
Introducing competition in retail electricity supply in India

July, 2013

Forum of
Regulators



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List of Abbreviations

Abbreviation	Full form
ACoS	Average Cost of Supply
AER	Australian Energy Regulator
APTEL	Appellate Tribunal for Electricity
BETTA	British Electricity Trading and Transmission Arrangements
BEST	BrihanMumbai Electricity Supply and Transport Undertaking
CEGB	Central Electricity Generating Board
CoS	Cost of Supply
CPP	Captive Power Plant
Discom	Distribution Company
DLF	Distribution Load Factor
DNO	Distribution Network Operator
E Act	Electricity Act, 2003 (including all subsequent amendments)
EPIRA	Electricity Power Industry Reform Act
ERC	Electricity Regulatory Commission
GFA	Gross Fixed Assets
LT	Low Tension
HT	High Tension
MERC	Maharashtra Electricity Regulatory Commission
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MU	Million Units
MUT	Maximum Uniform Tariff
MW	Megawatt
NETA	New Electricity Trading Arrangements
NLDC	National Load Despatch Centre
NPC/Napocor	National Power Corporation (of Philippines)
NTPC	National Thermal Power Corporation
O&M	Operation and Maintenance
OFFER	Office of Electricity Regulator
OFGEM	Office of Gas and Electricity Markets
PES	Public Electricity Supplier
PPA	Power Purchase Agreement
RInfra-D	Reliance Infrastructure Limited (Distribution)
REC	Regional Electricity Company
RETA	Review of Electricity Trading Arrangements
RPI	Retail Price Index
SECV	State Electricity Commission of Victoria
SERC	State Electricity Regulatory Commission
SMP	System Marginal Price
SOP	Standard of Performance
SPV	Special Purpose Vehicle
TandD	Transmission and Distribution
TPC	Tata Power Company Limited (Distribution)
UC	Universal Charge
WESM	Wholesale Electricity Spot Market

About the report

Objective

PwC was given the mandate by the Forum of Regulators to study national and international experiences in introducing competition in retail supply of electricity and develop a roadmap for introduction of competition in the retail electricity segment of India. The scope of work of the assignment was as under:

- Review international experiences (with primary focus on the UK) and study the best practices in dealing with issues such as:
 - Various existing models of retail competition in electricity supply, viz. Complete separation of carriage and content, Hybrid model (distribution company may also offer retail services), Distribution company being the provider of last resort
 - Phasing of competition in retail sale
 - Clarity of roles and responsibilities across distribution network and retail supply businesses
 - Tariff determination and pricing of retail electricity
 - Distribution network ownership issues
 - Management of transition from existing system to retail competition
 - Any other related issue in implementation.
- Suggest alternatives for separation of network and supply businesses in distribution in India with due regard to the power sector scenario in India
- To recommend a competitive retail supply model suitable for India with due regard to the existing realities of distribution in India
- Identify crucial bottlenecks in the implementation of retail competition in India and generate discussion on vital questions which are to be debated with relevant stakeholders – state regulators, power utilities especially distribution companies, consumer groups, etc. – in order to introduce competition in retail electricity sector in India

In line with the scope of work, this report discusses various learnings from international experiences in introducing competition in retail supply and gives recommendations on the structure, extent and timeline of similar reforms for India, keeping in view the ground realities of the Indian power sector.

The report also seeks to emphasise several matters related to retail supply competition that require a much broader discussion with all involved stakeholders and are preconditions to creating the right kind of atmosphere for ushering in reforms in retail electricity sector.

Structure

The report is structured in the following manner:

- Status of competition across various segments of the Indian power sector
- Competition in the distribution segment and issues plaguing customer choice
- Brief discussion of five international case studies in retail supply competition
- Brief discussion of Indian case studies viz. Maharashtra model of parallel licensees and electricity supply to Special Economic Zones in Gujarat and Kerala
- Blueprint for introducing retail competition in India (including pre-conditions and risk factors for introducing retail supply competition in India)
- Recommended model and roadmap

The recommendations in this report are borne out of preliminary discussions, study and analysis of the requisite environment for introducing retail sector reforms in India, in line with the mandate of this advisory assignment. The actual modalities of implementation of these recommendations must be subject to a much broader and exhaustive discussion with all involved stakeholders, which is a pre-requisite to creating the right kind of atmosphere for ushering in reforms in the retail electricity sector.

Each of the issues brought up, suggested or discussed in this section requires a detailed discussion and impact assessment before being taken up for action. Further focused studies shall be needed in order to finalize the recommended model for India if the course of retail supply competition is deliberated upon and taken up further.

Introduction

Need for providing user choice in the Indian power sector

“Democracy is about giving choice to the people”

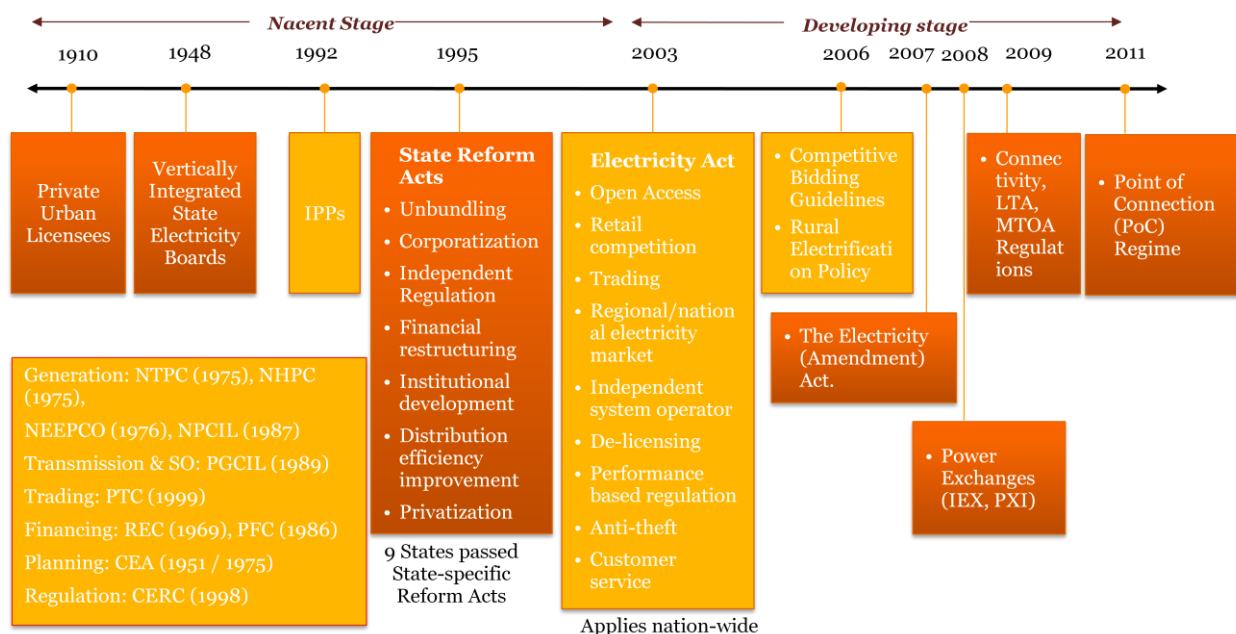
Power utilities have historically been government-owned monopolies because of the essential nature of services they provide and the massive capital investment they require. With the evolution of markets, nations around the world are recognizing the role played by regulated, well functioning markets in providing user choice and good quality service through provider competition. Such markets function within a set of rules and under the monitoring of regulatory bodies which ensure that the competitive framework is able to deliver **user choice**, operational and cost **efficiencies** as well as **policy objectives** such as universal access.

Status of competition across various segments of the Indian power sector

The initiation

The Indian power sector, since independence, was dominated by state and centrally owned vertically integrated utilities with the prime objective of making “power available to all”. The opening up of Indian economy in early 1990s and large scale liberalization, urbanization and industrialization led to a rapid increase in demand for power. The quantum of investment requirement grew exponentially and Government alone was no longer able to make adequate investments in the sector. As a result, power generation was de-licensed and opened to private investment in 1991 to provide a boost to the sector.

Legislative and regulatory groundwork



From 1996 onwards, focus shifted to unbundling of State Electricity Boards (SEBs) with the broad aims of enhancing function-specific efficiencies and ensuring better returns to generation and transmission businesses. Starting with Orissa, five more states opted for unbundling of their SEBs. Soon after in 1998, the Electricity Regulatory Commission Act was notified, which laid down provisions for establishing independent regulatory commissions at state and central level to regulate electricity prices. This form of

market structure was considered as a surrogate for competition in monopoly markets wherein the independent regulatory commission protects the interest of consumers and other market participants.

However, such a market structure is only transitional till the establishment of full scale competitive market. Subsequently, the Electricity Act 2003 was formulated to address the changing needs of the power market. The Electricity Act 2003 focussed on two elements: “development of a competitive power market with transparent market-driven pricing mechanism which gives the consumers enough options to choose from”, and “providing the right policy, legal and regulatory platform to the consumers for exercising their choice.” Based on these two core agendas, the Electricity Act 2003 has six major themes:

- Reorganization of the state owned vertically integrated electricity boards;
- De licensing of power generation to enable higher investments;
- Trading and market development;
- Tariff and subsidies;
- Consumer interest; and
- Open Access

Promoting competition in electricity sector is one of the cornerstones of the Electricity Act, 2003. In the spirit of encouraging competition, various reform measures have been initiated by the Central and State Governments such as open access for consumers above 1 MW of load, competitive procurement of power, competition in power transmission and distribution franchisee initiatives.

To this end, State Electricity Regulatory Commissions have been given the mandate to monitor and regulate state power utilities as well as power markets with a view to ensuring availability of power at competitive rates to all consumers. However, the roadmap and implementation of several of these initiatives, such as the modalities of offering open access to consumers, remain an area of discussion and debate.

The implementation

Following the enactment of the Electricity Act 2003, power generation was de-licensed and a number of fiscal and financial incentives were offered under various schemes such as Mega Power Policy and tax holiday. This attracted significant investments from private sector to leverage the demand-supply gap in the sector.

Subsequently, the Ministry of Power came out with competitive bidding guidelines for procurement of power, which allowed price discovery through market based mechanism. This ensured that private generation companies are allowed equal platform and opportunity to access the market as the public companies but most importantly it ensured competitive prices to benefit both, the consumers and the market.

Soon after, similar competitive bidding guidelines were put in place for enabling competition in power transmission as well. So far 8 inter-state transmission projects have been awarded under the competitive bidding regime and another 6-8 projects are already on the anvil. Similarly, a number of states such as UP, Rajasthan, Madhya Pradesh, Haryana, Tamil Nadu and Odisha are embracing competitive bidding in power transmission to enable private sector investments in the sector.

Today, distribution companies and open access consumers have the option of buying power from any generation company located at any place in the country, which offers favourable prices.

In contrast, competition in power distribution has been very limited.

Competition in Indian distribution segment and issues plaguing consumer choice

The initiatives undertaken by the Government of India and various states have led to competition in power generation and transmission. However, the spirit of competition and private participation in the Indian electricity distribution sector is still in the nascent stages.

The Electricity Act, 2003 laid down the foundation for introducing competition at the consumer end through open access and provision for parallel licensees. However, the parallel licensee regime insofar as it requires distribution licensees in an area to distribute power “through their own distribution system within the same area” has potential adverse consequences on tariff. Each distribution licensee investing in its own network would lead to replication of network and, as capital investment is a pass-through expense, it would also push up costs/tariffs for the end consumers.

Open access has not taken off very successfully even though all states have put in place regulations for open access for consumers above 1 MW of load. Operationalization of open access has its own share of problems as detailed in the following sub-section.

Pure play privatization has had limited success in metros like Delhi, Mumbai and Kolkata. Distribution companies in some states are now adopting the distribution franchisee model which is showing signs of being a viable model to enable competition and investments in distribution sector. But the market today needs another reforms initiative, targeting end consumers of electricity.

Current status of open access

In November 2011 the Ministry of Law and Justice, Government of India expressed its interpretation on the provisions of Electricity Act 2003, that consumers above 1 MW shall be deemed to be open access consumers and the State Electricity Regulatory Commissions can no longer continue to regulate the tariff for supply of electricity to any consumer of 1 MW and above. The need for discussion on introducing retail competition in electricity has started gaining ground in light of this interpretation of the Act.

There are various reasons that may be identified for the lacklustre operationalization of open access in India, as briefly set out below:

- **Power deficit scenario:** The country’s power deficit scenario is not very conducive to open access buying of power as it makes the power market a seller’s market. Due to power demand being greater than supply, the non-regulated prices of electricity (through trading or discovered in power exchanges) remain high, thereby eroding the extent of savings in power purchase cost that were envisaged through open access. Lack of depth in the wholesale and medium-term power market compounds the issue.
- **Lack of regulatory consistency in determining wheeling charges and cross subsidy surcharge:** There is no consistency in regulatory philosophy followed by state regulators in determination of wheeling charges and cross subsidy surcharge (paid by open access customers to distribution licensees). Due to unavailability of voltage wise data on cost and distribution losses, state regulators have to allocate costs and losses between the wheeling and retail supply functions on the basis of assumptions. Moreover, in the absence of proper data, cost of supply cannot be properly determined which affects the estimation of cross subsidy surcharge.
- **Conflict of interest:** Existing distribution licensees are wary of losing their high-paying and cross subsidising consumers and hence resist the concept of open access. It is often expressed by most state owned distribution companies that allowing open access to high value consumers would lead to migration of these consumers away from state distribution companies leading to financial losses. The same sentiment was vocalized by distribution companies before an inter-ministerial task force constituted under the aegis of Planning Commission to look into practical issues concerning operationalization of open access. Thus, conflict of interest is a major impediment in operationalization of open access.

- **Inadequate infrastructure:** Another key issue impeding open access is the lack of adequate transmission and distribution infrastructure leading to congestions in the network. This requires heavy investment in not only transmission but also the distribution (wire) network of states but most distribution utilities are too cash-strapped to make adequate investments in infrastructure.
- **Lack of consumer awareness:** Significant knowledge asymmetries exist in the power market in India. Consumers, especially smaller commercial or industrial users, are often at a loss about the process of open access along with specifics such as which trader/generator to approach, how to tie up power, prevailing market rates of buying power, etc. Moreover, due to the reluctance to distribution utilities to the idea of open access, consumers also fear the repercussions they may face from the distribution utility to which they have so far been connected, in terms of denial of technical support (such as repair of line breakdowns), denial of standby power in emergency, etc.

Need for another round of reforms through retail competition

One major reason why open access has not been able to take off in India can be traced back to the fact that distribution companies in India manage businesses of two different natures – wire business and retail business. The wire business by nature is a monopolistic and regulated-return earning business. Retail supply, on the other hand, is more conducive to providing consumer choice in the form of multiple suppliers, as it involves purchase of electricity in bulk from generators and selling it to consumers, apart from customer services, billing, and collection of charges from consumers. In a market structure wherein the wire business as well as retail business is handled by a single distribution company, conflict of interest makes the distribution company wary of losing its retail segment to competition. Hence, the scope for introducing open access and retail competition is limited in this scenario.

To overcome this issue, it is pertinent to segregate the wire business and retail business. In such a market all wire businesses will serve as common carriers and will be paid a reasonable regulated rate of return on their investments. The retail business could be made open to multiple companies operating in the same area, with end consumers having the choice to choose their retailers based on price and service quality.

Retail competition is expected to enhance operational and cost efficiencies, and give the end consumer more choice. Cost efficiency is achieved as competitors try to reduce input costs, and operational efficiency is focused upon as performance becomes a major criterion for consumers exercising their choice amongst various suppliers. Competitive power retailers would buy electricity from generators or in the wholesale market and package it to meet varied consumer demands. Their commercial viability would depend on their ability to meet consumer preferences and, in the face of competition, this is expected to result in lower retail prices (as competitive suppliers cut margins) and greater effort by competing retailers on increasing efficiency and consumer welfare.

Therefore, by introducing competition in retail supply and making sure that the market functions well within the defined set of rules, market competition is expected to ensure service quality as well as appropriate pricing.

Bringing in user choice through competition also helps in redefining the regulator's role from being a price-setter to that of a monitoring body and arbitrator. In a competitive framework, the regulator's role would be to establish guidelines/rules for the competitive retail market and strictly monitor the market for compliance, instead of fixing tariffs for every service.

International experience in introducing retail competition

With the objective set out as described in the previous section, we evaluate how retail sector competition has been attempted in various countries around the world, with successful as well as certain unsuccessful outcomes.

Internationally, the competitive retail supply model has been implemented in a full-fledged manner in the United Kingdom, New Zealand, Norway, Finland, Spain, 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 United Kingdom and the Australian state of Victoria are widely regarded as successful models of implementation where introducing competition in retail supply ultimately led to lower electricity prices for consumers.

Five international experiences, viz. UK, Australia, Argentina, Philippines and California, were chosen as case studies for a detailed study of their electricity reform processes, in particular the introduction of retail supply competition in these countries. Additionally, the Californian experience with electricity reforms post-1990s was also studied in detail in order to glean important lessons from the disastrous outcomes that followed reforms in the state.

This section comprises some select and relevant portions from the international experience of these countries. Details of these case studies are provided in the Annexure to this document.

Case study I: United Kingdom

The United Kingdom is hailed as the one of the most successfully implemented models of competition in the retail electricity sector. The reforms process in UK was a long one, starting from late 1980s, and saw several transformations before retail competition was finally made available to end consumers at the household level.

First steps towards restructuring of industry

The structure of the UK electricity sector prior to reforms was simple – there was a vertically integrated (Generation and Transmission) state-owned Central Electricity Generating Board to look after generation and transmission of power, and regional area board to distribute and supply power to various geographical areas.

The Electricity Act 1989 paved the way for restructuring and privatisation of the electricity industry in Great Britain. The Act had provisions for privatization, introduction of competitive markets, and a system of independent regulation. On 31 March 1990, all coal-fired and oil-fired generating plants in England and Wales that had previously been under the control of the state-owned Central Electricity Generating Board (CEGB) were allocated ('vested') to two new companies, National Power and PowerGen. The vertically integrated CEGB was split into 3 generating companies (National Power, Powergen and Nuclear Electric) 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 also sold off all 12 RECs.

Wholesale market reforms through the Electricity Pool

One of the innovations in the UK electricity sector at privatisation was establishment of the Electricity Pool of England and Wales. The Pool was set up to facilitate a competitive bidding process where generators named 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 of electricity (primarily the RECs). The

National Grid Company (NGC) operated the Pool and administered the Pool's settlement system on behalf of Pool members.

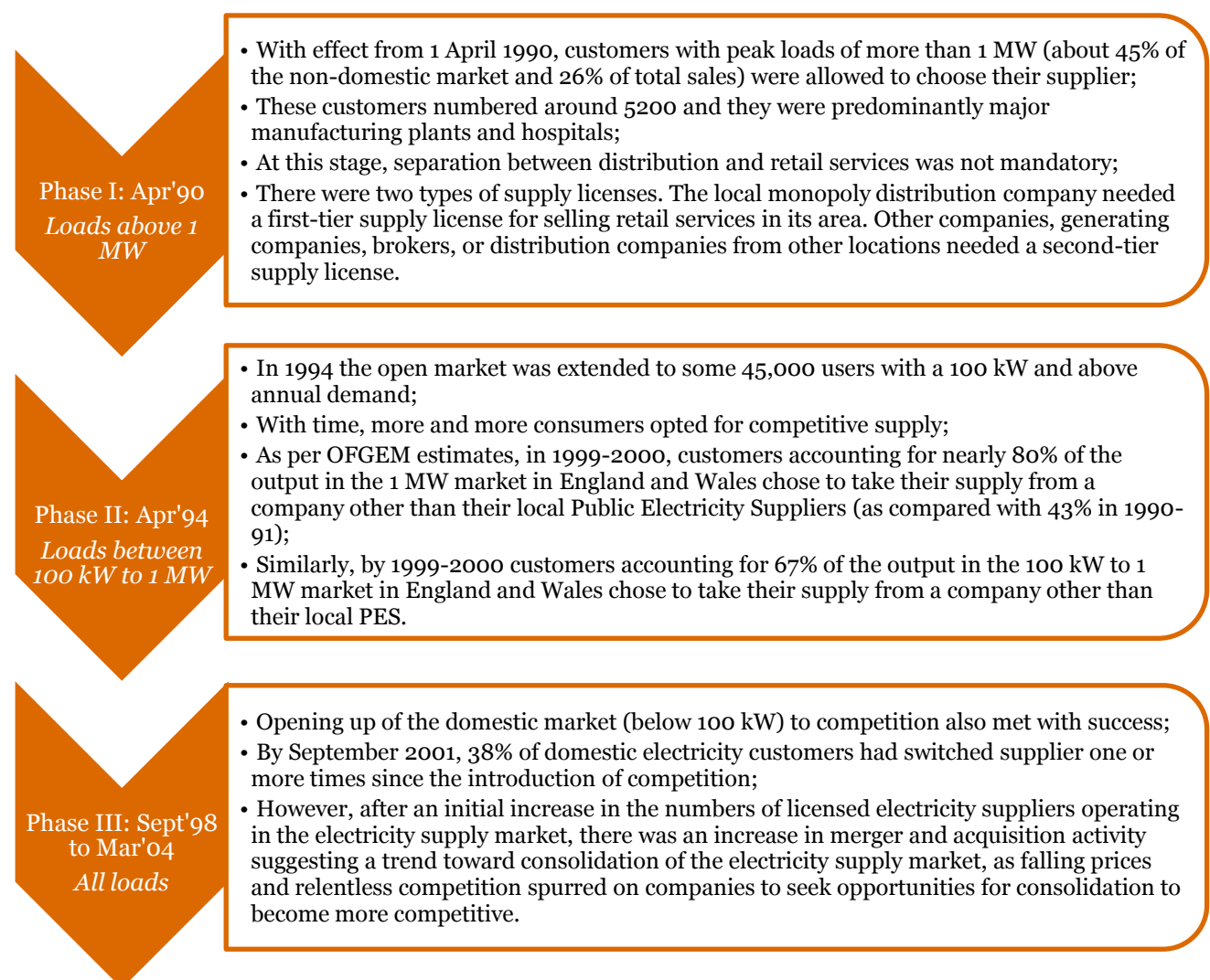
However, the Pool suffered from several drawbacks, the most important of them being:

- The pricing mechanism was vulnerable to gaming strategies by generators who could manipulate the Pool price by withdrawing plant from the market at key times; and
- There was a lack of competition in price setting, because price setting remained dominated by the two main generators – Powergen and National Power.

