dues from consumer;
- (3) Defining consumer category at the time of switching;
- (4) Security Deposits; and
- (5) Frequency of consumer switching.

FOR suggested that above issues regarding consumer switching would have to be detailed in the transfer scheme and roll out plans to be developed by individual states. It is suggested protocol and procedure set out in Mumbai parallel operation may be used in the rollout plans to be developed by individual states.

CONCLUSION:

In accordance of Electricity (Amendment) Bill 2014, Forum of Regulators (FOR) has prepared a model rollout plan for introduction of competition in retail sale of electricity and recommended a framework on key issues involved in implementation like segregation/reorganisation of Discoms and its new structure, roles and duties, power procurement mechanism, reduction of cross subsidies, allocation of losses amongst wire and retail supply companies. The suggested framework in respect of power procurement mechanism is in variance with the international framework which has a strong competitive wholesale market at national level and provides a competitive price of bulk power to retail companies. Whereas the framework suggested by FOR recommended an Intermediary Company at every State Discom, which will be inheritors/repository of existing power purchase agreements (PPAs) between Distribution Licensees and Generators, allocate power to retail companies based on average price of PPAs.

The international experience tells us that the creation of highly competitive wholesale electricity market was the centrepiece of reforms and success for extending competition at retail end consumers is largely dependent on this component. It is also worth noting that Philippines went for substantial wholesale market reforms before setting upon the course of retail competition. Mumbai parallel licensing experience under the present Electricity Act 2003 provides slow progress in consumer choice due to larger time frame taken for reduction of cross subsidy built in tariff and no scope of reduction of power purchase expense as it is historically tied up with its own regulated generating plant. Hence, prior to initiation of steps for the retail supply competition a systematic review on Indian wholesale market needs to be undertaken and ability of retail companies of every State to procure its requirement with competitive wholesale market price needs to be simulated.

International experience suggests that levy of Universal Charge (UC) on all electricity users in order to phase out cross subsidies remaining in the system is a concept that can be considered by India where tremendous cross subsidies still prevail in retail tariffs set by regulators.

International experience suggests that the retail competition introduced in phases, where in each phase, the new retail supply companies would be allowed to supply electricity to a certain section of consumers which results into contestable (unregulated) and non-contestable (regulated) retail market. This phasing is important because it allows new players, time to ramp up their resources gradually, protect low end consumers and acclimatise down to new regulations and industry structure.

In India large agriculture consumers are provided electricity connection without meter and with fixed tariff structure. Before making them as a contestable consumer it is necessary that the metering arrangement is required to be in place. FOR framework suggested that incumbent retail supply licensee would install the meter for unmetered consumers. This framework has not suggested any remedy to the contestability of such consumers.

International experience suggests a non-conflicting mechanism for separation of distribution business from contents of supply. It expects a separate distribution network company which owns and operates the distribution network assets and this company is not allowed to own the non-regulated generation and/or retail activities. These issues of international experience need to be factored into a detailed rollout framework for introducing competition in retail supply of electricity.

There are certain specific key issues which are Indian specific, like allocation of financial losses, allocation of technical and commercial losses between new companies and balance sheet segregation of Discoms, on which international learnings are non-documented and needs to be framed as per the State conditions.

REFERENCES:

- Govind Srivastava and VinishKathuria, (2017). Study of Power Sector Reform Programs Across the World and Lessons for India, *International Journal of Research in Management & Social Science*, Volume 5, Issue 2 (II): April - June, 2017.
- Shilpi Mukherjee, Tarun Dhingra, AnirbanSengupta, (2016). Status of Electricity Act, 2003: A systematic

- review of literature, *Energy Policy* (journal homepage: www.elsevier.com).
- AtulAgrawala, AnilKumar, T. Joji Rao, (2017). Future of Indian Power Sector Reforms: Electricity Amendment Bill 2014, *Energy Policy* 107 (2017) 491–497 (journal homepage: www.elsevier.com).
- Ofgem, (2016). Retail Energy Markets in 2016. www.ofgem.com
- Ofgem, (2013). State of the market report - Assessment framework, www.ofgem.com
- Ofgem, (2016). Wholesale Energy Markets in 2016, www.ofgem.com
- Nillesen and Michael G. Pollitt, (2011). Ownership Unbundling in Electricity Distribution: Empirical Evidence from New Zealand, *Review of Industrial Organisation*, Vol. 38, No.1 (January 2011),pp.61-93; <http://www.jstor.org/stable/23884892>.
- Stephen Thomas, (2005). British Experience of Electricity Liberalisation: A Model for India, <http://www.jstor.org/stable/4417518>.
- NITI Aayog, Government of India, (2017). Draft National Energy Policy.
- David M Newbery, (1999). *The UK Experience: Privatization with Market Power*, Department of Applied Economics Cambridge, UK.
- Parliament of Australia, (1997). *Electricity Industry Restructuring: The State of Play*.
- Richard Pond, (2006). Liberalisation, privatisation and regulation in the UK electricity sector.
- Essential Services Commission, (2013). Progress of Electricity Retail Competition in Victoria.
- John A. Anderson, (2009). Electricity restructuring: A review of efforts around the world and the consumer response.
- Prafulla Varhade, Dr Anil Kumar and Dr.Tarun Dhingra, (2017). Evolution of Retail Supply Competition in Distribution of Electricity: A Choice to Mumbai Consumers, *International Conference on Management of Infrastructure*, 2017, Dehradun.
- Forum of Regulators, (2015). Roll out Plan for Introduction of Competition in Retail Sale of Electricity, www.forumofregulators.com
- Payal Malik, (2011). Design of power markets: Different market structures and options for India, *Retail Competition Review*, (2014). Australian Energy Market Commission.
- Standing Committee on Energy, Ministry of Power, 2014, Electricity Amendment Bill, 2014. Fourth Report, Sixteenth Lok Sabha.
- Ministry of Law & Justice, Legislative Department, (2014). Electricity Amendment Bill, 2014 [No. 191 of 2014]. Press Information Bureau, Government of India.
- Power Finance Corporation Ltd., Government of India, (2015). The performance of state power utilities for the years 2011–12 to 2013–14. Report on the Performance of the State Power Utilities.
- Anderson J.A., (2009). Electricity restructuring: A review of efforts around the world and the consumer response, *Electricity Journal*, 22, 70–86, <http://www.sciencedirect.com/science/article>.
- Australian Energy Regulator, (2017). State of the Energy Market –May 2017, www.aer.gov.au
- SheoliPargal and Sudeshna Ghosh Banerjee, (2014). *More Power to India: The Challenge of Electricity Distribution*.
- Glenn A. Bowen, (2009). Document Analysis as a Qualitative Research Method, 2009
- Bryman, A., (2012). Social Research Methods. Oxford Publishers.
- Petticrew, M., Roberts, H., (2006). Systematic Reviews in Social Sciences. Blackwell Publishing.
- Prayas (Energy Group), Many Sparks but Little Light, 2017.
- Prayas (Energy Group), In the Name of Competition, 2017.
- Central Electricity Regulatory Commission, Introducing Competition in Generation of Electricity, 2004.