Therefore, the Pool was often subjected to regulatory interventions aimed at controlling monopolistic behaviour and preventing re-integration in the electricity industry.

Phased introduction of competition in retail supply

The supply market was opened up to competition in three phases, starting from April 1990 and culminating in May 1999. 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 twelve RECs or from the pool or from retailers.



Ownership separation of distribution and retail supply business

The Utilities Act 2000 abolished the existing distribution/retail licences, and introduced a Great Britain-wide licence, allowing all suppliers to supply customers nationwide. The Utilities Act also made a

provision for separating supply and distribution activities, requiring the separation of the supply and distribution businesses of former Public Electricity Suppliers (PES). Any company holding an electricity supply licence could now sell electricity, and all customers became free to choose their own supplier.

With regard to pricing of electricity, certain price controls were introduced in the electricity supply sector at privatisation. These price controls were applicable for those consumer categories who could not yet take advantage of the competitive market, owing to phased introduction of retail competition.

Evolving trading arrangements – RETA, NETA and BETTA

RETA: Beginning in May 1998, Review of Electricity Trading Arrangements (RETA) was launched with the stated aim of developing an entirely new wholesale market mechanism to replace the Pool. OFGEM had identified several major weaknesses in the Pool trading arrangements, which were to be fixed through RETA.

NETA: In time, OFGEM floated a proposal for introducing another system of trading, viz. the New Electricity Trading Arrangements (NETA). NETA sought to address the weaknesses of the Pool mechanism by adopting trading arrangements mimicking those in traditional commodity markets. NETA, introduced on 27 March 2001, was based on bilateral trading between generators, suppliers, traders and customers through forwards and futures markets and short-term power exchanges. Under NETA, the bulk of electricity was traded in forward, futures and short-term markets through bilateral contracts. These markets allowed contracts for electricity to be struck over a scale of time ranging from within-day to several years ahead.

BETTA: As of April 2005, NETA changed its name to the British Electricity Trading Transmission Arrangements (BETTA), and expanding to become the single Great Britain electricity market of England, Wales and Scotland. The arrangements under BETTA are based on bilateral trading between generators, suppliers, traders and customers across a series of markets operating on a rolling half-hourly basis.

Post-reforms electricity market in the UK

Electricity distribution networks carry electricity from the transmission systems and generators that are connected to the distribution networks to industrial, commercial and domestic users. There are 14 licensed distribution network operators (DNOs) each responsible for a distribution services area. The 14 DNOs are owned by six different groups. There are also four independent network operators who own and run smaller networks embedded in the DNO networks.

There are various types of Supply licences in UK at present, e.g. those for supply to Domestic premises, Non Domestic premises, “Green Deal arrangements”, etc. and supply licence applicants can even apply for specific premises/areas in which they are willing to supply electricity.

Domestic, and most commercial, consumers buy electricity from suppliers who pay the DNOs for transporting their customers' electricity along their networks. Suppliers pass on these costs to consumers. Distribution costs account for about 20% of electricity bills.

Retail electricity prices for end consumers

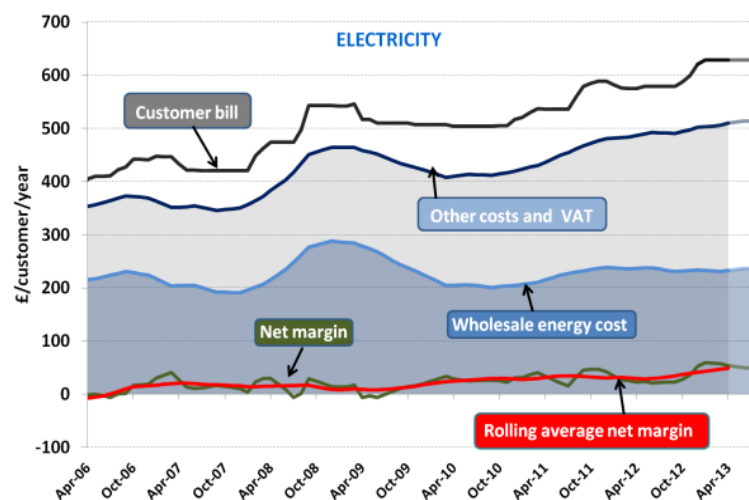
The regulator OFGEM administers a price control regime that ensures that efficient distributors can earn a fair return after capital and operating costs while limiting the amounts that customers can be charged. Price controls are set for 5-year periods. The current price controls for distribution networks run from 1 April 2010 to 31 March 2015.

An update on Retail Market Indicators published by OFGEM dated 10 April 2013 captures the “rolling average net margin” (average of the net margin data for the previous six months, the current month, and the next six months) on supplying to a typical consumer, in comparison to wholesale energy cost and other retail-related costs, as shown in the figure below.

To give an indicative idea of what comprises a typical electricity consumer's bill, the above graph shows that in April 2013, out of a total consumer bill of £630, wholesale costs account for £235 and VAT & other costs account for another £275, leaving a gross margin of £120 on the bill for the retail supplier. As compared to this gross margin, operating costs are likely to be £65, thereby leaving a net margin of £55 for the retail supplier on supplying to this consumer.

It is interesting to note that this net margin has been steadily increasing in the last seven years captured in this graph, which has led to scholars and policymakers to study aspects such as “misleading doorstep selling” by competitive retailers, and capacity of consumers to efficiently choose between alternative suppliers, etc.

Typical electricity customer bill, costs and total indicative net margin for the next 12 months



Source: Retail Market Indicators published by OFGEM in April 2013

Consumer switching

It appears to be a measure of some success that 72% of British consumers have switched their gas and/or electricity supplier during the last five years, as per a 2012 study conducted by YouGov SixthSense. However, the percentage of Domestic consumers included in this would be a real revelation of the success of retail supply competition in appealing to the smallest retail end consumers. This is important in view of the “switching inertia” that is often discussed in the UK electricity sector. OFGEM found in a 2011 consumer survey, four out of five domestic consumers fail to shop around for gas and electricity. Reasons for this have been attributed to the high search cost (before making the decision to switch) as well as switching costs, misleading tactics by retail supplier firms, consumers being suspicious of firms who use “misleading doorstep selling” in order to get consumers to switch over, and due to pure decision error by consumers as a consequence of the particularly complex market environment.

Learnings from the UK experience

The UK experience is highly encouraging for a nation considering the path of segregating electricity wire and retail supply businesses, and introducing retail competition. 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 in the country (through NETA and BETTA). 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 in the UK, was significant in assisting retail side reforms.

A noteworthy point was that the Utilities Act 2000 mandated ownership separation of distribution (wire) and retail supply businesses. With this legislation, a distribution network operator could no longer sell electricity as a retail supplier. This stemmed from the rationale that allowing distribution companies to remain in retail sale may adversely affect market competition because these distribution companies may discriminate between their own consumers and those taking supply from competitors when it came to network-related service, or they may subsidize 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.

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 may be 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 licensee 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.

It must be kept in mind that the reduction in retail electricity prices witnessed in the UK happened due to various reasons that complemented the benefits from retail competition, viz. wholesale market reforms and discovery of alternative source of energy (gas). Moreover, as observed in the post-reform UK, the role of the regulator remains important in monitoring the market behaviour of competitive rivals and ensuring that the market remains free and fair, which makes it possible for consumers to actually benefit from the potential gains from a competitive market.

Case study II: Victoria, Australia

Retail competition is progressively being introduced in Australia with Victoria being the first state where full retail competition was introduced. At present, Victoria is the second largest electricity market in Australia with approximately 2.1 million residential customers and 300,000 business customers. This sub-section summarises the main highlights in introduction of retail competition in Australia.

Objective of the reforms

The drive to restructure Australia's electric power industry to a more competition-based market was triggered principally by the need for improving Australia's economic efficiency and international competitiveness, and for reducing state and national debt.

Reforms took place over a period of 25 years beginning from 1980. Until then, the vertically integrated State Electricity Commission of Victoria (SECV) was responsible for the generation, transmission and delivery of electricity to all Victorians. In 1992, when a new Liberal Government came to power with the goal of liberalising utility markets, the electricity industry was singled out as one of the first targets of reform. The primary goal was to create an openly competitive electricity market for the sale of electricity to consumers. The anticipated result was lower prices and improved services.

The process of introducing retail competition

Restructuring of the electricity sector was considered vital for the envisaged reforms. The salient features of the electricity industry's restructuring were:

- 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 (NEM) organized as a centralized, market-based trading pool for buying and selling electricity; and
- Establishment of appropriate regulatory regimes.

The final stage of reform in Victoria was introduction of **Full Retail Competition** to consumers, where retailers would compete to sell electricity services to consumers outside their designated geographic region. The phasing of rolling out retail competition was as follows:

<i>Time period</i>	<i>Consumer segment opened up</i>	<i>Load details</i>	<i>Approx consumers</i>
Dec 1994	Large industrial consumers	> 5 MW	47
July 1995	Large commercial consumers	1 – 5 MW	330
July 1996	Medium industrial / commercial users	750 MWh – 1 MW	2000
July 1998	Small industrial / commercial users	160 – 750 MWh	> 8000
Jan 2002	Domestic; Small business consumers	Under 40 MWh	2,000,000

Specifying a tariff path for the deregulated market to ensure reduction in applicable retail tariffs

With the opening up of one part of the market (large industrial consumers with load above 5 MW) in 1994, a decision was taken by the Government about laying down a specific retail tariff path for the deregulated segments of the market by way of Maximum Uniform Tariffs viz. MUTs. This was in contrast to the UK approach of regulating the major elements of electricity prices rather than regulating the ultimate retail tariff at the consumer end. The Victorian approach was designed to deliver guaranteed price reductions for end consumers, unwind existing cross subsidies at approximate levels, retain the rural urban uniformity and provide some certainty as to prices until customers were contestable.

Reduction in cross subsidies

Distribution/retailing was encumbered with existing retail prices containing a complex array of cross subsidies including inter-class and intra-class distortions and most significantly a uniform urban/rural tariff structure. There was political pressure to maintain uniformity of prices but to do so in a way that enabled competition to be successfully implemented, even on a transitional basis. The Victorian approach involved capitalisation of cross subsidy as a one-time adjustment but enable, over time, distribution prices to gradually become cost reflective. The distribution businesses were free to unwind inter-class cross subsidies, but the Tariff Order limited the speed at which this could be done by capping any individual maximum increase to CPI +2%; an increase, which has generally been fully utilised by the distribution utilities since privatisation.

Post-reforms electricity market in Victoria

In 2004, right after full retail competition was introduced, the Essential Services Commission of Victoria (ESC) undertook a review of the effectiveness and performance of energy retail competition for small customers. The ESC found that the market is currently effective in those sub-markets 'where sufficient margin exists or has emerged to make market contracts attractive to those customers and the customers profitable to serve for retailers'. The ESC estimated that those sub-markets account for about 40% of small customers.

At present, there are five electricity networks (called distributors) operating across Victoria. 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 fourteen main energy provider brands retailing electricity to households in Victoria.

Learnings from the Victoria experience

Victoria has deregulated its retail supply market with reasonable success in terms of policy outcomes. The phasing of introducing competition was extremely circumspect in Victoria, with the first phase targeting only consumers with load above 5 MW, 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.

Case study III: Argentina

Argentina was one of the first countries to restructure its electricity industry and subsequently introduce retail competition, although these reforms were necessitated more by need as compared to the UK or Australia.

Objective of the reforms

The Argentine economy in the 1980s was in the doldrums and was beset by severe problems of hyperinflation, sluggish economic growth and a massive national debt. Under the new economic plan prepared to deal with the economic problems plaguing the nation, privatization was considered to be a solution to several of Argentina's problems, such as rising debt and deteriorating infrastructure. Therefore, spurred by the need for reforms to deal with its economy's problems, Argentina became one of the first countries to restructure the electricity industry.

The process of introducing retail competition

In 1989, Argentina had 3 state owned utilities offering generation, transmission and distribution services. Some provincial utilities (distributors) and electricity cooperatives also existed. Electricity spot market prices were high (around \$45/MWh in 1992) and transmission & distribution losses were to the tune of 25%.

As part of reforms, Argentina first restructured the federal electricity companies and then privatized them. In 1990, the Government was removed from direct operation in electricity industry. In 1992, an Act was passed to restructure and privatize industry. The Act divided the electricity industry into generation, transmission, and distribution.

The restructuring began in 1992 with the creation of a national regulatory body, ENRE, for the soon-to-be privatized Argentine electricity industry. Also, during 1992, a national electricity wholesale market was organized and the privatization of companies began, within the new rules established by the various treaties and privatization laws. The first three federally-owned electricity companies (Segba, Ayee and Hidronor) that were privatized produced a total of about 80 percent of the nation's supply of electricity.

Before the companies were privatized, they were restructured by separating them vertically, and, to a lesser extent, horizontally. First, power generation was separated from transmission and distribution. Then, the constituent power generation facilities were separated from one another resulting in separate companies. Hence, Generation became competitive, while Transmission and Distribution functions became regulated private monopolies.

The most crucial part of reforms was the creation of an independent market regulator (ENRE), along with a wholesale electronic market (MEM) and its independent operator (CAMMESA). ENRE was charged with enforcing laws, regulations and concession terms, setting distribution service standards, resolving disputes between electricity companies, overseeing CAMMESA, and setting maximum electricity prices. The MEM is a power pool aggregating electricity supply from all generation sources, comprising:

- A term market consisting of agreements for which quantities, prices and conditions are negotiated directly between buyers and sellers;
- A spot market with hourly prices taking into consideration economic production costs; and
- A balancing market.

Post-reform electricity market in Argentina

Between 1992 and 1995, 25 state operated companies were privatized. The generation market was made highly competitive and by 2000, there were 43 companies owning 96 plants. Wholesale spot prices fell to ~\$27/MWh by 2000 and TandD losses were down to an impressive 7% in 1999. Supply hours to consumers have also improved as result of the reform process.

The following electricity industry structure is currently in place in Argentina:

- Power generation companies are not allowed to own majority shares in Argentina's three transmission companies.
- The transmission and distribution companies have to provide open access to their systems for the power generators on a regulated basis.
- Distribution companies are organized as regional monopolies and permitted to buy electricity from the MEM or through contracts with power generation companies.
- The energy market was liberalized for customers with demands greater than 5 MW, and this has been successively reduced to 30 kW. These customers are free to contract directly with generators and can participate directly in the generation market.
- Tariff for Regulated customers (below 30 kW) is calculated by a formula that takes into account the wholesale prices, seasonality, capacity and local charges, if any.

Learnings from the Argentina experience

It is worth noting that Argentina went for major reforms in the wholesale and spot markets for electricity, along with a balancing market, before setting upon the course of retail competition. Vertical and horizontal separation ensured real competition in the generation sector.

Argentina has stopped short of deregulating the retail market for consumers with load under 30 kW. Tariff for these consumers, as mentioned above, is calculated by a formula pegged to wholesale prices, among other factors. An emerging nation such as India that is considering the path of retail competition may keep this option in mind since this would help in controlling the pace of deregulation in the retail electricity sector and small users, including households, may be opened up to competition only after properly reviewing the performance of retail competition in context of other consumer categories.

Case study IV: Philippines

The Philippines power industry is currently transforming itself under the mandates of the Electric Power Industry Reform Act of 2001 (EPIRA). One of the most significant reforms introduced vide the EPIRA is introduction of the Retail Competition and Open Access (RCOA) regime.

Objective of the reforms

The EPIRA 2001, a law more than six years in the making, was passed with the objective of ushering in watershed reforms in the Philippines electricity industry. The 2001 Act is seen by scholars to be 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. Therefore, the country's electricity industry restructuring involved the privatization of government-owned energy utilities, establishment of an organized wholesale market for sale of real-time electricity, and retail open access (or retail competition).

The process of introducing retail competition

The electricity regulator began the process of retail competition by clearly announcing that competition would be ushered into the market after the pre-conditions set in the EPIRA, 2001 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 regulator has mandated that at the start of retail competition, the distribution utility that has captive customers is the Supplier of Last Resort and this supplier shall serve customers who do not choose a retail electricity supplier (RES) as well as customers whose RES stops providing service without sufficient notice to the customer.

Official reports envisage that the phasing of retail competition would be thus: In the beginning, competition shall be open to consumers with load 1 MW & above; after 2 years, it shall be made available to consumers with load 750 kW & above; and there would be a gradual decrease in the load limit of the contestable market such that within 7 years, retail competition reaches household levels

A Wholesale Electricity Spot Market (WESM) has been created with a view to promoting competition in the electricity market in Philippines. The market provides the mechanism for identifying and setting real-time prices taking into consideration actual variations from the quantities transacted under contracts between sellers and purchasers of electricity.

Reduction in cross subsidy

The Electricity Power Industry Reform Act (EPIRA) of 2001 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.

The ERC 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 (other factors being payment for stranded debts, missionary electrification, equalization of taxes, and an environmental charge). The UC was envisioned as a non-bypassable charge collected from all end-users (except threshold and lifeline consumers) every month based on the approval of the ERC. Within a period not exceeding 3 years from the establishment of a Universal Charge (UC), it was mandated that cross subsidies shall be entirely phased out. A provision of Lifeline Rate was made for the marginalized end users during the phase out of cross subsidy for a period of 10 years.

Learnings from the Philippines experience

Levy of Universal Charge on all electricity users in order to phase out cross subsidies remaining in the system is a concept that can be considered by a country like India where tremendous cross subsidies still prevail in retail tariffs set by regulators. It is also worth noting that Philippines also went for substantial wholesale market reforms before setting upon the course of retail competition.

Case study V: California

Before any policy-level considerations on power sector reforms and introduction of competition to retail electricity sector, it is imperative to study in detail the California experience which 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.

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 they were able to fetch by reselling this power. Ultimately, the State of California had to step in and state funds were used to tide over the severe crisis.

Therefore, it is essential to study the California experience as a study of the risks and unforeseen outcomes of any substantial restructuring and reform-based initiative aimed at deregulation and introduction of competition in the power sector.

The California reforms – Divestment and Deregulation

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. An important fact to note here is that the default service pricing formula 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 distribution company (UDC) 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.

Under regulatory mandate, all three IOUs eventually divested all of their fossil-fuelled generation in California, retaining only their nuclear plants, hydro-electric plants, and their existing long-term contracts for procuring power from other sources. However, the three IOUs were still mandated to meet their default service obligations towards their remaining consumers by purchasing power from wholesale markets. As a result, the three utilities had a default service demand that was much higher than expected and, after divestiture, their net "short" position (difference between default service demand and energy from remaining generating assets of the utilities) was much larger than expected.

Reasons for the disaster

This section discusses, in brief, the several factors that posed inherent risks to the success of the Californian reforms and finally led to disastrous consequences.

1. **Increase in wholesale prices of power:** From mid-May 2000 onwards, wholesale electricity prices began to rise above historical peak levels. The reasons were several – rising natural gas prices, a large increase in electricity demand in California due to abnormally hot summer and strong economic growth, reduced imports from other states, rising prices for NOx emissions credits, and market power problems (elaborated below).

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2. **Horizontal market power problems:** During high demand periods, it was noticed that the market was clearing at prices far above the marginal cost of the most expensive generators in the region. This led to the belief that with increase in demand, some generators indulged in gaming and withheld capacity which often led to significant jumps in wholesale prices. After the summer season of 2000 came to an end and it was expected that wholesale prices would finally drop, it was observed that an unusually high proportion of total generation capacity was not in service (from November 2000 until May 2001, as much as 16,000 MW i.e. 35% of total capacity was not available). Power suppliers argued that their plants were not supplying on account of over-usage during the summer months, or for installation of new NOx emissions control systems, or due to environmental constraints, but California government officials suspected that the plants had been withdrawn from service at least partially for strategic reasons.
 3. **Fixed retail prices and high wholesale prices of power:** Although the IOUs were mandated to divest their generating capacity in order to reduce their market share in generation, they still had to meet their default service obligations towards their remaining consumers by purchasing power from wholesale markets. The problem compounded due to the fact that contrary to earlier predictions, no more than 3% of consumers (translating into 12% of retail demand) migrated to ESPs. As a result, the three utilities had a default service demand that was much higher than expected and, after divestiture; their net “short” position (difference between default service demand and energy from remaining generating assets of the utilities) was much larger than expected. As it started dawning upon the IOUs in early 1999 that they had a large un-hedged retail default service obligation, they sought approval from CPUC to enter into forward contracts with wholesale suppliers in order to hedge their short positions. The CPUC either rejected or restricted these requests, and consequently, a large fraction of California’s electricity demand was being served by the utilities purchasing power at high rates from the wholesale market and selling to consumers at a regulated fixed retail price.
 4. **Inadequate addition to generating capacity vis-à-vis growing demand:** In the entire decade of the 1990s, very little generation capacity was added in California and elsewhere. This was primarily on account of two reasons – One, there was excess capacity in the early 1990s that was expected to last for many years, and secondly, the electricity restructuring and associated changes in the state during the second half of the decade left the developers of new generating stations in a flux regarding the rules under which new power plants would be built. On the other hand, electricity demand in California grew much more quickly between 1996 and 2000 than had been anticipated.
 5. **Market inefficiencies:** Market design flaws increased the costs of ancillary services far above projections, led to scheduling and dispatch inefficiencies, slowed down investment in new power plants, increased the costs of managing congestion, increase spot market price volatility, and increased wholesale market prices generally.
 6. **Gross inaction by State and Federal regulators:** A curious sub-context to the California electricity sector mess was the arguably inadequate and sometimes hostile role played by both the California Public Utilities Commission (CPUC) and the Federal Energy Regulatory Commission (FERC) during the entire market meltdown. Some instances of the regulator’s inaction or slow redressal of a budding, potentially threatening issue have been documented in reports written on the matter, such as:
 - a. Non-addition of generation capacity in the face of increasing demand
 - b. Repeated denial of requests made by IOUs for hedging their “short” positions:
 - c. Rejection of pleas by IOUs for lifting the freeze on retail rates which, in the face of increasing wholesale market prices, was ruining the finances of IOUs

It may be observed from a detailed reading of the California crisis that the problems in California were not issues that are integral to deregulation of markets, but resulted from the way in which reforms were implemented in the state along with ineffective regulatory and government responses to various crucial situations.

Learnings from the California experience

Introduction of retail electricity competition had been carried out successfully in some countries before the electricity sector restructuring in California, and the same has also been successfully accomplished in several other parts of the world post the California crisis. Although there are many success stories of retail sector reforms to draw lessons from, learning from failures is equally if not more important for any policymaker.

The California crisis is an example of how wholesale market design can go ghastly wrong if not corrected properly and how market structure can be manipulated by dominant players by gaming. It becomes clear from the state's experience that the focus areas for any reform targeting vertical disaggregation, deregulation or retail sector competition, must include:

- Strong and effective regulatory framework;
- Proper designing of the market for electricity trading;
- Requisite accompanying/prior reforms in the generation/wholesale side of the market;
- Cost-reflective tariffs; and
- Requisite infrastructure to support the electricity markets.

Indian experience in retail consumer choice

This sub section looks at two special instances of distribution and supply of electricity within India:

- a) Parallel distribution licensees in Mumbai, Maharashtra
- b) Special Economic Zones of Gujarat and Kerala

Case study I: Parallel distribution licensees in Mumbai

The situation of a parallel licensee is contemplated under the 6th proviso of Section 14 of the Electricity Act, 2003. As per this proviso, the Appropriate Commission may grant a license to two or more persons for distribution of electricity through their own distribution system within the same area subject to the conditions.

Currently, there are four distribution licensees in Mumbai:

- BrihanMumbai Electricity Supply and Transport Undertaking (BEST)
- Reliance Infrastructure Ltd. (Distribution) (RInfra-D) previously known as BSES
- Tata Power Company Ltd. (Distribution) (TPC-D), and
- Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL)

Background

BSES (subsequently renamed RInfra-D) held the license to supply power at 33 kV and below. A major chunk of power for retail sale by BSES was procured from TPC. Meanwhile, TPC was a Bulk Supply licensee and only served bulk consumers (1000 kVA and above) including BSES and BEST.

In 2002, RInfra-D filed a petition complaining of encroachment by TPC within its area of supply. RInfra-D petitioned that supply of electricity by TPC directly to retail consumers with maximum demand below 1000 kVA within RInfra-D's area of supply was in contravention of its licence terms as well as the provisions of various Electricity laws.

The case was heard by the Maharashtra Electricity Regulatory Commission (MERC) and in July 2003, MERC held that TPC can supply power to any consumer. However, vide the same order, MERC restricted TPC from offering new connections below 1000 kVA in the licensed area common to both RInfra-D and TPC, on the ground that there was no level playing field between TPC and RInfra-D.

Both licensees filed separate appeals against this order before the Appellate Tribunal for Electricity (APTEL). The Appellate Tribunal through its judgment dated 22 May 2006, disposed of both appeals holding that the TPC under its license was entitled to supply energy only in bulk and not in retail to consumers, irrespective of their demand.

Appeals were filed by TPC and others against this APTEL judgment. Finally, the regime of parallel distribution licensees in Mumbai was ushered in vide a landmark Supreme Court judgment dated 8 July 2008 whereby the apex court upheld Tata Power's contention that it was a universal supplier in Mumbai and could distribute power to any retail consumer in the city apart from its entitlement to supply power to other licensees in bulk, as quoted below:

"(...) under the Terms and Conditions of the licenses held by it Tata Power Co. Ltd. is entitled to effect supply of electrical energy in retail directly to consumers, whose MD is less than 1000 kVA, apart from its entitlement to supply energy to other licensees for their own purpose, and in bulk, within its area of supply as stipulated in its licenses."

On the issue of supply of power by TPC through the common network of RInfra-D, the Supreme Court held that introduction of the very concept of wheeling is against the contention that not having a distribution line in place disentitles TPC to supply electricity in retail directly to consumers. Further, the Court observed that the concept of wheeling was introduced in the Electricity Act, 2003 to enable distribution licensees who are yet to install their distribution line to supply electricity directly to retail consumers, subject to payment of surcharge in addition to wheeling charges as determined by the State Commission. To quote:

“75. (...) It is no doubt true that Section 42 empowers the State Commission to introduce a system of open access within one year of the appointed date fixed by it and in specifying the extent of open access in successive phases and in determining the charges for wheeling having due regard to the relevant factors, but the introduction of the very concept of wheeling is against Mr. Venugopal’s submission that not having a distribution line in place, disentitles T.P.C. to supply electricity in retail directly to consumers even if their maximum demand was below 1000 kVA. The concept of wheeling has been introduced in the 2003 Act to enable distribution licensees who are yet to install their distribution line to supply electricity directly to retail consumers, subject to payment of surcharge in addition to the charges for wheeling as the State Commission may determine. We, therefore, see no substance in the said submissions advanced by Mr. Venugopal.”

Thereafter, MERC issued two separate regulations in 2008 notifying the specific conditions of Distribution License applicable to RInfra-D and TPC. Further, pursuant to the Supreme Court order, the Maharashtra Electricity Regulatory Commission (MERC) issued an interim Order dated October 15, 2009 evolving a mechanism for facilitating changeover by consumers from one Distribution Licensee to another Distribution Licensee using the distribution network of RInfra-D, with the long-term objective of introducing competition, thereby supplying cheaper electricity to consumers situated in the area common to both TPC and RInfra-D.

Issues during changeover to parallel licensee regime and solutions adopted by MERC

A host of issues were faced during the changeover of consumers, many of which were resolved by the MERC as detailed below:

- **Network to be used by parallel license (TPC):** RInfra-D’s area of supply formed a part of TPC’s area of supply, i.e. both had common areas to the extent of RInfra-D’s area of supply. TPC proposed to use RInfra-D’s existing distribution network in order to ensure smooth changeover. Hence, as per MERC’s order, TPC was allowed to use RInfra-D’s network to supply power after paying wheeling charges for using the network.
- **Customer migration:** Modalities were specified in context of changeover of customers –
 - Period for changeover not to exceed 30 days from the date of receipt of complete changeover application form by TPC;
 - Treatment of past dues/liabilities and disconnection to be carried out as per Section 56 of the Electricity Act, 2003 (i.e. connection to be disconnected in case of default of payment);
 - Migration not allowed to consumer who is in arrears without clearing his dues, or for a disconnected consumer (in arrears)
- **Energy meters:** The following modalities were put in place in context of energy meters –
 - Regarding ownership of energy meters, consumers were given the choice to continue with the existing meter of RInfra-D, or opt for a meter from TPC, or purchase own meter;
 - Meter for changeover consumers to have downloadable capability (since TPC was entitled to supply to consumers with maximum demand less than 1000 kVA);
 - Standard meter specifications laid down for third party meter purchase;

- Joint testing of meter at the time of migration;
 - Meter reading for consumers to be done by TPC (because TPC would be responsible for billing and collection, and meter reading is an integral part of bill preparation);
 - TPC to provide meter reading info to RInfra-D on daily basis along with the date and time;
 - As detailed in the sub-clause on ‘Theft and inspection’ below, it was deemed that RInfra-D would have the right to inspect and read consumer meters from time to time, to keep a check on distribution losses.
- **Security Deposit:** Final month’s bill to be issued by RInfra-D. In case of non-payment of dues, RInfra-D, after deducting the Security Deposit available with them, could disconnect the consumer if the consumer did not pay the balance amount in time.
 - **Theft and inspection:** Any theft by meter tampering or bypassing meter implies increased distribution losses for RInfra-D and requires RInfra-D to pay for this energy in Intra-State pool at System Marginal Price. Hence, to keep a check on distribution losses, it was deemed that RInfra-D should have the right to inspect and read consumer meters from time to time for detection and investigation of theft by way of meter tampering or bypassing of meter.

Migration of consumers from RInfra-D to TPC

It is estimated that subsequent to the Supreme Court judgment in July 2008 and the MERC order operationalizing parallel licensing in September 2009, there has been a migration of ~300 MW load from Reliance Infra to TPC in Mumbai [Source: The Policy Maker, February 2011]. In the financial year 2011-12, about 1.2 lakh consumers migrated from RInfra-D to TPC, of which residential consumers accounted for 88%, followed by commercial segment (11%) and industrial segment (1%). [Source: Business Standard, 13 July 2012]

As per industry experts, TPC’s competitive rates led to the surge in migration. According to the proposal for rates filed with the MERC in FY 2010-11, the average billing rate of Reliance Infrastructure’s distribution wing stood at Rs 7.06 a unit, against Rs 5.20 a unit for Tata Power’s distribution arm.⁴ In particular, for cross-subsidizing categories i.e. the high-end consumers of RInfra-D, shifting to TPC has so far entailed a reduction in cross-subsidy surcharge due to the consumer mix of TPC (with a greater proportion of high-end consumers as compared to RInfra-D, which RInfra-D has called a result of “cherry picking” of new consumers by TPC) along with more competitive tariffs.

Levy of Cross Subsidy Surcharge and Regulatory Asset surcharge on changeover consumers

The Commission has defined various groups (Group-I, Group-II and Group-III) for payment of Cross Subsidy Surcharge (CSS) and Regulatory Assets and allowed applicability of the same for changeover consumers to TPC-D.

- Group I: Consumers connected to RInfra-D who continue to receive supply from RInfra-D;
- Group II: Consumers who continue to be connected to RInfra-D, but have migrated to TPC-D for receiving supply, i.e., consumers who are receiving supply from TPC-D through RInfra-D's wires;
- Group III: Consumers who are no longer connected to RInfra-D and have migrated to TPC-D for receiving supply, i.e., consumers who are receiving supply from TPC-D through TPC-D's wires;

Of the above, only Group II consumers were required to pay cross-subsidy surcharge.

Thereafter, RInfra-D filed a petition before MERC against large scale migration of consumers and raised the issue of “cherry picking” of consumers by TPC. The licensee submitted that with the current cross subsidy surcharge being zero, shift of industrial consumers out of RInfra-D was resulting in loss of subsidy which would ultimately burden low-end consumers in the form of a tariff shock. Hence, on 9 September 2011, the MERC issued an order for de-novo redetermination of cross subsidy surcharge for open access transactions and applicability of the same to changeover consumers.

Restriction on migration from RInfra-D to TPC vide MERC Order dated 22 August 2012

In view of large scale consumer migration of high-end consumers, RInfra-D filed a petition before MERC seeking relief on account of certain issues affecting RInfra-D and its financial viability. In its order dated 22 August 2012 on the petition filed by RInfra-D, the Commission decided as quoted below:

“the Commission has come to the conclusion that there is a need to intervene in the manner of changeover and switchover of consumers (...) and there is a need to calibrate the migration of consumers from one Licensee to another, in order to ensure a level playing field and also to protect the interests of low-end consumers being supplied electricity in the Common Area of supply between RInfra-D and TPC-D.”

Accordingly, the MERC ordered that henceforth, consumer migration would allowed from RInfra-D to TPC only for the residential category of consumers and that too only for consumers who consume electricity up to 300 units a month. As per MERC's own estimates shared with the public vide a press release dated 6 September 2012, migration of low-end residential consumers (consuming less than 300 units a month) of RInfra-D to TPC would help these customers significantly save on their bills. According to the press release, consumers who “switch over” to TPC (i.e. migrate to TPC's own network) would save as much as 45-50% on their monthly bills, while consumers who “changeover” to TPC (i.e. migrate to TPC as their licensee but still connected to RInfra-D's network) would benefit by 18-29%, depending on their consumption levels.

Universal service obligation (USO) in Mumbai

Each distribution licensee in Mumbai holds the licence to distribute electricity within a specified area and in line with the respective tariff schedule issued for that licensee by the MERC. Hence, there is more than one distribution licensee in several areas and each licensee has an obligation to supply electricity to any consumer who may demand electricity supply from that licensee under the Universal Service Obligation.

Timeline of events for Mumbai's distribution licensees

S. No.	Date	Particulars
1	Background	<ul style="list-style-type: none">• License to BSES (subsequently renamed R-Infra).<ul style="list-style-type: none">— To supply power at 33 kV & below.— Power procurement from TPC.• TPC (Bulk supply licensee): Served bulk consumers (1000 kVA).• 2002: R-Infra filed a petition complaining of encroachment by TPC within its area of supply (for consumers below 1000 kVA).• 2003: MERC held that TPC can supply to any consumer. However, TPC was restrained from offering new connections below 1000 kVA on the ground that there is no level playing field for TPC and BSES.• 2006: APTEL held that TPC entitled to supply energy only in bulk and not retail.
2	8 July, 2008	Supreme Court Judgment: TPC-D allowed to supply power in Mumbai and it can look at utilizing the distribution system of existing supply licenses.
3	20 August, 2008	MERC notifies License conditions to TPC and Reliance
4	15 October, 2009	Interim Order issued. Based on the Hon'ble Supreme Court Judgement dated 8 July 2008, operating procedures for use of RInfra's wire (Wheeling) for supplying to consumers (all categories) who have migrated to TPC issued.
5	29 July, 2011	MERC allowed applicability of Cross Subsidy Surcharge (CSS) and Regulatory Assets for changeover consumers to TPC-D. Defined various groups for payment of CSS: <ul style="list-style-type: none">• Group I: Consumers who continue to be connected to RInfra-D and continue to receive supply from RInfra-D• Group II: Consumers who continue to be connected to RInfra-D, but have migrated to TPC-D for receiving supply, i.e., consumers who are receiving supply from TPC-D through RInfra-D's wires• Group III: Consumers who are no longer connected to RInfra-D, and have

S. No.	Date	Particulars
		migrated to TPC-D for receiving supply, i.e., consumers who are receiving supply from TPC-D through TPC-D's wires <i>Applicability of Charges: Only Group II required to pay cross-subsidy surcharge.</i>
6	9 September, 2011	RInfra filed petition because of large scale migration under S.43 and raised issue of Cherry picking by TPC. (Rs 11,000 Cr moved leading to burden on low end consumers. Rs 50 Cr through CSS) De-novo redetermination of cross subsidy surcharge for open access transaction and applicability of CSS to consumer who changeover to RInfra network
7	22 August, 2012	RInfra sought relief on account of certain issues affecting its financial viability. The Commission modified the changeover protocol and restricted the changeover for Residential consumer only having monthly consumption less than 300 units . This restriction was applicable for one year.
8	24 December, 2012	<ul style="list-style-type: none"> • TPC challenged MERC order of July, 2011 on levy of cross subsidy surcharge in APTEL • APTEL upheld the MERC decision.

Learnings from Mumbai

Mumbai has been in the forefront of providing choice to retail electricity consumers in India. However, like any other pioneering move, there have been several regulatory and legal challenges on the way.

The legal battles between RInfra-D and TPC-D in Mumbai drive home the point that segregation of distribution wire and retail supply business is a must to avoid any conflict of interest of the network operator. Reduction and gradual elimination of cross subsidy is essential for bringing about retail competition since the incumbent distribution licensee, who is saddled with a traditional tariff structure laden with cross subsidies, would naturally resent the loss of high-paying (and cross subsidising) consumers to competitive retail suppliers.

At the same time, the Mumbai experience has also thrown up certain issues regarding the parallel licensee regime. As the APTEL observed in its December 2012 judgment, as TPC-D was using the wires network of RInfra-D, the set up resembles open access more than a parallel licensee regime. However, the main requirement of a parallel licensee regime being that each licensee should invest in its own network, leads to replication of infrastructure in a country like India which adds to the financial burden on end consumers.

Therefore, against this backdrop, segregation of distribution (wire) and supply businesses and then introducing competition in the retail segment appears to be a good way of bringing about retail choice.

Case study II: Special Economic Zones of Gujarat and Kerala

Distribution and supply of electricity within Special Economic Zones (SEZ) may require a special regulatory approach in view of the fact that these are Greenfield areas and a newly created SEZ is likely to have no existing distribution network. Therefore, while the SEZ would fall within the geographical area of supply of a distribution licensee, the SEZ area would not have an 'incumbent distribution licensee' per se. Such issues were discussed and studied at length by the Gujarat Electricity Regulatory Commission (GERC) and Kerala State Electricity Regulatory Commission (KSERC) at the time of granting licenses for distribution of electricity within various Special Economic Zones in the states.

Gujarat

The Ministry of Commerce, Government of India had issued guidelines pertaining to SEZ Developers for setting up power generation facilities and its distribution within the SEZ area. However, in one of the first applications of its kind, the SEZ developer Essar SEZ Hazira Ltd. applied to the GERC in 2008 for a 'second' distribution license in addition to the license held by Dakshin Gujarat Vij Company Ltd. (DGVCL) in whose geographical area of supply the Essar SEZ area was located. Essar SEZ petitioned to be allowed to distribute electricity in the SEZ *without* generating any power, after having entered a memorandum of understanding with Bhandar Power Limited for supply of power from their plant at Hazira. The applicant had also made an investment of nearly Rs 200 Crores for setting up of the transmission and distribution infrastructure.

Similarly, Synefra Engineering & Construction Ltd. (formerly Suzlon Infrastructure Ltd.) made a similar application in 2008 before GERC for distribution of electricity in Kandla SEZ, which fell within the geographical area being served by Madhya Gujarat Vij Company Ltd. (MGVCL) without generating any electricity, having received sanction from MGVCL for 10 MVA of power at 66 kV level for further distribution of electricity within the SEZ, if allowed. In this case as well, the applicant had made an investment of about Rs 16 Crores in setting up a transmission & distribution network.

In both the cases, the following stands were taken by various stakeholders:

- **Government of India:** The Government of Gujarat approached the Ministry of Commerce, Government of India on the requirement of license for distribution of electricity under the SEZ Act, 2005. In response, the Government of India issued guidelines dated 21 February 2009 under which it was mentioned that the exemption notifications could be issued on case to case basis by following due process of law. As such, either a distribution license under the Electricity Act or a Notification under the SEZ Act would serve the purpose of supplying electricity to the consumers in the SEZ area. Therefore, it was understood that the "purpose would be served" once the appropriate Commission grants a distribution license for the SEZ area to the applicant.
- **Government of Gujarat:** The implication of "generation and distribution" in Section 14(1) (i) of the Gujarat SEZ Act, 2004 was examined by the legal department of the Government of Gujarat. The Legal Department opined that SEZ developers are at liberty to distribute electricity in the SEZ area without generating the same themselves and they may arrange power from other source(s). Such a developer is eligible for grant of license for distributing the electricity in the SEZ area. The Government expressed its firm view that SEZ developers may be granted a distribution license with a universal power supply obligation to distribute electricity in the entire SEZ area and once the license is granted to SEZ developer, the area may be considered as excluded from the license area of distribution companies.
- **Existing Discom:** The Discom in whose area of supply the respective SEZ was located had no objection to grant of Distribution License to the applicant for the area as prayed. However, the existing Discom submitted that on grant of license to the applicant, it would not entertain any new demand for power in the licensed area, i.e. it would no longer be obliged to discharge duties as a Licensee in that area.

On the basis of remarks received from various stakeholders as summarised above and on a thorough legal reading of all relevant documents pertaining to grant of license for distribution of electricity, the GERC observed that Section 11 of the Gujarat SEZ Act, 2004 made it clear that the SEZ area is an Industrial

township under the clause (1) of Article 243-Q of the Constitution of India. Thus, the area proposed to be served by the applicant(s) fulfilled the criteria of area for getting second Distribution License as laid down in the National Electricity Policy.

Further, after going through various documentary submissions made as required by the applicants and resolution of relevant legal issues as discussed above, in both cases the Commission proceeded to issue distribution license for 25 years to the applicant for the SEZ area as prayed for, after notification of a Public Notice to that effect and hearing the objections received. However, the Commission did not exclude the SEZ license area from the area of supply of the existing Discom, deeming that “exclusion of the area is against the interest of public, because it will lead to restriction in their choice.”

Kerala

In October 2008, Infopark, a Government of Kerala undertaking, submitted an application before the Kerala State Electricity Regulatory Commission (KSERC) to grant licence for distribution of electricity in the Special Economic Zone for IT/IT Enabled Services (“IT Park”) at Cherthala. At the public hearing, the Kerala State Electricity Board (KSEB) objected to grant of license, while the Government of Kerala had no comments to offer in this matter.

KSEB contended that it was already the deemed licensee for the area covered in the application for distribution licence by Infopark as KSEB was already the deemed licensee for distribution of power in the whole state of Kerala as per. Infopark had also confirmed that some consumers of KSEB existed in the specified area at present and hence KSEB asserted that the area covered by application of Infopark should not be excluded from the deemed area of KSEB. Hence, KSEB’s submission was that Infopark’s application could only be treated as that of a “second licensee”. Further, KSEB also raised questions on the legal sustainability of the “minimum area” of supply for which license was being requested.

After perusing all available documents, KSERC observed that the notification dated 10 February 2006 issued by Ministry of Commerce and Industry, Government of India, stipulates that State Governments shall endeavour that generation, transmission and distribution of power within a Special Economic Zone is allowed to the Special Economic Zone Developer. The Special Economic Zones Policy document issued by Government of Kerala on 17 June 2003 states that the SEZ developer would be entitled to get the exclusive licence for retail distribution of electricity. Moreover, clause 3.2(a) of the Licensing Regulations, 2006 issued by KSERC exempts Special Economic Zones from the minimum area requirement.

On the basis of the above, KSERC ordered that in the specified SEZ area, Infopark alone shall be the Licensee authorized to distribute electricity. The area was also excluded from the area of licence of KSEB.

Learnings from SEZ experience in Gujarat and Kerala

Distribution of electricity within Special Economic Zones (SEZ) is a comparatively newer regulatory issue. Since these areas are greenfield areas are likely to have no existing distribution network, it is a matter of regulatory discretion whether a developer who applies for a distribution licensee for supplying electricity within the SEZ should be given a second license (with the Discoms whose area of supply the SEZ lies in, being treated as the incumbent licensee) as in the case of Gujarat, or an exclusive license to supply, as in the case of Kerala. It may be noted that only the Gujarat regulatory decision results in a situation of retail choice for consumers in the SEZ area.

Blueprint for introducing retail electricity competition in India

Pre-conditions and risk factors

While international experience may provide an insight into the kind of reforms that have successfully or unsuccessfully been carried out in retail electricity sector, it must be borne in mind that different countries have embarked upon retail sector reform in different phases of their reform trajectory, and countries like India that are now looking at the prospect of similar reforms must consider past international experience as well as their own market conditions, socio-economic conditions and the stage of reforms attained by the electricity sector in their country.

Energy sector reforms aiming at opening up the retail market to competition demand a few pre-conditions that are crucial to the success of a competitive retail supply model. These pre-conditions would include:

1. Economic
 - a. wholesale market reforms with sufficient buyers/sellers, availability of untied capacity, absence of market power, governance and market rules
 - b. cost-reflective tariffs across various voltage levels and also dealing with cross subsidies
2. Financial
 - a. Sustainable sector viability
 - b. Treatment of existing financial losses
3. Technical
 - a. Treatment of existing distribution losses
 - b. Suitable supply infrastructure in place (problem of selective load relief, necessity for independent/dedicated feeders, cost sharing of new metering infrastructure, etc.)
4. Institutional
 - a. Ownership segregation between wire and supply businesses

The following section elaborates on these pre-conditions which are crucial to the success of a competitive retail supply model in the electricity sector.

Economic pre-conditions

Wholesale market reforms

Across the world, electricity has traditionally been supplied by a single fully integrated company comprising the generation, transmission and distribution functions. Therefore, the first set of reforms invariably demands that the electricity industry be split into functionally-different elements, i.e. separate generation, transmission and distribution functions, or an integrated generation and distribution function and a separate transmission function (currently the state of power utilities in several Indian states).

The ultimate aim of separation of functions, especially the generation function, is to ensure that generation and retail gradually become competitive markets and transmission and distribution, which would remain regulated monopolies, may be separated from the competitive activities and would provide non-discriminatory access to the network for competing generators and retailers. Retail competition, in context of international experience and also with relevance to the existing scenario in India, is a stage of reforms that typically requires the state of affairs in the power sector to be already liberalized to a great extent, and in particular requires a well-functioning wholesale market. Countries which have successfully

adopted a competitive retail supply model ensured that a robust wholesale market was in place before opening up the retail supply sector.

One reason for setting up wholesale markets is to provide viable options for procurement of power for smaller retail suppliers or large end consumers. Small retailers as well as large end-users seeking to cut out unnecessary overhead in their energy costs are expected to reap the benefits inherent in a well-functioning wholesale electricity market. An efficient, well-functioning, competitive and transparent market will give consumers a real choice between various companies supplying electricity and will make the market accessible to all suppliers. Thus, competitive energy markets can deliver benefits to consumers through lower bills, better service and greater choice.

Another reason for wholesale market reforms is that the traditional monopoly status of the generation part of the electricity sector is thought to contribute to inefficiency in pricing, because the costs of any inefficiency in generation is invariably passed on to consumers. In India, for instance, power purchase cost (taking into account the existing/normative distribution losses) comprises almost 75-80% of the average cost of supply faced by any distribution utility. Therefore, an efficient and price-competitive generation sector would go a long way towards reducing the cost of supplying power to end consumers. A sufficiently liquid and well-functioning wholesale electricity market would provide price signals that would stimulate investment in generation capacity as and when needed (thereby taking care of the supply/capacity side of the market) as well as be used as a reference index for long-term and short-term electricity prices. Hence, it is expected that market forces would maximise efficiency, stimulate generation capacity as per demand requirement and would drive inefficient producers out of the market, thereby bringing down the power purchase costs of retailers and end-consumers.

Recommendations for the Indian context

Wholesale market reforms are immensely important for the Indian power sector at present, especially for the feasibility of introducing competition in retail supply. The following are requisites for market design:

1. Reducing dominant market power in generation: The main aim is to ensure there are many players in the market and no player has a dominant position, enough to manipulate the market. This step usually involves breaking up big generating companies into smaller ones to ensure market forces apply.
2. Creation of voluntary public wholesale spot energy and operating reserve market institutions: Unlike other markets, electricity wholesale markets need to be designed as part of market restructuring exercise. The markets do not create themselves. The markets need to be designed:
 - to ensure real-time balancing of supply and demand of electricity across the area,
 - to ensure optimum utilization of transmission capacity,
 - to respond quickly to generation or network outages, and
 - to facilitate economical trading opportunities amongst retail suppliers and buyers and sellers of electricity.

The existing market structure in India for bulk power is primarily characterized by bilateral and multilateral contracts between generation plants owned by central and state governments, IPPs, surplus captive generation capacity and the distribution utilities/SEBs. Less than 5% of the gross energy generated in the country is being traded either through negotiated trading arrangements or brokered by power traders. Being a seller-dominated market, the trading activity is far from competitive and over the years this led to complaints of higher margins being charged by some traders. In line with provisions of the Electricity Act 2003, the CERC imposed a trading margin of 4 paise/kWh on trader brokered exchanges. This, however, does not recognize relative scarcity in some parts of country or some hours of the day and hence, setting up of an organized platform for trading electricity contracts is the need of the hour.

The development of wholesale markets is arguably the pivotal step in power market reforms. A competitive and well defined wholesale market is expected to provide sufficient checks and balances to ensure supply of power to consumers at the most economical price. The market will also ensure that adequate profits are available in the sector to encourage new investment in generation, transmission and

distribution segments of the sector value chain, albeit not abnormal profits since competition in the sector will enforce efficiency of prices. This structure of the market will encourage investment in the sector as there will be return available for investors.

Also, depth of the generation market is imperative for successful retail competition. It is necessary to ensure that there is enough untied capacity available in the coming years for retail suppliers to be competitive enough in pricing electricity vis-à-vis DNOs with their existing low-cost PPAs. Sufficient regulatory clauses also need to be built in to monitor, prevent and address cases of market abuse, in view of generators like NTPC controlling a significant percentage of total power generated within the country. For this purpose, it may be considered to set up a medium term capacity market for power to be contracted for duration of 1-3 years. Capacities that are un-tied/released can participate in this market, and the National Load Dispatch Centre may be enabled for the purpose of operating this market.

Risk factors

Setting up of an efficient and well functioning wholesale electricity market is much easier said than accomplished. In the specific context of India, the maturity of financial markets involved in wholesale trading of electricity may be a cause for concern. For instance, as per current financing norms, generators planning to set up power plants in India have to show fuel supply agreements and power purchase agreements in order to secure financing for the project, since debt financing is contingent upon assured off-take of power once the plant is ready and essentially, only corporate balance sheets get financed at present. If we look towards a wholesale energy market based solution, an essential requirement for efficient functioning of the same would be adequate untied generation capacity. Hence, there would need to be some assurance that financiers of energy projects would be mature enough to provide requisite financing to generators who wish to trade power through the pool instead of signing long term PPAs.

Although market economists assume that electricity can be bought and sold like any other commodity, even well established wholesale electricity markets cannot claim to be operating efficiently and in the most sustainable manner. While some failures such as the California experience are well documented and talked about, even in other countries where wholesale electricity markets have been set up and retail competition is in various stages of taking off, companies have tried to circumvent the market by integrating generation and retail, or bypass the wholesale market or sign long-term agreements with generators with no linkage to market prices. Even in wholesale power markets that are long established and where competition seems to be strong, e.g. in countries such as Germany, Britain, and the Nordic area, newer challenges are now emerging in these nations.

The difficulties in setting up a well functioning and efficient wholesale electricity market are many. The special features of electricity mean that many of the factors that allow wholesale markets to work for other commodities are absent for electricity, which include: a) the need for supply and demand to match at all times, without which the whole system would collapse, b) inelasticity of electricity for several uses due to which the demand for electricity cannot easily be influenced in the short-term by price changes which restricts the structuring of wholesale market operations, and c) fuel-driven volatility in the cost of generation of electricity from fossil-fuel based plants.

Another drawback of any market-based structure is that policymakers have to assume that market forces, and any distortion or possibility of agenda-driven motivation therein, would not compromise energy security.

Moreover, any sort of a market-based structure assumes that the costs of introducing and operating a competitive market would be negligible, which may never be true for electricity to the extent that the most basic cost of competition here is the risk premium on investment, since building a power plant is a risky venture no matter how the industry is structured.

Some characteristics of Indian power market that make the design of a wholesale market challenging are:

- Bilateral or multilateral contracts accounting for most of the power being traded in wholesale markets;
- Negligible power surplus available for trading;

- Limited demand side response to price signals, demand being dependent upon various extraneous factors.

The following needs to be explored and kept in mind while designing competitive wholesale markets.

- Present Transmission capacity and the concurrent nature of the industry mean that an integrated trading scenario is not feasible and this must be taken into consideration in terms of adopting zonal (regional) trade or integrated market model till the time the transmission capacity gets augmented.
- A transparent spot market is essential to keep the system reliable and to make sure important price and other information is percolated to all market participants.
- Given the current system constraints a Medium term capacity market can be created that may be run by the TSO. This market will have all untied and spare capacities in the market. The idea will be to increase the capacity of this market as and when the present Power purchase agreements (PPAs) expire and therefore competing utilities will start to acquire power from the market more and more, with the passage of time.
- It is very important that lessons be learnt from the California experience. The California liberalisation is a classic case of how wholesale market design can go wrong and the market structure can be manipulated by dominant players by gaming.

Cost reflective tariffs

The issue of cross subsidy requires much attention. Currently in India, tariffs are designed keeping socio-economic considerations in mind and are hence pegged to capacity-to-pay. Therefore, in spite of the fact that distribution losses, theft and other commercial losses are lower for industrial consumers, which makes their category-wise cost of supply lower than average, these consumers still pay higher tariffs since it is deemed that they can afford to cross-subsidize other consumer categories. Domestic and agricultural consumers pay tariffs lower than the actual cost of supplying power to these categories, lower even than the average cost of supply, thus getting cross-subsidized by commercial and industrial consumers who typically pay tariffs higher than their cost of supply.

Need for voltage wise and category wise determination of cost of supply

As and when the retail supply market is thrown open to competition, the first segment to avail the benefits of competition would be large consumers with load 1 MW or above. If these consumers move away to other retail suppliers, the distribution network operator (which would continue supplying power to other consumer categories) would suffer a loss, because significant cross subsidies would get eroded. Therefore, in order to assess the true impact of cross subsidy erosion and to take remedial measures, the first step towards addressing the cross subsidy issue is to determine voltage wise and/or category wise cost of supply for all states. Allocation of losses to 66/33/11 kV and DT/line loss level is necessary in order to arrive at accurate estimation of category-wise cost to serve consumers. But this data is currently not maintained by Indian Discoms.

Moreover, while estimating cross subsidies, cross-subsidies should be on the basis of voltage/category wise cost of supply instead of average cost of supply. This would require action on the part of distribution utilities as well as state regulators because at present, very few states have an indicative voltage wise cost of supply model in place and ready for reference.

The Philippines experience

In Philippines, the Electricity Power Industry Reform Act (EPIRA) of 2001 mandates that all types of cross subsidies must 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.

The Philippines Electricity Regulatory Commission (ERC) 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 (other factors being payment for stranded debts, missionary electrification, equalization of taxes, and an environmental charge). The UC was envisioned as a non-bypassable charge collected from all end-users (except threshold and lifeline consumers) every

month based on the approval of the ERC. Within a period not exceeding 3 years from the establishment of a Universal Charge (UC), it was mandated that cross subsidies shall be entirely phased out. Inter-regional grid cross subsidy was removed in 2002 when the National Power Corporation (NPC or Napocor) unbundled its rates. Intra-regional grid cross subsidy was removed in three phases in September 2003, September 2004 and September 2005.

For inter-class cross subsidy removal, the ERC approved a two-phase removal scheme for customers of the Manila Electric Company: 40% of the subsidy was removed in October 2004 and the remaining 60% in October 2005. As per Philippines ERC estimation, the residential rates were to increase by PHP 0.2852/kWh during the first phase and PHP 0.4278/kWh during the second phase. However, the Napocor provided a discount of PHP 0.30/kWh to residential consumers in order to mitigate the cross subsidy removal. Also, poor marginal residential users were already provided lifeline discount rates of as much as 50 percent [Source: OECD/The World Bank]. A provision of Lifeline Rate was made for the marginalized end users during the phase out of cross subsidy for a period of 10 year.

The Australia experience

Two types of cross subsidies prevailed in Australia before the reforms:

- i. Urban-Rural cross subsidy: Urban consumers subsidizing rural consumers.
- ii. Inter class cross-subsidy: Consumers of one category subsidizing consumers of other category.

In case of the urban-rural cross subsidy issue, the Australian government proposed to settle it by means of a one-time adjustment. As far as the inter-class cross subsidy was concerned, distribution businesses were allowed to unwind the subsidies subject to a maximum impact on tariffs of up to CPI+2%.

Recommendations for the Indian context

It is recommended that the structure of tariff designing should change, from category-wise tariffs being pegged to average cost of supply system to tariffs being pegged to category wise/voltage wise cost of service. Although the National Tariff Policy mandates tariffs being brought within a range of “ $\pm 20\%$ of the average cost of supply”, the tariff for each category would be truly “cost reflective” only if it is pegged to the cost of serving that category.

With regard to the aim of reducing cross subsidies, to begin with, regulators should be encouraged to give effect to the National Tariff Policy guideline on gradual elimination of cross subsidies. Hence, it is recommended that the process of cross subsidy reduction be made time bound. In order to avoid a tariff shock situation, it is necessary to follow some rationale in setting up the cross subsidy removal trajectory.

In India, all competitive market consumers may be loaded with a Cross Subsidy Surcharge in initial years, to make operations viable for incumbent distribution companies with regard to its captive (i.e. non competitive) retail market. In this scenario, no matter whether the consumer has shifted to the new retailer or is still connected to the incumbent retailer, a pre-decided (regulated) per unit charge can be recovered under a separate head of cross subsidy surcharge, till the time the cross subsidy is phased out gradually.

Alternatively, a **Universal Charge (UC)**, similar to the one levied in Philippines, may be imposed on all consumers before rolling out the first phase of retail competition. The duration of levy of this UC would be subject to the extent to which cross-subsidies are reduced before retail competition is introduced, and may be continued for as long as deemed to be required by an authorised body, thus being more in the nature of a permanent levy built into retail tariffs, rather than a short-duration transitory mechanism.

This Universal Charge would be an identical charge imposed on per-unit basis on sales to all consumers of incumbent distribution companies and collection of UC would go towards a state-wide/national fund to reduce the extent of cross subsidy in retail supply. An illustration is provided in page 44 of this report to show a simplified working model depicting levy of Universal Charge and its subsequent utilization towards reducing cross-subsidies.

Additionally, the Government may provide some sort of a viability gap funding in order to compensate incumbent Discoms for the loss of high-tariff consumers, in view of the fact that retail tariffs may not realistically be increased substantially for the Domestic category in the coming years. Also, as is the case with Philippines, a “lifeline rate” may be introduced in India as well for Below Poverty Line consumers in order to protect their interests and ensure that their tariffs remain, to a certain extent, subsidized by the Government or cross subsidized by other categories.

One heartening aspect regarding cross subsidies is that an improvement in efficiency levels, especially reducing distribution losses in supplying power to categories such as domestic and agriculture which currently are beset with significant distribution losses, would automatically reduce the cross-subsidy gap to be bridged, by reducing the cost of supply at the consumer end. Currently, distribution losses are extremely high for LT categories such as Domestic and Agriculture consumers while losses in supplying power to HT consumers are considerably lower, which leads to a substantial difference in the costs of supplying power to LT and HT categories. But the reduction in distribution loss envisaged by segregation of distribution and retail supply functions and entry of private/competitive retail suppliers would lead to a reduction in average cost of supply. This, over time, would help in rationalization of tariffs without having to drastically increase the tariffs of the lowest-paying categories as would undoubtedly happen if there is no accompanying reduction in distribution losses.

Risk factors

Cross subsidies are inherently built into the tariff regimes prevalent all over India. Historically, the tariffs charged from consumers, as allowed by state regulatory commissions, have been moderated to quite an extent and have not always kept pace with real rate of inflation, steep increases in fuel costs, energy exchange volatilities, etc. Furthermore, to protect consumer interest and in view of socio-economic considerations, tariffs have also been structured in such a manner that reduces the burden on domestic, agricultural and other economically weak categories, while placing a proportionately higher burden on categories that are deemed to have a greater capacity-to-pay, such as medium/large industries and commercial consumers. In addition to all this, most distribution utilities grapple with huge distribution losses – technical as well as commercial – while supplying to domestic, commercial and agricultural consumers which leads high costs of supplying power, especially to these categories.

Hence, any pan-national attempt to reduce cross subsidies has to inevitably begin from a stage where there is a huge disconnect between the tariff and cost of supply applicable to the economically weakest and politically most sensitive categories, viz. domestic and agricultural consumers. This undoubtedly makes the task of reducing cross subsidies a difficult one to embark upon and equally difficult to see through to the logical end of cross subsidy elimination. Apart from the challenges of designing a cross subsidy reduction mechanism, other factors such as regulatory approval and political will/appetite for such a move may prove to be equally significant impediments.

One exercise which is in the nature of being a pre-requisite to structuring any cross subsidy reduction programme is the determination of voltage wise and/or category wise cost of supplying power. In view of the state of electricity sector regulatory accounts in India, this is a difficult task primarily due to lack of basic voltage wise expenditure/revenue accounts (e.g. allocation of assets, manpower costs, etc.) and voltage wise accounting of distribution losses in most distribution utilities across the country. Therefore, it becomes essential for state electricity regulatory commissions to start issuing directions to distribution companies to prepare voltage wise accounts, so that an accurate estimate of cross-subsidy at the national level may be arrived at.

Financial pre-conditions

Sector viability

Before any major reforms are undertaken, it is important to take care of the poor financial health of distribution utilities today. To this end, the Ministry of Power notified a Scheme for Financial Restructuring of State Power Distribution Companies (Discoms) on 5 October, 2012, which aims at helping the distribution utilities tide over their financial troubles by way of several interventions. The most significant assistance being given to Discoms is the provision for takeover of 50% of outstanding short-term liabilities of the Discoms by the State Government. With such assistance, it is hoped that the country’s Discoms would be able to stand firmer on their feet as far as their financials are concerned.

Treatment of existing financial losses

Dealing with existing financial losses also requires attention, especially since the distribution companies of India currently show combined accumulated losses of more than Rs 2 lakh crores on their balance sheets. Moreover, there are significant regulatory assets that have been created by various state regulators for the distribution companies in their states, which are in the nature of acknowledged revenue gaps that have not yet been passed on to consumers in the form of a tariff hike. These regulatory assets are a notional source of revenue on the P&L statements of Discoms and hence lead to the overall financial losses being under-estimated, since no actual revenue accrues to the Discoms from these regulatory assets.

However, allocation of financial losses between the distribution and retail supply functions may be a tough task. This is because distribution business being capital-intensive, most capital assets would be allocated to the distribution network operator whereas the retail supply function would retain most of the revenue stream. Hence, there would be a need to balance cost and revenue centres between the two segregated businesses. One would also need to consider which of the two functions can better bear the financial losses, given their existing financial position. It may be argued that although most cost centres and loss centres lie with retail supply function after accounts segregation, financial losses are loaded in a disproportionate manner on to the distribution network operator because the network operator, through efficiency gains, can deal with financial losses better since the DNO has more assets on the balance sheet.

Recommendations for the Indian context

For dealing with accumulated financial losses and existing regulatory assets of Discoms, a Special Purpose Vehicle (SPV) may be created to take over all existing financial losses of the Discoms, and a Regulatory Surcharge can be levied on all consumers (of incumbent Discom as well as competitive supply retailers) which would go towards the SPV.

Risk factors

With regard to creating a SPV for dealing with financial losses and liquidating the same through recovery from consumers over time, via a Regulatory Surcharge, the same may be subject to similar kind of concern as surrounds the proposal for levy of a Universal Charge towards cross-subsidy reduction, since a Regulatory Surcharge would increase the tariff impact for all categories of consumers and there may be challenges raised on the question of incidence versus impact on consumers.

Technical pre-conditions

Treatment of distribution losses

Before designing any model for separation of the distribution and retail supply businesses, consensus needs to be built on the treatment of distribution (technical and commercial) losses in supply of power. A pre-requisite to this exercise would be segregation of accounts and preparation of separate accounts for the distribution and retail supply businesses.

Existing distribution losses of distribution companies need to be assessed accurately so that technical and commercial losses can be allocated between distribution and retail supply, which is essential for setting incentive-based efficiency targets for the distribution network operator after distribution has been separated from the retail supply function. Further, there is a need to allocate distribution losses to different voltage levels to arrive at voltage-wise and category-wise loss levels for each Discom. This is required for estimating the existing level of cross subsidies and setting targets for gradual reduction of cross subsidies.

Recommendations for the Indian context

All technical losses may be allocated to the incumbent Discom/Distribution network operator since these losses are on account of technical parameters. On the other hand, commercial losses that arise on account of various issues such as faulty meters, non-metering, meter bypassing, etc. may be attributed to the retailers. Segregation of losses is necessary to get to the correct allocation of existing distribution losses.

Risk factors

Accurate estimation of distribution losses would be difficult in view of the fact that many states still have unmetered consumers whose consumption (for the purpose of estimating total sales and hence total distribution losses) is difficult to determine precisely. In some states, distribution losses have been questioned by the regulator and hence may need to be re-determined. Establishment of correct baseline values of existing distribution losses is necessary because after separation of the two functions, achievement (and over/under-achievement) of distribution loss targets would form one of the components of tariff for the DNO as well as for the regulated segment of the retail supply market.

Suitable supply infrastructure

Separation of distribution and retail supply of electricity would require advanced metering for consumers in the competitive segment of the market because in the absence of separate meters and till the time that sufficient power availability is attained, imposition of load restrictions by the incumbent Discom would needlessly impact competitive market customers and vice versa. Therefore, distribution utilities may need to install advanced metering for all eligible consumers before the market is opened up for competition, or consumers may be directed to ensure that all consumers connected on a feeder take supply from the same retail supplier, and any consumer wishing to opt for a different retail supplier may make arrangements to be shifted to an independent/dedicated feeder.

Therefore, before rolling out retail competition related reforms, the timeline for installation of advanced meters needs to be discussed. It would also merit a discussion on sharing of costs related to new investments in metering infrastructure – whether the cost of advanced metering should be borne by the consumer segment(s) for which it is installed, or borne by the utility, or financed through grants by the State/Central Government, or shared among all consumers in the utility's annual revenue requirement. There would also be the cost of meters rendered obsolete by advanced metering and recovering the cost of these “stranded assets”.

It may also be discussed whether metering should also be privatized and made competitive.

Recommendations for the Indian context

Considering the huge cost and time involved, there might be several practical issues involved in ensuring advanced metering for all consumers or ensuring that all consumers opting for competitive retailers are on the same/independent feeders. Therefore, keeping in view transitional requirements, three approaches may be considered in this regard:

- a) Without any changes in the existing metering infrastructure, as a transitional approach it may be considered that consumers in the competitive market segment may take supply from any of the retail suppliers, irrespective of the feeder on which they are connected, if they are willing to undergo load restrictions that shall be announced well in advance by all retail suppliers. Hence, if one consumer out of ten consumers connected on a particular industrial feeder wishes to take supply from another retail supplier, he would be free to do so if he is willing to undergo load shedding / load restriction cuts as applicable to the other consumers on his feeder. At the same time, all retail suppliers would be obligated to declare in advance their load restriction schedules, along with details of feeders that would be impacted.
- b) Meters should be separated for the concerned consumer segment (i.e. 1 MW and above, and subsequently other categories as and when opened up to competition) by the time competition is introduced for that consumer segment, e.g. 1 MW consumers may be given supply on independent feeders for starters and the same may be carried out for other consumer segments, on request basis, in time before retail competition is extended to those segments. Alternatively, it can be advocated that only those consumers (within the segment opened up to retail competition) would be able to opt for a competitive retail supplier who are on a dedicated/independent feeder. Under this scenario, taking the example of the market segment of “above 500 kW load” consumers being opened up to retail competition, a particular consumer with load above 500 kW would be able to opt for a competitive retail supplier only if: (a) he is connected on an independent feeder or is willing to be shifted to an independent feeder after

bearing the requisite costs; or (b) he is connected on such a feeder where all the consumers are willing to shift to the same competitive retail supplier.

- c) Advanced metering may be completed for various segments of the market as and when they are opened up to competition in a phased manner. If this is achieved, then it would not be necessary for all consumers connected on a feeder to take supply from the same retail supplier, since power supply to individual consumers can be regulated from a remote level.

It may be recommended that any meter-related infrastructure would have to be borne as a one-time cost by consumers. Since the majority of stranded assets of incumbent Discoms would be in the domestic category and this sector shall be thrown open to retail competition not before 6 years from Day Zero, it may be explored whether most existing meters would have lived out their lifetime by then, which would make the issue of stranded costs relatively insignificant.

Risk factors

Installation of advanced metering infrastructure and/or shifting of consumers to independent/dedicated feeders would be a time-intensive and cost-intensive exercise and hence the matter of consumers bearing these costs, as recommended, may be a tad difficult to push through and generate consensus on.

However, the requirement for consumers opting for a competitive retail supplier to be connected on independent feeders is an essential pre-condition for retail supply competition to be implemented. Any delay in the timeline for readying of suitable infrastructure may result in delaying the timelines for rolling out competition in the proposed stages.

Institutional pre-condition: Ownership segregation between wire and supply businesses

One potential distribution sector reform that is gaining attention is the segregation of ownership of the distribution (wire) and retail supply functions. There are successfully implemented international precedents for this reform, the most notable of them being the United Kingdom which separated ownership of distribution (wire) business from retail supply of electricity through various legislative reforms, before introducing competition in the retail supply sector.

Rationale for separating ownership

- **Elimination of conflict of interest:** A major motivation for separating the two functions would be to eliminate conflict of interest in the Distribution segment of the electricity sector, which has been hindering repeated efforts by policy makers to bring in consumer choice and greater competition in supply of electricity via measures like Open Access. Indian distribution companies are saddled with huge transmission & distribution losses, with losses being highest for low-voltage consumers such as domestic households, and lowest for high-voltage industrial consumers. The latter are most likely to opt for any hint of competitive access to power which promises reliable supply at reasonable rates. However, these consumers also form the cross-subsidising segment for any Distribution utility, which is why utilities resist the loss of high-paying / cross-subsidising consumers and make deliberate attempts to block the distribution network in order to disallow competitive access to the network which could cater to the needs of these consumers. Therefore, there is a need to bring in neutrality in the Distribution network by separating the Distribution and Retail Supply functions, as consumer choice is bottlenecked without such neutrality being built into the system.
- **Encourage investment in wires network:** Another compelling reason for separating the two functions is to encourage investment in distribution networks by making the distribution business a distinct, regulated business with assured returns. At present, the cash-strapped position of distribution utilities in India often hinders investment in improvement of distribution infrastructure. Lack of funding, disallowance of capital expenditure & related financing by regulators, and unclear cost-benefit mapping in view of widespread distribution losses are some reasons why distribution utilities cannot incur as much capital investment in up-gradation and maintenance of distribution networks as is required for our country. In this scenario, it makes

sense to make distribution business separate from retail supply, wherein the main task of the distribution network operator would be to maintain and strengthen the distribution network (and associated works) with all costs being pass-through in nature to the distribution licensee, subject to certain performance/efficiency related norms. With separation of carriage and content, a separate wire business can remain a natural monopoly with regulator-determined tariffs and may be owned by the Government, if need be.

- **Focussed efforts at efficiency improvement:** Separation of the two functions would also help the entities managing the respective functions in focusing their efforts on efficiency enhancement. While the distribution company, in such a scenario, would be focused entirely on improving the technical and operational efficiency of the distribution (wire) system up to the consumer meter, the retail supplier can focus entirely on power procurement and consumer interface (billing, revenue collection, metering, customer care, etc.). This would also help to bring in transparency in technical and commercial losses in the Distribution segment.
- **Transparency in revenue and cost streams:** Separate distribution (wire) and retail supply businesses would also ensure greater transparency in revenue and cost streams of both functions, and would ensure that the less remunerative function (retail supply) is not being cross subsidised by the revenue generated by the most remunerative business, which hinders investment and efficiency improvement in the more remunerative business.

Keeping all the above preconditions in mind, the time is now ripe to build consensus on the matter of segregation of wire and retail supply business and gradual introduction of competition in the retail sector of electricity in order to foster private sector participation and a spirit of competition, and to reap the gains of a competitive atmosphere.

Feasible market structure

The competitive retail supply model that can be advocated for adoption by India keeping in mind the realities of the Indian power sector, is detailed below.

- Feasible market structure
 - Segregation of network and supply businesses
 - Ownership separation after 3 years; onset of second supply licensee
 - The model would start off as a hybrid model wherein only one segment of consumers (1 MW & above load) would be initially open to competition
- International experiences in retail sale competition have been studied to recommend the market structure for India and the recommendations show an appreciation for differences in baseline conditions
- Phased approach with clear milestones over a 6 year period
- Clear identification of enablers which will facilitate this transition
- Minimum disruption have been envisaged in existing contracts
- Recommendations might assist in operationalizing the open access

It may be kept in mind that the recommendations in this report, including the suggested timeline, are borne out of preliminary discussions, study and analysis of the requisite environment necessary for introducing retail sector reforms in India, in line with the mandate of this advisory assignment. However, the actual modalities of implementation of these recommendations must be subject to a much broader and exhaustive discussion with all involved stakeholders, which is a pre-requisite to creating the right kind of atmosphere for ushering in reforms in the retail electricity sector.

Timelines for implementation

Activity	Timeline
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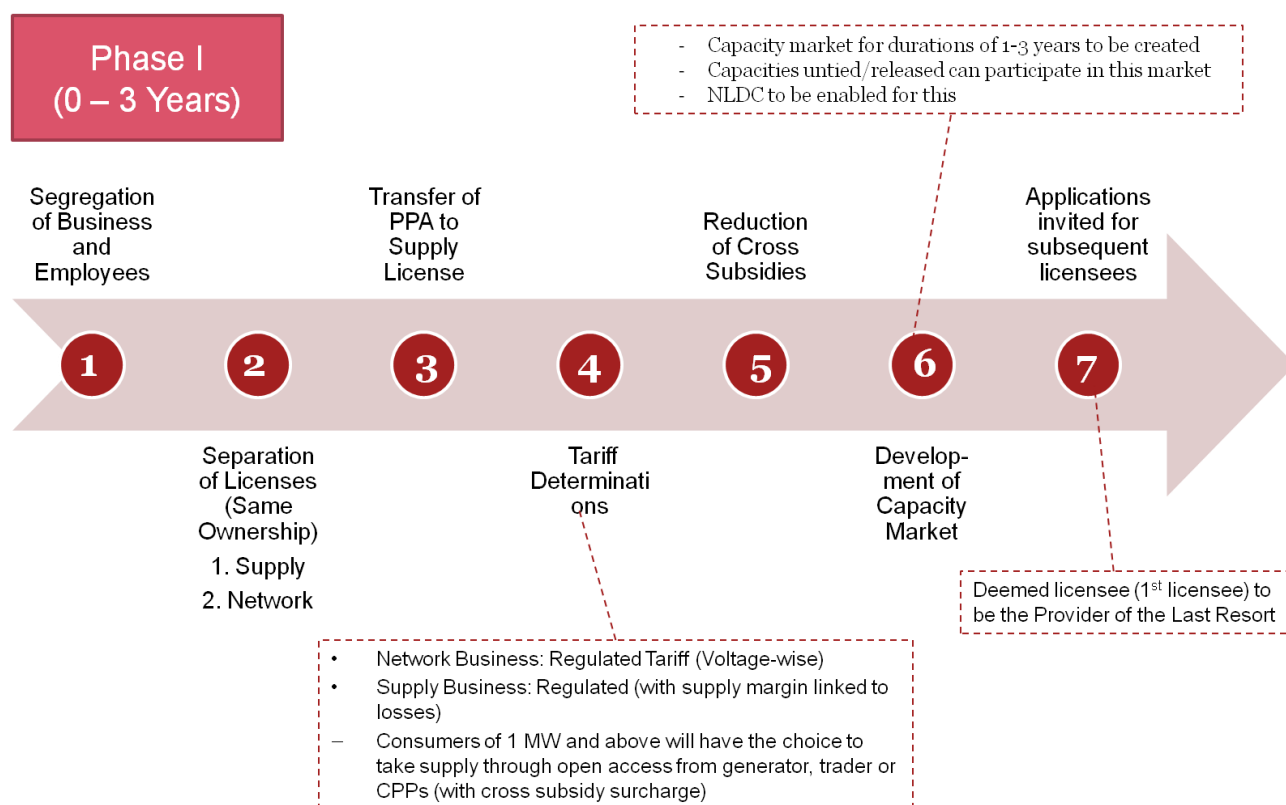
Activity		Timeline
PHASE I		0 Day – 3 years
Step 1	Separation of Business <ul style="list-style-type: none"> - Segregation of Accounts (including segregation of Technical and Commercial losses) - Segregation of employees. 	
Step 2	1. Two separate licences (with same ownership) <ul style="list-style-type: none"> - Network Business <ul style="list-style-type: none"> - Owns distribution network. - Proposed Responsibility: Network planning (up to consumer meters), Construction capital expenditure, Operation & Maintenance and Fault Restoration. - Retail Supply Business <ul style="list-style-type: none"> - Proposed Responsibility: Power procurement and management of existing contracts, Existing power trading, Supply to consumer, Meter reading and meter-related operations, Billing, Collection, Credit Contracts, and Customer Care. 2. Transfer of PPAs to Supply Licensee 3. Tariff Determination <ul style="list-style-type: none"> - Network Business: Regulated Tariff (Voltage-wise) - Supply Business: Regulated (with supply margin linked to losses) - Consumers of 1 MW and above will have the choice to take supply through open access from generator, trader or CPPs (with cross subsidy surcharge) - Stringent timeline for disposal of Open Access cases. - Reduction of cross subsidies (Time bound) 4. Capacity Market – Medium Term <ul style="list-style-type: none"> - Capacity market for durations of 1-3 years to be created - Capacities untied/released can participate in this market - NLDC to be enabled for this 	
Step 3	Invite Applications for second/subsequent supply license	Completion of 2 Years
PHASE II		3 Years – 6 Years

Activity		Timeline
Step 4	1. Ownership separation <ul style="list-style-type: none"> - Network licensee cannot be in supply business. 2. Introduction of Retail Competition <ul style="list-style-type: none"> - Onset of second/subsequent supply licences. 3. Tariff determination <ul style="list-style-type: none"> - Network Business: Regulated (incentive based) - Supply Business: <ul style="list-style-type: none"> - De-regulated for 1 MW and above consumers. - Regulated for consumers below 1 MW (with concept of supply margin linked to loss reduction) - No surcharge (as cross subsidy and losses would have been reduced substantially in the first phase and also because of other design changes) 4. Competition in supply business <ul style="list-style-type: none"> - Competition between deemed supply licensee and second/subsequent supply licensee: The former would have cheaper power purchases but high losses while the latter would be likely to face higher power purchases but benefit from lower losses and operation costs. 	
PHASE III		After 6 Years
Step 5	Further de-regulation of Supply Business – <ul style="list-style-type: none"> - Deregulation of less than 1 MW and up to 100 kW first and subsequently any consumer 	

Retail competition - phasing and operationalization

This section details the various steps involved in phasing and operationalization of the recommended model of competitive retail supply.

PHASE I: Groundwork (from Day Zero to 3 years)



Step 1: Separation of Businesses

Separation of wheeling business and retail supply business is essential in order to accurately allocate costs, fixed assets, debt servicing, financial losses, etc. to the two functions.

Some of the mandatory tasks associated with the separation of businesses can be enlisted as:

- Maintenance of separate accounts and need for proper regulatory accounting
- Segregation of assets in order to correctly assess the Gross Fixed Assets (GFA) of each business. The same could also help in assessing depreciation, repair and maintenance charges, etc. as a function of the GFA of the distribution network business at the time of regulatory determination of tariff for the distribution function.
- Asset segregation, in turn, requires asset valuation. Since the fixed assets registers could not be maintained by most of the distribution companies, the biggest challenge would be to get the asset valuation done for the purpose of asset segregation.
- Employees need to be allocated between the two functions, which would help in assessing the employee cost of the distribution business at the time of regulatory tariff setting.
- An important pre-condition is separation of technical and financial losses.
 - Allocation of technical losses: Allocation of technical losses between the distribution and retail supply business is essential because normative loss targets shall be set for the distribution business at the time of regulatory approval of distribution tariff. For this purpose, the baseline loss data needs to be in place and agreed upon.

- Allocation of financial losses: Since retail supply business would necessarily get divested and transferred to a separate owner in due course of time, therefore it is essential that financial losses are clearly booked to the accounts of distribution business and retail supply business separately.

Separate retail supply function

In India, several distribution companies are already privatized. Although in Phase I of this proposed competitive supply model, the two functions are merely required to be separated and can otherwise continue operating under the same ownership, in due course of time it is proposed that the same entity cannot own both functions. With that in view, private distribution companies may pose stiff challenges in the very first stage that requires separation of distribution and retail supply functions.

Also, distribution franchisees are functioning in some areas and their contracts would be difficult to dissolve before the contract period is over. In this scenario, some discussion is required on how to deal with existing distribution franchisees.

Recommendation

- On the matter of distribution franchisees, they may be allowed to continue operations at existing terms and conditions but their contract may not be extended.

Allocation of distribution losses

Accurate estimation of distribution losses would be difficult in view of the fact that many states still have unmetered consumers whose consumption (for the purpose of estimating total sales and hence total distribution losses) is difficult to determine precisely. But distribution losses need to be assessed so that technical and commercial losses can be allocated between distribution and retail supply, which is essential for setting incentive-based efficiency targets for the distribution network operator after distribution has been separated from the retail supply function.

All technical distribution losses can be allocated to the incumbent Discom/Distribution network operator since these losses are on account of technical parameters. On the other hand, commercial losses that arise on account of various issues such as faulty meters, non-metering, meter bypassing, etc. can be attributed to the retailers. Hence, this segregation of the losses is a must to get to the correct allocation of the distribution losses.

Further, there is a need to allocate losses to different voltage levels to arrive at voltage wise and category wise loss levels for each Discom. This is required for estimating existing level of cross subsidies and setting targets for gradual reduction of cross subsidies.

International experience

Australia: In Australia, a concept of Distribution Loss Factor (DLF) has been developed to take care of the allocation of Distribution Losses. The Australian Energy Market Commission has formulated this concept. According to the National Electricity Rules, 2012, the DLF should be made applicable to all the consumers connected. However, the method of determination of the DLF varies according to the consumer category.

Australia's National Electricity Market Management Company (NEMMCO) charges electricity retailers for metered energy at the consumer premise multiplied by the relevant Distribution Loss Factor (DLF) and Transmission Loss Factor (TLF). The sum of the combined distribution and transmission losses are then factored into the final tariff that the Consumer pays. This DLF is calculated by the local Distributor annually. The National Electricity Rules also mandates that any consumer who uses more than 40 GWh per year or has a maximum demand of 10 MW or more must have an individually calculated DLF.

Moreover, the National Electricity Rules require that each year the Distribution Network Service Provider must determine the distribution loss factors to apply in the next financial year, get them approved by the Australian Energy Regulator (AER) and provide these to the Australian Energy Market Operator (AEMO) for publication by 1 April.

Recommendation

- In the groundwork stage, regulators may be encouraged to direct distribution utilities to carry out segregation of feeders and/or achieve 100% metering so that distribution losses may be accurately estimated.
- Distribution utilities also need to be directed to start maintaining voltage-wise asset registers to determine voltage wise losses.

Risk factors

Accurate estimation of distribution losses would be difficult in view of the fact that many states still have unmetered consumers whose consumption (for the purpose of estimating total sales and hence total distribution losses) is difficult to determine precisely. In some states, distribution losses have been questioned by the regulator and hence may need to be re-determined. Establishment of correct baseline values of existing distribution losses is necessary because after separation of the two functions, achievement (and over/under-achievement) of distribution loss targets would form one of the components of tariff for the DNO as well as for the regulated segment of the retail supply market.

Dealing with cross subsidies

As detailed in the previous section, the issue of cross subsidy requires painstaking attention as well as political will. Currently in India, on the basis of the capacity-to-pay considerations, domestic, agricultural and other consumers pay tariffs lower than the actual cost of supplying power to them, whereas industrial consumers typically pay tariffs higher than their cost of supply, thereby cross-subsidizing other categories. This is because although distribution losses, theft and other commercial losses are lower for industrial consumers, thus keeping their category-wise cost of supply lower, these consumers still end up paying higher tariffs since it is deemed that they can afford to cross-subsidize other consumer categories.

As and when the retail supply market is thrown open to competition, the first segment to avail the benefits of competition would be large consumers with load 1 MW or above. If these consumers move away to other retail suppliers, the distribution network operator (which would continue supplying power to other consumer categories) would suffer a loss, because significant cross subsidies would get eroded. Therefore, in order to assess the true impact of cross subsidy erosion and to take remedial measures, voltage wise and/or category wise cost of supply should be determined for all states.

However, allocation of losses to 66/33/11 kV and DT/line loss level is necessary in order to arrive at accurate estimation of category-wise cost to serve consumers. But this data is nearly impossible to get in the case of Indian Discoms.

Moreover, while estimating cross subsidies for each state, it needs to be debated whether cross-subsidies should be on the basis of voltage/category wise cost of supply or the average cost of supply. At present, very few states such as Himachal Pradesh have an indicative voltage wise cost of supply model in place and ready for reference.

International experience

United Kingdom: UK did not have significant cross subsidies at the time of introducing retail supply competition reforms.

Philippines: The Electricity Power Industry Reform Act (EPIRA) of 2001 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.

The ERC 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 (other factors being payment for stranded debts, missionary electrification, equalization of taxes, and an environmental charge). The UC was envisioned as a non-bypassable charge collected from all end-users (except threshold and lifeline consumers) every month based on the approval of the ERC. Within a period not exceeding 3 years from the establishment of a Universal Charge (UC), it was mandated that

cross subsidies shall be entirely phased out. Inter-regional grid cross subsidy was removed in 2002 when the National Power Corporation (NPC or Napocor) unbundled its rates. Intra-regional grid cross subsidy was removed in three phases in September 2003, September 2004 and September 2005.

For inter-class cross subsidy removal, the Commission approved a two-phase removal scheme for customers of the Manila Electric Company: 40% of the subsidy was removed in October 2004 and the remaining 60% in October 2005. As per Philippines ERC estimation, the residential rates were to increase by PHP 0.2852/kWh during the first phase and PHP 0.4278/kWh during the second phase. However, the Napocor provided a discount of PHP 0.30/kWh to residential consumers in order to mitigate the cross subsidy removal. Also, poor marginal residential users were already provided lifeline discount rates of as much as 50 percent [Source: OECD Trade Policy Studies: Liberalisation and Universal Access to Basic Services Telecommunications, Water and Sanitation, Financial Services, and Electricity]. A provision of Lifeline Rate was made for the marginalized end users during the phase out of cross subsidy for a period of 10 year.

Australia: Two types of cross subsidies prevailed in Australia before the reforms:

- i. Urban-Rural cross subsidy: Urban consumers subsidizing rural consumers.
- ii. Inter class cross-subsidy: Consumers of one category subsidizing consumers of other category.

In case of the urban-rural cross subsidy issue, the Australian government proposed to settle it by means of a one-time adjustment. As far as the inter-class cross subsidy was concerned, distribution businesses were allowed to unwind the subsidies subject to a maximum impact on tariffs of up to CPI+2%.

Recommendation

- In India, competitive market consumers may be loaded with a Cross Subsidy Surcharge in initial years, to make operations viable for incumbent distribution companies with regard to its captive (i.e. non competitive) retail market
- Alternatively, a **Universal Charge (UC)** may be imposed on all consumers before rolling out the first phase of retail competition. This UC would be an identical charge imposed on per-unit basis on sales to all consumers of incumbent distribution companies and collection of UC would go towards a state-wide/national fund to reduce the extent of cross subsidy in retail supply. An **illustration** is provided on the next page to show a simplified working model depicting levy of Universal Charge and its subsequent utilization towards reducing cross-subsidies.
- The Government may provide some sort of a viability gap funding in order to compensate incumbent Discoms for the loss of high-tariff consumers, in view of the fact that retail tariffs may not realistically be increased substantially for the Domestic category in the coming years.
- As is the case with Philippines, a “lifeline rate” may be introduced in India as well for Below Poverty Line consumers to protect their interest.

Illustration – Universal Charge

- The illustration shows a simplified working model showing the proposed mode of levying Universal Charge (UC) and its subsequent utilization towards reducing cross-subsidies.
- The starting point for a cross-subsidy reduction roadmap is the acknowledgment that: (a) category-wise tariffs have to be within a $\pm 20\%$ range of the average Cost of Supply; and (b) In view of the current tariff structure across all states of India, there is a heavy element of cross-subsidy involved in the tariff design and hence, regulators should be encouraged to revise tariffs of Domestic and other cross-subsidized categories in such a way that it reflects the true cost of supplying power to these categories. Similarly, tariffs of traditionally cross-subsidizing categories should be revised in such a way that the cross-subsidy component in their tariffs is gradually brought down.
- Only four consumer categories are considered in this illustration – Domestic, Non Domestic, LT Industrial and HT Industrial.

- The illustration looks at a three-year time period. Cross subsidies (in this illustration) are not entirely removed within this time period, but the model may be extended to further years and/or modified accordingly once a timeframe is decided for elimination of cross-subsidies.
- A reasonable tariff hike is considered for all categories for each of the two subsequent years (Years 2 and 3) but for each category, the tariff is increased in such a manner that it aids the gradual reduction of cross-subsidies and attempts to recover more and more of the average cost of supplying power through tariff.
- **Year 1:** A Universal Charge of 30 paise/unit is imposed uniformly on all categories. In the first year, the UC is only collected and directed towards a cross-subsidy removal fund, and hence it is not put to use. Hence, the net realization of each consumer category is higher than their respective tariff by the extent of the UC levied, i.e. 30 paise/unit.
- **Year 2:** A Universal Charge of 40 paise/unit is imposed uniformly on all categories. In this second year, the revenue collected from imposition of UC in Year 1, which yielded a total of Rs 196 Crores, is utilized towards reducing the tariff impact on cross-subsidizing categories, viz. Non Domestic, LT Industrial and HT Industrial categories. Hence, Rs 196 Crores spread over the sales to these categories in Year 2 results in their realization reducing by 48 paise/unit. Therefore, with a UC of 40 paise/unit being levied on these cross-subsidizing categories but a relief of 48 paise/unit also being provided to them by utilizing the UC fund of the previous year, the net impact on cross-subsidizing consumers is a reduction of 8 paise/unit from their respective Commission-determined tariffs for Year 2.
- **Year 3:** A Universal Charge of 50 paise/unit is imposed uniformly on all categories. In this third year, the revenue collected from imposition of UC in Year 2, which yielded a total of Rs 275 Crores, is utilized towards reducing the tariff impact on cross-subsidizing categories, viz. Non Domestic, LT Industrial and HT Industrial categories. Hence, Rs 275 Crores spread over the sales to these categories in Year 3 results in their realization reducing by 64 paise/unit. Therefore, with a UC of 50 paise/unit being levied on these cross-subsidizing categories but a relief of 64 paise/unit also being provided to them by utilizing the UC fund of the previous year, the net impact on cross-subsidizing consumers is a reduction of 14 paise/unit from their respective Commission-determined tariffs for Year 3.

Category	Revenue (Rs Cr)	Sales (MU)	Tariff Y1 (Rs/Unit)	Tariff Y2 (Rs/Unit)	Tariff Y3 (Rs/Unit)
Domestic	17.56	82.00	2.14	2.38	2.65
Average CoS			3.91	4.10	4.30
Industrial	40.84	67.38	6.06	6.19	6.32
Total	58.40				
Transition Year 1					
Category	UC (Rs/Unit)	Rev from UC (Rs Cr)	Less per unit	Net realization	Realization by utility
Domestic	0.30	2.46		2.44	20.02
Industrial	0.30	2.02	0.67	5.70	38.38
Total		4.48			58.40
Transition Year 2					
Category	UC (Rs/Unit)	Rev from UC (Rs Cr)	Less per unit	Net realization	Realization by utility
Domestic	0.50	4.10		2.88	23.62
Industrial	0.50	3.37	1.11	5.58	37.61
Total		7.47			61.22
Transition Year 3					
Category	UC (Rs/Unit)	Rev from UC (Rs Cr)	Less per unit	Net realization	Realization by utility
Domestic	0.70	5.74		3.35	27.43
Industrial	0.70	4.72	1.55	5.47	36.85
Total		10.46			64.28

Risk factors

Cross subsidies are inherently built into the tariff regimes of every distribution utility. Hence, any pan-national attempt to reduce cross subsidies has to inevitably begin from a stage where there is a huge disconnect between the tariff and cost of supply applicable to the most cross-subsidized categories, viz. domestic and agricultural consumers. This makes the task of reducing cross subsidies a difficult one. Apart from the challenges of designing a cross subsidy reduction mechanism, other factors such as regulatory approval and political will/appetite for such a move may prove to be equally significant impediments.

Moreover, accurate estimation of prevailing cross subsidies requires data on voltage wise and/or category wise cost of supplying power. Currently, this is difficult task due to lack of basic voltage wise expenditure/revenue accounts (e.g. allocation of assets, manpower costs, etc.) and voltage wise accounting of distribution losses in most distribution utilities across the country. Hence, this data gap needs to be addressed before designing any comprehensive mechanism for cross subsidy reduction.

Segregation of employees of distribution and retail supply functions

Allocating employees to the two functions is necessary for properly allocating the employee cost burden to the two functions. Most existing State Boards/Discoms already have legacy issues and are over-staffed.

Point for discussion: Should Voluntary Retirement Scheme (VRS) be introduced in all incumbent Discoms to deal with overstaffing issues? If yes, how would such a Scheme be funded?

Recommendation

- A manpower requirement/optimization study may be undertaken to help the two functions shed excess manpower by phasing out certain posts once those posts fall vacant.
- A Voluntary Retirement Scheme (VRS) is essential in this regard since efficiency in operations would be impossible to achieve unless unproductive/sub-productive employees are offloaded.

Allocation of financial losses and regulatory assets

Even after segregation of accounts, allocation of financial losses would require attention. This is because distribution business being capital-intensive, most capital assets would be allocated to the distribution network operator whereas the retail supply function would retain most of the revenue stream. It should also be considered which of the two functions can better bear the financial losses, given their existing financial position. It may be possible that although most cost centres and loss centres lie with retail supply function after accounts segregation, financial losses are loaded in a disproportionate manner on to the distribution network operator because the network operator, through efficiency gains, can deal with financial losses better since the DNO has more assets on the balance sheet.

Point for discussion: How to deal with existing distribution franchisees?

Recommendation

- For dealing with accumulated financial losses and regulatory assets of Discoms, a **Special Purpose Vehicle (SPV)** may be created to take over all existing financial losses of the Discoms, and a Regulatory Surcharge can be levied on all consumers (of incumbent Discom as well as competitive supply retailers) which would go towards the SPV.

Step 2: Preliminary operationalization

Separation of licences

This would clearly demarcate the roles and responsibilities of the two functions, as detailed below:

Distribution Network Business:

- This business shall own the distribution network.
- The distribution network operator would have the following responsibilities:

- Network planning (up to the consumer meter)
- Capital expenditure on building and augmentation of the distribution network
- Operation and maintenance of the network such as network reinforcement and replacement, improved overhead line repair, etc.
- Fault restoration

Retail Supply Business:

- This business shall provide the last mile connectivity to consumer's point of supply
- The retail supplier would have the following responsibilities:
 - Power procurement and management of existing contracts
 - Existing power trading
 - Supply to consumer
 - Meter reading and meter-related operations
 - Consumer billing
 - Collection of revenue from consumers
 - Credit contracts
 - Customer care for meter, billing, collection related issues as well as for all technical problems (in case of technical problems, the retail supplier would connect with the DNO)

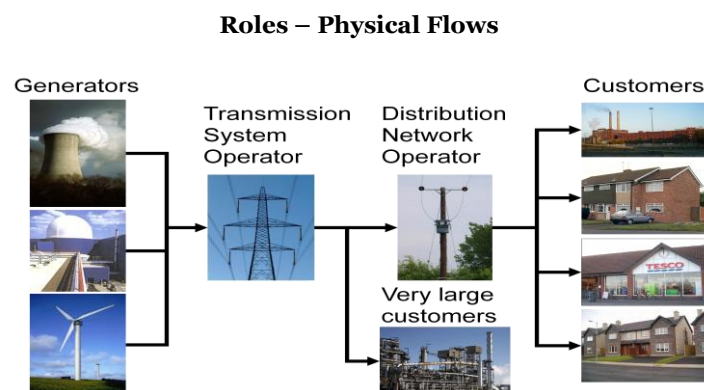
With such a demarcation of roles and responsibilities, all technical aspects of providing supply to consumers would be handled by the distribution network operator. The retail supplier would be responsible for procurement of power and customer-interface post delivery of power, i.e. meter reading, billing, revenue collection and customer care.

Also, as per this division of roles, anything beyond the consumer meter (e.g. internal wiring/tripping) would be the responsibility of the consumer and any technical faults that are not related to the distribution network or consumer meter would have to be repaired by consumer on his own.

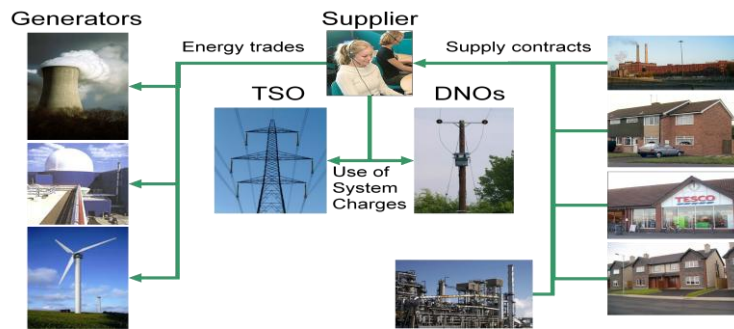
International experience

United Kingdom: It must be highlighted that in the UK, there was a **ten-year gap** between introduction of retail competition for the first segment of consumers (in 1990 for consumers with load 1 MW and above) and separation of carriage & content i.e. Distribution and Retail Supply functions (under the Utilities Act of 2000). However, in the Indian scenario, due to factors detailed in the section titled 'Reasons for separating Distribution (Wire) and Retail Supply functions' it has been explained that a separation of carriage and content is essential for several reasons such as eliminating conflict of interest, incentivizing investment in the two functions, focused efficiency gains, etc.

In the UK, after segregation of the two functions, roles and responsibilities were as shown below:



Roles – Financial flows



Transfer of existing PPAs to supply licensee

With the separation of licences and responsibilities, procurement of power would become the supply licensee's responsibility. Hence, all existing PPAs signed between generators and the erstwhile Discom shall be transferred to the incumbent supply licensee of the area as it is.

International experience

This is at divergence with the process in the UK and Philippines since these countries privatized all their generation assets prior to retail competition, thereby effectively dissolving all existing PPAs.

Philippines: In Philippines, the same is recommended to be done on a case to case basis, for each power purchase agreement (or those that may be disputed).

Points for discussion

Turkey: A program was launched to indirectly privatise existing plants of Turkish Electricity Generation and Transmission Company (TEAS) through a so-called Transfer of Operating Rights (TOOR) to private sector investors under Law 3096. The investor bids for the transfer of rights and subsequently operates and sells generated electricity to TEAS. The objective was to increase the efficiency and rehabilitate the transferred plants without TEAS bearing the capital cost. In essence, a private party operates plant formally owned by the state.

Area, tenure and nature of supply licence

Modalities of the supply licences need to be discussed and worked out, keeping in mind the following:

Area of licence: The area of retail supply licence has to be demarcated in such a way that it ensures enough interest among potential suppliers for them to apply for a licence, and also ensures that the benefits of competition reach all sections of the society. If a licence area is predominantly rural or more prone to technical or commercial losses, then there may not be enough applicants for that licence area, or applicants may insist on a government subsidy or viability gap funding mechanism in order to ensure adequate returns. One solution could be to bundle together rural and urban areas of contiguous geography and offer it as a single licence area.

Tenure of licence: Similarly, the tenure of supply licences may be discussed. On one hand, we could consider issuing licences for an initial period of only 3 to 5 years. However, the flip side of such short tenures would be that retail suppliers may not be able to negotiate strongly with generators because ideally long-term power procurement contracts work out to be the cheapest for consumers, and if the retail supplier is not sure about his area of supply and consequently demand for power, he cannot enter into long-term contracts with generators.

Nature of licence: It may also be considered that licences be given for specific purposes (e.g. commercial licence, domestic licence, etc.) on the lines of UK, but in the Indian context that is neither recommended nor practically feasible.

International experience

United Kingdom: Section 30 of the Utilities Act, 2000, specifies the following with regard to supply licences:

- “(3) A supply licence may authorise the holder to supply electricity—*
(a) to any premises;
(b) only to premises specified in the licence, or to premises of a description so specified; or
(c) only to any premises situated in a specified area, or to premises of a specified description which are so situated.”
(4) The Authority may, with the consent of the holder of a supply licence, modify terms included in the licence in pursuance of subsection (3) so as to extend or restrict the premises to which the licence holder may give a supply of electricity.
(....)
(7) A licence and any extension or restriction of a licence under subsection (4) or (6) shall be in writing.
(8) A licence shall, unless previously revoked in accordance with any term of the licence, continue in force for such period as may be specified in or determined by or under the licence.”

Recommendation

- In the initial stages, the entire state could be treated as one contiguous area of licence, otherwise private suppliers may not show interest in operating in rural areas or areas with economically weaker population.
- Competition can be ensured by issuing licences to several entities for the same licence areas.
- Licences may be provided for an initial period of 25 years, unless revoked, after which re-demarcation of supply areas may be considered.

Points for discussion

- a. If supply licence areas are to be smaller, on what basis will these areas be notified?
- b. If licence areas need to be changed after a few years, how would this be negotiated with the existing holders of the licence whose tenures are for (say) 25 years?

Pricing of electricity

Network Business: Regulated Tariff (Voltage-wise)

Supply Business: Regulated Tariff (with a concept of supply margin linked to losses). The supply margin shall be crucial in attracting private players to the retail sector once the sector is thrown open to competition, since players will compete by increasing efficiencies and at the same time under-cutting each other's prices by reducing this supply margin. A lot will depend upon the distribution losses also since it plays an important role in the setting up of the tariff. Here, the concept of the Distribution Loss Factor (DLF), as seen in Australia, can be introduced, which is levied on the total consumption of the individual consumers.

Consumers of 1 MW and above can take supply under open access from generators or traders or captive power projects, but will have to bear a cross subsidy surcharge.

Stringent timeline for disposal of open access applications

For the market segment comprising 1 MW load and above consumers to be successfully deregulated, by way of allowing these consumers to take power through open access if they wish, it has to be ensured that open access applications of consumers are disposed of in a timely and transparent manner.

International experience:

USA: FERC Order 888 states that all public utilities owning, controlling, or operating transmission lines will file for and obtain a single pro-forma tariff for non discriminatory access to transmission services that offer others the same transmission service they provide themselves.

Recommendation:

- It may be recommended that all open access consumer applications be decided (either accepted or rejected with sufficient reason in writing) within a period of 1 month from the date of receipt of application.

Time bound reduction of cross subsidies

Regulators should be encouraged to give effect to the National Tariff Policy guideline on gradual elimination of cross subsidies and on tariff being cost-reflective. In this context, it is recommended that the process of cross subsidy reduction be made time bound. In order to avoid a tariff shock situation, it is necessary to follow some rationale in setting up the cross subsidy removal trajectory.

Points for discussion

- Within what time period should cross subsidies be completely eliminated?
- Should cross subsidy be calculated voltage wise or average cost of supply? Although voltage wise CoS is preferred, data availability is a big issue.

Recommendation

- **Removal of Cross Subsidy from before the Retail Competition is allowed for any Consumer Category:** It is desirable to abolish the cross subsidy before any category of consumers is allowed to enjoy the perks of retail competition to avoid any complication and unfair means arising out of the existence of the cross subsidy.
- Otherwise, the issue of cross subsidy can be taken up by the government then, by creating a pool, where in, no matter whether the consumer has shifted to the new retailer or is still connected to the incumbent retailer, a pre-decided (regulated) per unit charge can be recovered under a separate head of cross subsidy surcharge, till the time the cross subsidy is phased out gradually.

Increasing the depth of generation capacity market

Depth of the generation market is important for successful retail competition. It is necessary to ensure that there is enough untied capacity available in the coming years for retail suppliers to be competitive enough in pricing electricity vis-à-vis DNOs with their existing low-cost PPAs. Sufficient regulatory clauses also need to be built in to monitor, prevent and address cases of market abuse, in view of generators like NTPC controlling a significant percentage of total power generated within the country.

Therefore, for the Indian context, wholesale market reforms are immensely important for the Indian power sector at present. A competitive and well defined wholesale market is expected to provide sufficient checks and balances to ensure supply of power to consumers at the most economical price. The market will also ensure that adequate profits are available in the sector to encourage new investment in generation, transmission and distribution segments of the sector value chain, albeit not abnormal profits since competition in the sector will enforce efficiency of prices.

Recommendation

- **Medium term capacity market:** Medium term capacity market must be created for contracts of duration 1-3 years. Capacities that are untied or released can participate in this market. National Load Dispatch Centre may be enabled to act as the operator for this market.

Risk factors

Setting up of an efficient and well functioning wholesale electricity market is much easier said than accomplished. Although market economists assume that electricity can be bought and sold like any other commodity, even well established wholesale electricity markets cannot claim to be operating efficiently and in the most sustainable manner. While some failures such as the California experience are well documented and talked about, even in other countries where wholesale electricity markets have been set up and retail competition is in various stages of taking off, companies have tried to circumvent the market by integrating generation and retail, or bypass the wholesale market or sign long-term agreements with generators with no

linkage to market prices. In the specific context of India, the maturity of financial markets involved in wholesale trading of electricity may be a cause for concern.

Some characteristics of Indian power market that make the design of a wholesale market challenging are:

- Bilateral or multilateral contracts accounting for most of the power being traded in wholesale markets;
- Negligible power surplus available for trading;
- Limited demand side response to price signals, demand being dependent upon various extraneous factors.

Decreasing the market share of generators

In a competitive retail market, the size of each generating firm should not be so large as to exert monopoly pressures on power procurement rates.

International experience

United Kingdom: Full divestment was carried out in the UK (except for Nuclear Electric in the initial stages). All 12 Regional Electricity Companies as well as the two major fossil-fuelled generating companies were floated on the London Stock Exchange and sold off to the public.

Philippines: Privatization of all generation assets is mandated as one of the first steps towards retail competition.

Recommendation

- Divestment of generating companies may not be an option for India, at present. However, it must be kept in mind that for a truly competitive electricity market, the significant market shares of mammoth entities such as NTPC, NHPC, etc. should be monitored and preferably reduced.

Step 3: Invite Applications for second/subsequent supply licence (with fixed timelines) – After completion of two years from Day Zero

After completion of two years from Day Zero, the designated Authority / Monitoring Committee shall invite applications for Second/Subsequent supply licence. The eligibility criteria for applicants for Second/Subsequent Supply licence may be determined before that.

Points for discussion:

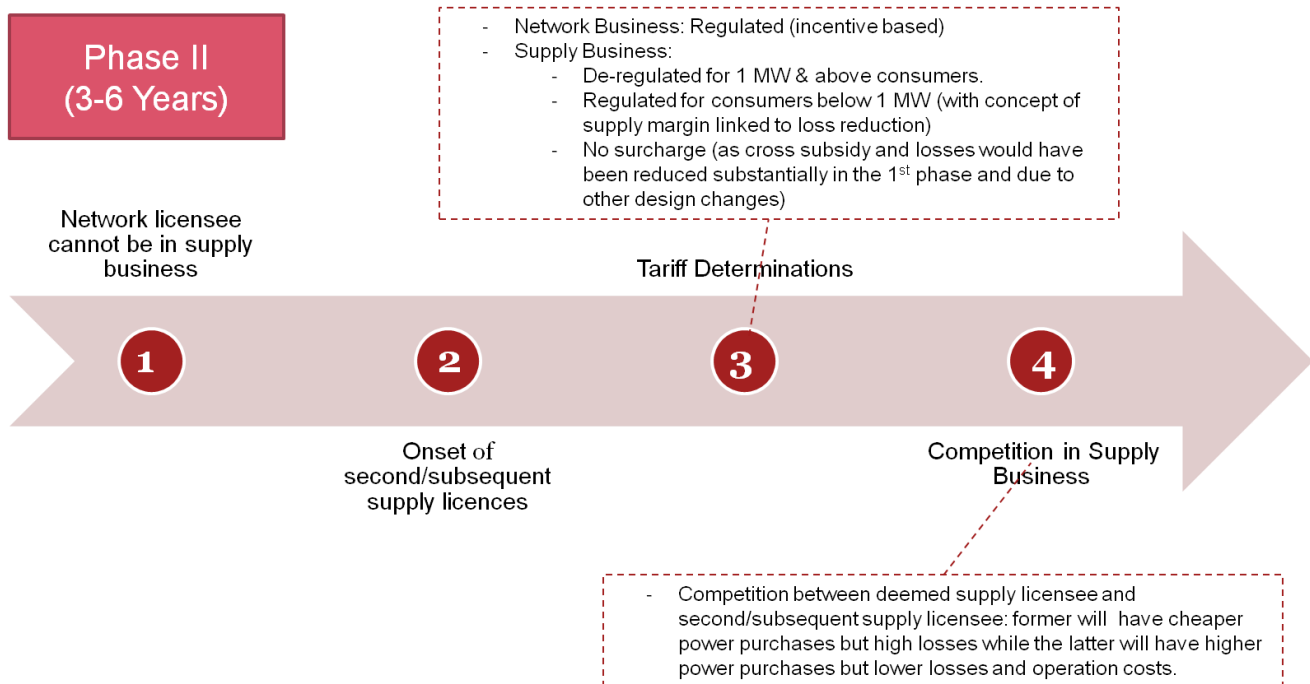
- a. What will be the nature and composition of the authority that will invite applications? Would it be state-wise (one for each state) or pan-India?
- b. As discussed before, what should be the area of supply licences, as well as the tenure of the initial licences?
- c. Would there be any eligibility criteria for supply licence applicants (net worth, quantum of tied up power, prior technical experience, etc.)
- d. Within how many days to dispose of (i.e. either accept or reject with sufficient reason in writing) supply licence applications?
- e. Would there be any public consultation in the entire process of issuing second/subsequent supply licences and if so, at what stage?

Recommendation

- The designated Authority / Monitoring Committee shall be responsible for either accepting or rejecting with detailed reasons any application for Second/Subsequent Supply License within a period of 2 months from date of receipt of application. Any delay in accepting or rejecting an application within this stipulated time period may be taken up by the applicant by escalating the matter.
- Under the current regulatory framework, such a designated Authority / Monitoring Committee can only be constituted at the state level.

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- Eligibility criteria should be set which include, among other things, the following:
 - Financial Sufficiency / Net Worth and Quantum of tied up power with the applicant: The supply company must have adequately strong balance sheets to sign long-term PPAs and procure power as per the anticipated demand of its consumers. In case of the applicant being a special purpose vehicle, the relevant parent company's accounts and guarantees should be scrutinized.
 - Business Plan: As per the approach followed in several other nations, applicants may be required to submit a 5-year or 10-year business plan in relation to their application, including information on project. The business plan would be keenly evaluated by an independent team at the designated Authority / Monitoring Committee and if the business plan is deemed sound, only then would the applicant be eligible for a supply license
 - IT-related capability: Applicant may be required to furnish details of the IT system to be employed for billing and customer care management, since the same would affect the licensee's discharge of duty and performance standards.
 - General capabilities: At the time of providing supply licenses, the designated Authority / Monitoring Committee should consider the availability of sufficient appropriate financial, managerial and technical resources to ensure that the applicant would be able to comply with the terms and conditions that would govern supply licenses.
 - Initially, the entire state could be treated as one contiguous area of licence, otherwise private suppliers may not show interest in operating in rural / economically weaker areas
 - Anyone selling directly to consumers should acquire a retail supply licence, as in the UK.

PHASE II: Operationalization (3 to 6 years from Day Zero)



Step 4: Putting retail competition into implementation

Ownership separation

Mandating separate ownership of the distribution wire and retail supply businesses would ensure that conflict of interest is done away with. Ownership separation would ensure that the distribution network licensee cannot be in the retail supply business any longer. However, this has to be done within 3 years from Day Zero. There is also a need to analyse the impact of change in ownership, competition and separation of businesses on the level of costs and their allocation.

International experience

United Kingdom: In the UK, separation of ownership happened much later in 2000, after the entire supply sector was made competitive and deregulated, with the Utilities Act of 2000. Section 30 (2) mandating that “the same person may not be the holder of both a distribution licence and a supply licence.” Hence two different types of supply licences that existed till then (PES licences and second-tier supply licences) were replaced with only one type of supply licence, and the distribution company could no longer hold a supply licence at all. The case for ownership separation is strengthened by studies in the UK which concluded that competitors have been slower to gain market share where there is common ownership despite considerable intervention by the regulator, thereby indicating that common ownership may impede competition.

Points for discussion:

- Given the current financial position of distribution companies in the country, how to ensure divestment of loss making entities? Divestment is a must since the distribution network operator can no longer have the same ownership as the retail supply function.
- What if there are no takers for a particular area’s supply licence?
- Can competitive bidding be undertaken for selling off retail supply functions?

Recommendation:

Separate ownership of distribution wire and retail business is necessary for eliminating conflict of interest which impedes both open access as well as retail competition. Separate ownership would also make a stronger case for focused investments and specialized efforts on function-specific efficiency improvement.

Onset of second supply licence

Onset of second/subsequent supply licences: As discussed earlier, retail competition would be introduced in a phased manner with 1 MW and above consumers first being given the opportunity to choose their own retail supplier from the competitive market.

It is essential to note that by this time, all supporting infrastructure and policies should be in place for retail competition to be unrolled.

Advanced metering

Separation of distribution and retail supply of electricity would ultimately require advanced metering for consumers being served by the DNO / incumbent Discom and those served by the second/subsequent supplier, because in the absence of separate meters, load shedding by the Discom would needlessly impact competitive market customers. Similarly, the Discom would not be able to impose load restriction cuts on its own customers when they are to get some specified hours of supply.

Points of discussion:

- a. What should be the timeline for reorganising the electrical network including advanced metering systems? It should also be ensured that advanced metering is completed at least for 1 MW and above consumers within 3 years from Day Zero, i.e. at the time of implementing retail competition.
- b. Who will bear the costs of investing in reorganising the electrical network?
- c. Should a separate operator manage metering?
- d. What about recovery of investment in existing meters?

International experience

United Kingdom: While former Public Electricity Suppliers are default providers of metering services, competition was introduced in April 2000 which allowed suppliers to choose any meter service provider for functions of meter operator, data collector and data aggregator.

Recommendation

- In view of the challenges in supplying power to consumers with the current metering infrastructure, three alternatives may be considered:
- Advanced metering to be adopted till the time there is sufficient availability of power.
 - Alternatively, customers of new retail suppliers can be put on independent feeders.
 - Alternatively, customers of new suppliers would have to agree to load shedding in the area, as determined and declared in advance by the DNO.
- Separate operators for meter-related activities are not recommended, since the UK experience of privatizing and opening up the meter-related arena is not encouraging.

Risk factors

Installation of advanced metering infrastructure and/or shifting of consumers to independent/dedicated feeders would be a time-intensive and cost-intensive exercise and hence the matter of consumers bearing these costs, as recommended, may be a tad difficult to push through and generate consensus on.

Timeline of readying infrastructure

Delay in implementing IT, metering or related infrastructure could affect timelines of introducing retail competition. It can be debated if there need to be penalty clauses for not achieving groundwork targets (essential for introducing retail competition) and if so, the modalities of imposing these penal clauses.

Provider of last resort

It is to be debated whether there should be a provision for the same once retail competition is ushered in. Provider of last resort has the obligation of offering electricity against some specified tariff to any customer,

irrespective of load characteristics or payment record. The intent of this concept is the same as the universal service obligation. This also brings up the issue of a penalty mechanism against Provider of Last Resort, in case of failure to meet the requirements of this clause.

International experience

United Kingdom: As per standard licence conditions, Last Resort Supply Direction may be given to the distribution licensee if the regulator considers that (a) a circumstance has arisen that would entitle the regulator to revoke the Electricity Supply Licence of the other supplier; and (b) the licensee could comply with the Direction without significantly prejudicing its ability to continue to supply electricity to its customers and to fulfil its contractual obligations for electricity supply.

Recommendation

- Once separation of distribution business and retail supply is achieved, the obligation of being 'Provider of Last Resort' would be split into two:
 - The 'Duty to Connect' would rest with the DNO who would be obliged to make available the distribution network on request and would be obliged to connect any person to the network on reasonable/approved terms.
 - The 'Duty to Supply' would rest with both the incumbent Discom as well as competitive retail supplier(s) who would be obliged to meet all reasonable demands for supply of electricity made by customers within the areas that they operate, on reasonable/approved terms. They are also required to ensure that they have sufficient electricity at their disposal to meet their customer requirements. Hence, this obligation would be met through adequate contracts with generators or by establishing their own generation.

Standards of performance

How should the responsibility for meeting Standards of Performance (SOP) be allocated between the separate businesses? Should the competitive retail market have any SOP?

International experience

United Kingdom: With the Utilities Act of 2000, separate regulations were made for guaranteed and overall standards of performance, for electricity distributors and electricity suppliers both. During the initial phases of competitive supply i.e. as long as there was a hybrid model, separate standards were set down for distribution and supply business with Supply standards relating only to the response time to customer queries (as opposed to the quality of service provided). However, in due course of time, SOP norms for retail suppliers were removed with price deregulation, since free competition itself demands efficiency.

Recommendation

- In the initial stages of retail competition, Standards of Performance would continue to be imposed on the incumbent Discom as well as competitive retail supplier(s) and would continue to be monitored by the Commission to check any negligence in meeting the specified standards of performance.
- With time, once the competitive retail market is deemed to be sufficiently evolved, Standards of Performance may be withdrawn since competition itself would demand and foster quality supply and good performance standards.

Pricing of electricity

- For the Network business, pricing would be regulated (incentive based)
- For the Supply business, pricing would be as below:
 - De-regulated for 1 MW and above consumers.
 - Regulated for consumers below 1 MW (with concept of supply margin linked to loss reduction)

Competition in supply business

Competition between deemed supply licensee and second/subsequent supply licensee: The former will have cheaper power purchases but high losses while the latter will have higher power purchases but lower losses and operation costs.

Competitive retail supplier would procure power from the market or through bilateral trading, to supply to its market of consumers. The rate of power purchase will determine the retail supplier's competitiveness to a large extent, along retail supply margin.

Point for discussion: It may be discussed that whether procurement of a retail supply license is necessary in case a generating company wants to sell power directly to consumers.

Components of tariff for the competitive retail supplier

The competitive retail supplier's tariff would have the following components:

- Wheeling charges: Regulator determined
- Power purchase cost: As tied up / arranged by the retail supplier
- Retail Supply Margin: This would include fixed costs such as employee costs, interest costs, administrative expenses, etc. These are the costs with maximum scope for efficiency-linked reduction which would enhance the retail supplier's competitiveness.

Additional charges that may be levied subject to regulatory approval:

- Universal charge: Towards reducing cross-subsidy
- Regulatory surcharge: Towards the SPV that will take over all existing financial losses

<h2><i>PHASE III: Further Competition (Beyond 6 years from Day Zero)</i></h2>

Step 5: Further de-regulation of Supply business

Subsequently, the retail supply business shall be made competitive for more and more consumer segments, with competition being introduced in phases.

- Deregulation of less than 500 kW to 1 MW segment
- Deregulation of less than 100 kW to 500 kW segment
- Deregulation of consumers below 100 kW, including small commercial and domestic consumers

It must be kept in mind that the success rate of retail sector competition, as reflected in the number of consumers changing their suppliers, would undoubtedly depend on the ability of competitive retail suppliers to procure power at competitive rates and gain by efficiency improvements. Taking the example of Australia, in 2004 the Essential Services Commission of Victoria (ESC) undertook a review of the effectiveness and performance of energy retail competition for small customers and found that the market is currently effective in those sub-markets 'where sufficient margin exists or has emerged to make market contracts attractive to those customers and the customers profitable to serve for retailers'. The ESC estimated that those sub-markets account for about 40% of small customers.

Points for discussion:

- a. Once the separation of the businesses is done and Retail Competition is introduced, would the market still be regulated with the regulatory body capping the Maximum Retail Price? In other

words, should the State Commission decide a price ceiling for all consumers, even the ones who are taking supply from second licensee?

- b. Will there be regulatory control over the Quality of Service or it will purely be survival of the fittest? In the latter case, can it be possible that the overall quality deteriorates across all the Retailers due to the lack of any regulatory control?
- c. Will the pricing strategy be controlled?

For example, some retailers might come up with two-tier pricing, offering more discounts to the consumers switching over than the prices being offered to the existing consumers, or vice-versa?

- d. How will the transition issues be taken care of?
 - i. The transfer of services from one retailer to another, in case a consumer decides to switch. How would the two retailers (old and new) co-ordinate with the physical transfer of the connection apart from the legal formalities?
 - ii. In case of any dispute, how will the transfer of connection occur? For example if the consumer has not cleared the dues with the previous retailer.
 - iii. Will the same meter be used for the billing purpose or the new retailer installs its own meters?
 - iv. How consumer awareness will be made to encourage them to switch, in case there are more competitive options (which sure will be)? Because, in Australia, by the end of first year the switching of consumers was found to be much less.
 - v. How will the consumers be protected from the misleading marketing campaigns?
 - vi. Will the second licensee have access only to the deregulated segment of the existing market, or will he also get access to any new consumer taking new connection? If he may be allowed to supply to any new consumer (irrespective of whether that consumer belongs to the deregulated segment of the existing market, or not), at what tariff can the retailer supply to the new consumers – regulated tariff / deregulated tariff with a maximum cap?

Recommendations:

- SERC may set a price cap for Retail Supply Margin
- SERC may set a minimum benchmark for Quality of Supply and may review conditions frequently.
- Consumer awareness to be generated to encourage consumers to switch suppliers if needed, when faced with competitive options
- Regarding consumer issues during transition, these would need to be sorted out between the two retail suppliers and the consumer, and the matter if unresolved may be escalated to an ombudsman. Regarding clearing of old dues being mandatory for switching to another retail supplier, ideally security deposit should take care of outstanding dues. Dues owed to the incumbent Discom / previous retailer should not be of concern to the second/competitive retailer.

Concluding note

Power Distribution is the weakest and most un-remunerative link in the Indian power sector due to various reasons such as significant energy losses occurring at the distribution end which are inevitable to an extent, direct interface with consumers with no certainty of full recovery of dues, tariffs that are not commensurate with costs of supply, and considerations of socio-economic & political sensitivity. Moreover, as noted in the recent Shunglu Committee Report on the financial position of distribution utilities, the inefficiencies of generation and transmission are also passed on at cost-plus basis to distribution companies. After the un-bundling of State Electricity Boards, most states have separate distribution companies engaged in the business of electricity distribution. But reforms have not achieved their specified aims and in many states, the ground reality is very different from the envisioned post-reform scenario. Most Discoms of the country continue to perform poorly - financially and operationally.

The Indian power distribution sector is facing a watershed moment today, standing as it is at the brink of a financial abyss. At present, the country's Discoms have accumulated losses of more than Rs 2 lakh crores on their balance sheets, apart from significant regulatory assets that have not yet been passed on to consumers in the form of a tariff hike.

In this scenario, one compelling reform that can be undertaken is the segregation of Distribution (Wire) business from Retail Supply, and gradual opening up of the Retail Supply business to competition.

Separation of the two functions would encourage investment in distribution networks by making the distribution business a distinct, regulated business with assured returns. At present, the cash-strapped position of distribution utilities in India often hinders investment in improvement of distribution infrastructure. Lack of funding, disallowance of capex and related financing by regulators and unclear cost-benefit mapping in view of widespread distribution losses are some reasons why distribution utilities cannot incur as much capital investment in up-gradation and maintenance of distribution networks as is required for our country. Hence, it makes sense to make distribution business separate from retail supply, wherein the main task of the distribution network operator would be to maintain and strengthen the distribution network (and associated works) with all costs being pass-through in nature to the distribution licensee, subject to certain performance/efficiency related norms.

Another argument for making Distribution business separate from retail supply is to help the two functions in focusing their efforts on efficiency enhancement. While a separate distribution company would be focused entirely on improving the technical and operational efficiency of the distribution system up to the consumer meter, the retail supplier can focus entirely on power procurement and consumer interface (billing, revenue collection, metering, customer care, etc.).

This report discusses various learnings from international experiences in retail supply competition (successful models such as UK and Victoria as well as resounding failures like California) and gives recommendations on the structure, extent and timeline of similar reforms for India, keeping in view the ground realities of the Indian power sector. This report also seeks to emphasise several matters related to retail supply competition that require a much broader discussion with all involved stakeholders which is a pre-requisite to creating the right kind of atmosphere for ushering in reforms in the retail electricity sector. Finally, this report attempts to point out various risk factors that can pose a challenge to the success of the proposed reforms. It is imperative that all these, and more, risk factors are adequately understood, assessed and tackled in a comprehensive manner, before competition can be introduced in the retail electricity supply sector in India.

Therefore, the time is now ripe to build consensus on this matter and mobilize regulatory opinion as well as legal/judicial approval for separate Distribution (wire) and Retail Supply functions, and gradually introduce competition in the retail sector of electricity in order to foster private-sector participation and competition, and to benefit from the gains of a competitive atmosphere. But at the same time, regulators, policymakers and all stakeholders involved in this discussion must not lose sight of all the veritable challenges that the Indian power sector needs to address and overcome before embarking upon such a significant reform measure.

Annexure

A. International experience in detail

This Annexure provides a detailed summary of the international experiences in segregation of functions and introduction of retail competition in the United Kingdom, Victoria (Australia), Argentina and the Philippines.

Case study I: United Kingdom

The Electricity Act 1989 paved the way for restructuring and privatisation of the electricity industry in Great Britain. The Act had provisions for privatization, introduction of competitive markets, and a system of independent regulation. In contrast to earlier privatisations of the gas and telecommunications sectors, the electricity industry was restructured prior to privatisation, in response to criticism of previous sell-offs where it appeared that a public monopoly was basically transformed into a private monopoly.

In February 1988, the government laid out its plans for the industry in the White Paper Privatising Electricity (Secretary of State for Energy, 1988). The White Paper stated that competition would 'create downward pressures on costs and prices, and ensure that the customer comes first'.

Restructuring and privatization of the power utilities

On 31 March 1990, all coal-fired and oil-fired generating plants in England and Wales that had previously been under the control of the state-owned Central Electricity Generating Board (CEGB) were allocated ('vested') to two new companies, National Power and PowerGen, in a 60:40 ratio. The vertically integrated CEGB was split into 3 generating companies (National Power, Powergen and Nuclear Electric) and one transmission company (National Grid Company i.e. NGC). Regional area boards were replaced with 12 regional electricity companies (RECs). The local distribution systems were transferred to the RECs and each REC was obliged to supply on request all reasonable demands for electricity in its authorised area.

Thereafter, shares of Power Gen and National Power were offered to the general public and the government retained only 40% equity position in the two companies. The government also sold all 12 regional area boards (now called Regional Electricity Companies or RECs). The total proceeds to the government of these asset sales reached £10.2 billion.

England and Wales electricity pool

One of the innovations in the UK electricity sector at privatisation was establishment of the electricity pool, which was one of the first mechanisms of its kind. The pool was set up to facilitate a competitive bidding process where generators named bid prices for electricity for each half hour of the day. The pool also acted as a balancing mechanism that established which plants would run to meet forecast demand. The primary purpose of the day-ahead price setting process in the Pool was to produce a least-cost schedule of plants that would be dispatched by the National Grid Company (NGC) who operated the transmission system, to meet forecast demand in each half-hour of the next day. The NGC operated the pool and administered the pool's settlement system on behalf of pool members.

The Pool acted as a clearinghouse between generators and wholesale consumers of electricity (primarily the RECs). The pool was open to all generators and consumers wishing to participate. The bids were ranked by price and the last unit required to meet demand set the clearing price for the system.

All generators of over 50 MW had to be licensed and sell their power into the Power Pool. Generators of less than 50 MW could choose not to be licensed, and did not have to sell their power to the Power Pool. Irrespective of their size, generators signing contracts directly with customers were required to establish a supply arm, and that arm had to obtain a so-called "second-tier license" and join the Power Pool.

Electric power generators with capacity exceeding 100 MW were required to submit their generation units to dispatch by the National Grid Company (NGC).

However, the Pool suffered from several drawbacks, as summarized below:

- The pricing mechanism was vulnerable to gaming strategies by generators who could often manipulate the Pool price by withdrawing plant from the market at key times;
- Lack of competition in price setting, because although there had been substantial new entry into the generation market, most new entrants were CCGTs with long-term off-take contracts and, therefore, price setting remained dominated by the two main generators – Powergen and National Power;
- The capacity payment mechanism seemed misconceived, because it rewarded shortage rather than rewarding new investment as it was meant to do;
- All successful bidders were paid the marginal price, no matter what price they bid. This seemed likely to build in volatility to the Pool price because the cost of the marginal plant could vary by a large amount;
- Costs imposed due to departures from the production and demand schedules were imposed as common cost in the form of ‘Uplift payment’ on all parties participating in the Pool, rather than being met only by the parties that were responsible for them.

Therefore, the Pool was often subjected to regulatory interventions aimed at controlling monopolistic behaviour and preventing re-integration in the electricity industry.

Phased introduction of competition in retail supply

The supply market was opened up to competition in three phases, starting from April 1990 and culminating in May 1999. 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 twelve RECs as well as from the pool or from retailers.

Phase 1: April 1990, for customers with load above 1 MW

With effect from 1 April 1990, customers with peak loads of more than 1 MW (about 45% of the non-domestic market and 26% of total sales) were allowed to choose their supplier. These customers numbered around 5200 and they were predominantly major manufacturing plants and hospitals.

At this stage, separation between distribution and retail services was not mandatory. Thus, retail services could be offered by distribution companies that owned wires as well as by independent companies. There were two types of supply licenses. The local monopoly distribution company needed a first-tier supply license for selling retail services in its area. Other companies, generating companies, brokers, or distribution companies from other locations needed a second-tier supply license.

Phase 2: April 1994, for customers with load between 100 kW to 1 MW

In 1994 the open market was extended to some 45,000 users with a 100 kW and above annual demand. However, taking supply from a retail supplier and not the DNO (distribution network operator) was not mandatory, and by late 1994, only some 10,000 out of the 45,000 eligible consumers between 100 kW to 1 MW had sought competitive supply. The 12 RECs also approached their customers and offered them incentives to stay in return for tying them into two-year contracts.

However, with time, more and more consumers opted for competitive supply and as per OFGEM estimates, in 1999-2000, customers accounting for nearly 80% of the output in the 1 MW market in England and Wales chose to take their supply from a company other than their local Public Electricity Suppliers, PES (as compared with 43% in 1990-91). Similarly, by 1999-2000 customers accounting for 67% of the output in the 100 kW to 1 MW market in England and Wales chose to take their supply from a company other than their local PES.

Phase 3: Sept 1998 to March 1999, for the domestic market as well

The opening up of the domestic market (that is, below 100 kW) to competition also met with success. By September 2001, 38% of domestic electricity customers had switched supplier one or more times since the introduction of competition. The former PES suppliers lost, on average, 10% per annum of their supply service

area market share (measured in terms of customer numbers) since the introduction of competition. By the end of September 2001, the former PESs had lost an average of approximately 30% of customers in their own areas.

After an initial increase in the numbers of licensed electricity suppliers operating in the electricity supply market, there was an increase in merger and acquisition activity suggesting a trend toward consolidation of the electricity supply market, as falling prices and relentless competition spurred on companies to seek opportunities for consolidation to become more competitive.

Periodic reviews of market functioning

Since full opening of the domestic electricity supply market in May 1999, there has been substantial development in competition in the market. To guide its regulatory policy, OFGEM undertakes annual reviews of the development of domestic supply competition.

- The review found a high degree of awareness of different suppliers among electricity customers, with eight in ten being aware of at least two electricity suppliers.
- Satisfaction with suppliers was extremely high across different service areas, with no more than 3% dissatisfied.
- However, the review found that there was much ignorance and apparent confusion about the different prices offered by electricity suppliers, with only one third of customers having succeeded in making their own comparisons, and as much as half of switchers appearing to have changed supplier without directly making their own comparisons.
- The review found that 38% of domestic electricity customers had, by September 2001, switched supplier one or more times since the introduction of competition.
- The incidence of switching electricity supplier among disadvantaged groups was found to be much closer to that of the population as a whole than in the previous year, with customers with very low incomes, disabled customers and single parent families switching at rates in excess of the average. Pensioners and electricity customers in rural areas continued to switch at lower than the average rate.

The Utilities Act 2000 – Separate licensing and complete separation of distribution and retail supply

The Utilities Act 2000 abolished the existing distribution/retail licences, and introduced a Great Britain-wide licence, allowing all suppliers to supply customers nationwide. The Utilities Act also made provision for the separation of supply and distribution activities, requiring the separation of the former Public Electricity Supplier (REC) supply and distribution businesses, and requiring these activities to be separately licensable.

Thus, all suppliers were now on the same legal footing and the distribution activities of the former PESs have become separate businesses. Any company holding an electricity supply licence could sell electricity, and all customers became free to choose their own supplier.

Deliberations done in the UK before complete separation of distribution and retail supply

(From a February 1998 OFFER consultative paper)

1. Issues deliberated before complete separation of distribution and supply:

- How or in what ways separation should be taken forward before or in parallel with any proposals to legislate;
- How the various PES activities should be grouped into separate businesses, and whether these separate businesses should be in separate companies, particularly with respect to distribution, metering and supply;
- How far operational separation between businesses should be required – for example, with respect to staff, locations and assets such as IT systems and sites;
- How far cost allocations of joint assets and services should be prescribed and on what basis;

- How far uniformity should be imposed on companies whose structure and scope may be increasingly different from each other;
- How responsibility for meeting Standards of Performance should be allocated between the separate businesses and revised where appropriate;
- What if any changes are appropriate in the structure of the use of system charges that PESs make to generators, suppliers and final customers to recover allowed revenues;
- How separate licensing might treat the various statutory and licence obligations of the PES - for example, which if any business should retain an obligation to supply, whether there would henceforth be a difference between the supply obligations of a PES and a second tier supplier, whether the concepts of tariffs and tariff customers would remain, how to ensure that the obligations of the distribution and supply licences can be discharged if they are in separate ownership, and so on;
- How far it is appropriate to encourage or require separate ownership, and by what means and over what timescale.

2. Issued deliberated with respect to regulatory accounting:

- Which businesses of electricity licensees should be required to prepare regulatory accounts, taking account amongst other things of conclusions on the greater separation of PES businesses;
- The scope for publication of more regulatory accounting information;
- How far and in what area there is a case for detailed standardisation across all companies, for example, with respect to rules for transfer pricing and cost allocation as between different businesses;
- How far and in what areas it is preferable to allow flexibility, and how to deal with differences between companies in organisation and management accounting;
- What implications for regulatory accounting arise where PESs contract out significant functions, such as billing, customer service or maintenance, to other companies in the same group;
- Whether the basis of asset valuation should be specified, and if so whether it should be historic cost, current cost, or the “regulatory asset valuation” (linked to values used in price control reviews);
- Whether changes should be made to make clearer the relationship between PES regulatory accounts and the assumptions (about, for example, costs and capital investment) on which the new price controls are based;
- The extent to which PESs should provide narrative explanations of significant year-on-year changes;
- Timeliness of provision, including the possibility of combining regulatory accounts with other information provided to OFFER.

3. Concerns expressed by stakeholders (PESs):

- Practical implications
 - At least for price control purposes there was a need to define more clearly what is meant by distribution, supply and metering
 - Unbundling of activities would create significant extra costs, could result in wasteful duplication
 - Process of unbundling, especially delays in timelines, may harm customer service.
 - Second tier suppliers concerned that so long as the activities remained under common ownership, further measures would continue to be necessary to ensure that all PES services are being provided on a non-discriminatory basis.
- Metering
 - Some remained unconvinced of the benefits of competition in this area and several raised concerns, arguing that metering and meter reading are a fundamental part of the infrastructure required for distribution
 - Concern about the recovery of investment in existing meters and many PESs argued that there should be an allowance to cover these “stranded assets”
 - Suppliers should have primary responsibility for meter operation and related services but to protect competitors PESs should be encouraged to outsource non half-hourly meter reading, data collection and aggregation activities.

Transitions in determination of charges

In the UK electricity sector, price controls took the form of a price cap set by the regulator. Price caps were expressed in terms of a RPI-X constraint on charges, where the X factor reflects expected efficiency gains and investment requirements. A cost pass-through, or Y factor, may also be added to allow significant cost items, which are outside the control of management, to be passed through directly to consumers in final prices. There is therefore an incentive for companies to make efficiency gains and reduce costs. The formula also included a loss adjustment factor, which adjusted for units lost during distribution and this gave **an incentive to RECs to reduce these losses**. Periodic reviews of price caps were undertaken to ensure that the benefits of efficiency gains got passed on to customers over time.

Price controls were introduced in the electricity supply sector at privatisation. With phased introduction of retail competition, the main concern was to how to determine when competition is sufficiently developed to allow for the removal of price controls.

- Until March 1994, the initial supply price control was in terms of a maximum average charge per unit of electricity supplied by each company. From 1 April 1994, since competition was extended to customers with a maximum demand above 100 kW, price controls were restricted to those customers with a maximum demand below 100 kW who could not yet take advantage of the competitive market.
- Until April 1998, the former REC's supply charges were regulated by a RPI-X+Y revenue yield control (RPI=Retail price index). The Y factor, which had five components, enabled each REC to pass through to customers such costs as were already regulated by other price controls.
- The next supply price restraint ran from April 1998 to 31 March 2000 during the transition to competition in the supply market. The price controls applied only to the PESs. **Second tier suppliers were not subject to any price restraint**. The controls covered domestic and small non-domestic customers, known as designated customers, and took the form of maximum price caps rather than the cost pass-through controls that applied prior to this.
- The next electricity retail price controls were introduced in April 2000 for two years. These price controls on the ex-PES suppliers took the form of a restriction on the weighted average unit price they could charge to standard domestic customers and the weighted average unit price they could charge to domestic economy customers within their supply service areas.
- **From 1 April 2002, OFGEM proposed to replace regulation of electricity supply via price controls with the use of powers of investigation and enforcement under competition law.** Consistent with OFGEM's commitments, this also resulted in the removal of the two remaining prescribed standards of performance in electricity supply, and the lifting of the requirement on ex-PES suppliers to submit regulatory accounts to OFGEM. OFGEM continued to monitor the behaviour of all suppliers and, in particular, dominant suppliers, and could take action if that behaviour seemed likely to be prohibited by competition law.

Review of electricity trading arrangements (RETA)

Beginning in May 1998, RETA was launched with the stated aim of developing an entirely new wholesale market mechanism to replace the Pool. OFGEM had identified the following major weaknesses in the Pool trading arrangements, which were to be fixed by the introduction of RETA:

- Price setting in the Pool was overly complex since it required the submission of at least nine different bid parameters for each generator;
- Prices had risen substantially, and become increasingly volatile, since the Pool began trading even though fossil fuel prices had fallen;
- Capacity and availability payments rewarded generators for making plant available, not operating it;
- Bids did not reflect costs as many baseload generators consistently bid a zero price, relying on the mid-merit generators to set System Marginal Price (SMP);

- Market liquidity, and the lack of publicly available price data for forward contracts, was putting consumers at a disadvantage when negotiating forward cover against Pool prices;
- Participation of the demand side in price setting was limited to a few very large industrial consumers.

New electricity trading arrangements (NETA)

OFGEM floated a proposal for introducing another system of trading, viz. NETA, and synthesised all comments received by stakeholders and generated through internal discussions. NETA basically sought to address the weaknesses of the Pool mechanism by adopting trading arrangements mimicking those in traditional commodity markets. NETA, introduced on 27 March 2001, is based on bilateral trading between generators, suppliers, traders and customers through forwards and futures markets and short-term power exchanges.

Under NETA, the bulk of electricity is traded in forward, futures and short-term markets through bilateral contracts. These markets allow contracts for electricity to be struck over a scale of time ranging from within-day to several years ahead, enabling participants to secure cover for their likely output or demand at competitive prices. Only small volumes, around 3% of total energy traded, has been traded through the balancing mechanism, used by NGC to balance the system.

One of the key features of NETA is that, unlike the former pool where NGC centrally dispatched generating plant, generators now self-dispatch and are subject to imbalance prices if their generation does not match their contractual output. Another key element of NETA is that the demand-side is fully incorporated into the new balancing arrangements. Suppliers and customers may offer load reductions to the balancing mechanism in direct competition with generators.

Fall in UK electricity prices and reasons (1999 – 2002)

Electricity prices in England and Wales, which had been significantly above marginal costs, fell sharply in the last years of the centralised electricity market, the Pool. The decentralised New Electricity Trading Arrangements introduced in March 2001 saw much lower prices, and the change in trading rules has been generally viewed (particularly by the industry's regulator) as one of the main reasons for the price reduction.

However, many academic papers have undertaken econometric analysis to determine the reason behind the significant fall in British electricity prices. In particular, the focus has been on assessing how much of the price fall was on account of external factors such as discovery of gas and additional generation capacity. The basis objective of these papers has been to establish whether falling prices during 1999–2002 were caused by OFGEM forcing the dominant duopoly of fossil fuel generators to divest coal-fired plants, or because the Pool market mechanism was replaced with New Electricity Trading Arrangements ('NETA'), or some other factor.

Most studies conclude that NETA did have a direct impact on the market price for electrical capacity, because the Pool's Capacity Payment was abolished with the Pool. Since Capacity Payments had reached high levels in the late 1990s, despite an apparent surplus of capacity, their abolition contributed directly to the reduction in overall electricity prices.

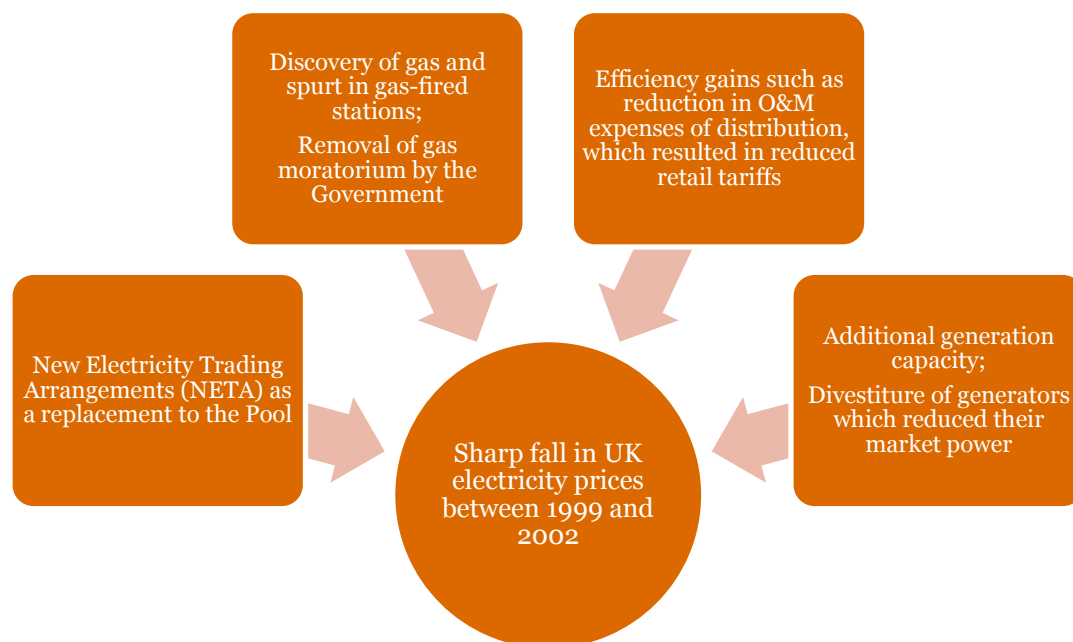
However, much more significantly, the lower prices seem to be the result of additional capacity, and of divestitures, forced and voluntary, by the major generators. Both the major generators wanted to become vertically integrated, and the forced divestitures were the price for regulatory approval. To the extent that NETA encouraged the trend towards vertical integration, it therefore had an indirect impact on prices. Some papers show conclusively that the change from a centralised, compulsory, spot market to a decentralised market based upon bilateral trading does not appear to have changed the relationship between concentration and short-term market prices.

Removal of the "gas moratorium" in October 2000 and regulatory approval for import of low-cost foreign coal were also major reasons for the fall in electricity prices in Britain. Gas Moratorium refers to the "stricter consents" policy of the UK government in October 1998 which limited and restricted government approvals to gas-fired plants. This gas moratorium was imposed due to several reasons: To protect the relative expensive deep-mined British coal; initial energy security concerns arising out of the "dash for gas" which gave rise to fears that the British power sector may become overly reliant on gas; and the view of several quarters that

certain distortionary forces in the Pool were biasing fuel choice in favour of gas. The gas moratorium was introduced in October 1998 to halt the "dash for gas" and prevent the imminent closure of several deep mines. The gas moratorium had significantly slowed down the development of gas-fired generation. The policy resulted from concerns that the UK electricity sector was becoming too reliant on gas too quickly, and certain features of the electricity market made gas-fired power plants very attractive which was to the detriment of the coal industry. However, with removal of the gas moratorium towards the end of 2000, electricity prices started falling further.

An additional may have been the weakening of the then influential trade unions, particularly the National Union of Mineworkers (NUM). The Conservative Government identified that a privatised electric utility industry would no longer be under an obligation to purchase British coal at its then high price. The privatised electricity supply industry would likely react by importing cheaper foreign coal or force UK price reductions, instead of utilizing the expensive deep-mined British coal. The scope for the NUM to take action without severely damaging the British coal industry would be eliminated.

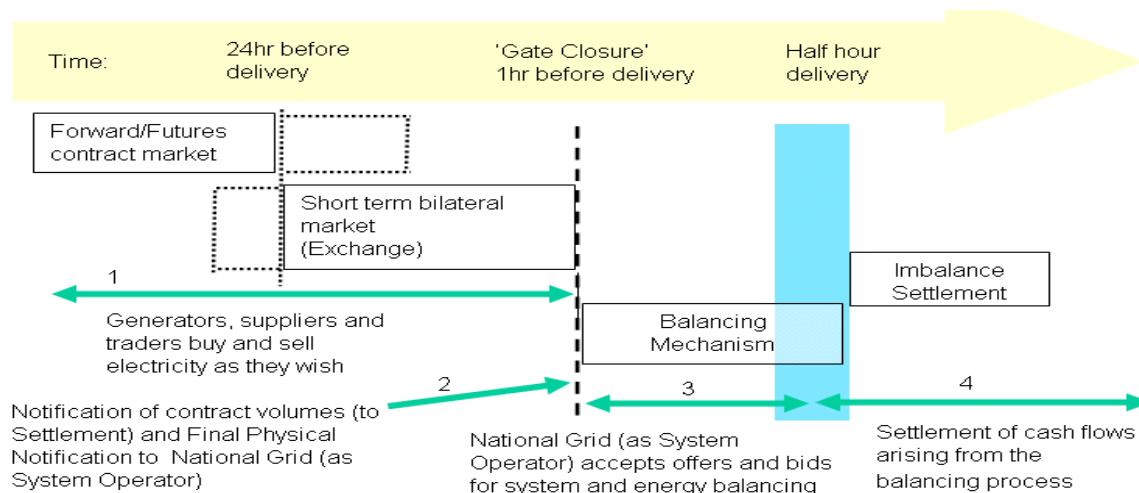
The following graphic depicts the multitude of reasons which together led to the sharp decline in UK electricity prices around the period 1999 – 2002:



British electricity trading and transmission arrangements (BETTA)

As of April 2005, NETA changed its name to the British Electricity Trading Transmission Arrangements (BETTA), and expanding to become the single Great Britain electricity market of England, Wales and Scotland. The arrangements under BETTA are based on bilateral trading between generators, suppliers, traders and customers across a series of markets operating on a rolling half-hourly basis.

Under these arrangements generators self despatch their plant rather than being centrally despatched by the System Operator. There are three stages to the new wholesale market, plus a new settlement process. These are illustrated below:



Current structure of the electricity sector in the UK

At present, the power sector in the United Kingdom is organised thus: Electricity distribution networks carry electricity from the transmission systems and generators that are connected to the distribution networks to industrial, commercial and domestic users. There are 14 licensed distribution network operators (DNOs) each responsible for a distribution services area. The 14 DNOs are owned by six different groups. There are also four independent network operators who own and run smaller networks embedded in the DNO networks.

Domestic, and most commercial, consumers buy electricity from suppliers who pay the DNOs for transporting their customers' electricity along their networks. Suppliers pass on these costs to consumers. Distribution costs account for about 20 per cent of electricity bills.

There are various types of Supply licences in UK at present, e.g. those for supply to Domestic premises, Non Domestic premises, "Green Deal arrangements", etc. and supply licence applicants can even apply for specific premises/areas in which they are willing to supply electricity. In this regard, in a guidance issued for gas and electricity supply license applications, OFGEM specifies that, *"A supply licence applicant may specify the type of premises or the area of the premises to be supplied. We will not grant a licence where, in our opinion, the description or area of the premises to be supplied would artificially exclude premises likely to be owned or occupied by persons who are chronically sick, disabled or of pensionable age, or who are likely to default in the payment of charges."*

The regulator OFGEM administers a price control regime that ensures that efficient distributors can earn a fair return after capital and operating costs while limiting the amounts that customers can be charged. Price controls are set for 5-year periods. The current price controls for electricity distribution networks run from 1 April 2010 to 31 March 2015.

Case study II: Victoria, Australia

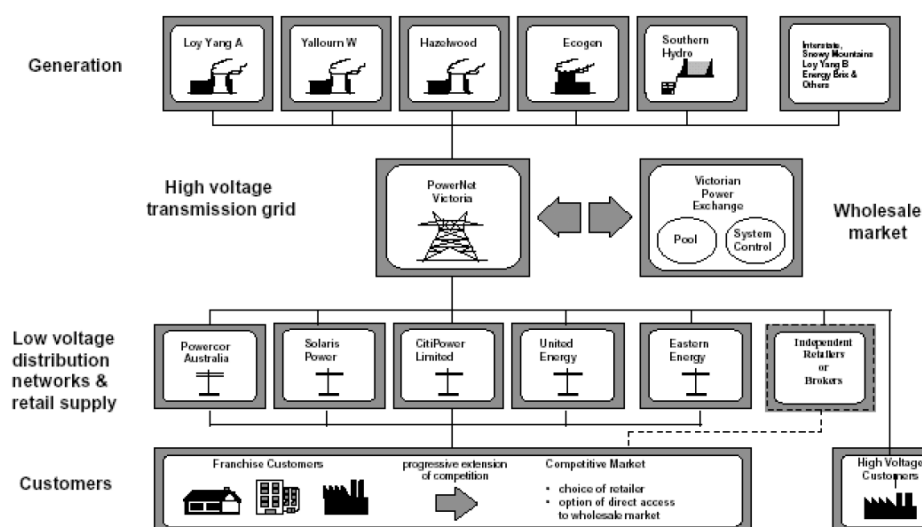
Retail competition is progressively being introduced in Australia with Victoria being the first state where full retail competition was introduced. At present, Victoria is the second largest electricity market in Australia with approximately 2.1 million residential customers and 300,000 business customers. This sub-section summarises the main highlights in introduction of retail competition in Australia.

Timeline of transition to full retail competition in Victoria

Time Period	Details
Up to the 1970s	Up to 1970, the electricity sector in Australia was completely monopolistic with the government owning most of the assets and State Electricity Commission of Victoria (SECV) was the governing body then.
1982	Debt to the extent of \$3.4 Billion
1992	New Liberal Government with a mandate to reform public utilities and liberalise utility markets
1992	The Council of Australian Government (COAG) created a National Competitive Market for Electricity under the National Competition Policy.
1993	A team of consultants was appointed to determine the structural changes to be made. It was then determined that disaggregation of SECV into Generation, Transmission and Distribution and Retail was required to be carried out in order to introduce competition in the electricity sector.
1993	Under the Electricity Act of 1993, three new government companies were formed out of the SECV viz. Generation Victoria (Generation), National Electricity (Transmission) and Electricity Services Victoria (Distribution and Retail)
1994	<ul style="list-style-type: none"> • Generation and Distribution/Retail companies were divided into 5 companies each based on their geographical location. This horizontal division was carried out with a view of introducing contestable market wherein the generators would compete with each other to sell to retailers and retailers compete with each other to get consumers. • Transmission function split into two companies viz. Power Net Victoria (a pole and wire company to maintain and manage the high voltage grid) and VicPower Exchange (to administer and monitor the wholesale electricity market and ensure safety of supply) • Office of Regulator General (ORG) was established to oversee the electricity sector as an independent regulatory body. The role of the ORG was to regulate prices, oversee service efficiency and facilitate market-based competition.

1995

INDUSTRY STRUCTURE



1995

The five distribution/retail were sold off to international purchasers predominantly and the licenses for the same were issued by ORG, with the same obligations as those

Time Period	Details		
	applicable to the former government owned entities.		
May 1996 – June 1999	Generation companies also sold off to private purchasers		
1995 - 1999	Hence, between 1995 and 1999, the former SECV’s assets were individually sold off to private owners. The sale of Victoria’s electricity assets coincided with the broader economic agenda of privatising Victoria’s assets in order to combat the State’s significant level of debt and the perceived inefficiencies of state-owned industries.		
1998	The proposed National Competition Policy got implemented with the establishment of the New Electricity Market – an interconnected wholesale generation grid linking Victoria, Queensland, New South Wales, the Australian Capital and South Australia.		
The final stage of reform in Victoria was introduction of Full Retail Competition to consumers, where retailers would compete to sell electricity services to consumers outside their geographic region.			
<i>Time period</i>	<i>Consumer segment opened up</i>	<i>Load details</i>	<i>Approx consumers</i>
Dec 1994	Large industrial consumers	> 5 MW	47
July 1995	Large commercial consumers	1 – 5 MW	330
July 1996	Medium industrial / commercial users	750 MWh – 1 MW	2000
July 1998	Small industrial / commercial users	160 – 750 MWh	> 8000
Jan 2002	Domestic; Small business consumers	Under 40 MWh	2,000,000

Objective of the reforms

The drive to restructure Australia's electric power industry to a more competition-based market was triggered principally by the need for improving Australia's economic efficiency and international competitiveness, and for reducing state and national debt. The public monopoly structure of Australia's traditional electricity industry began to be re-examined in the early 1990s. The main motivations for this re-examination of the industry's structure were: Rising interest rates on state-owned debt, a general economic decline, and productivity and benchmark comparisons that showed opportunities for cost savings. Reduction in public debt as a part of restructuring was driven in part by a sharp increase in state debt servicing caused by rising interest rates at the end of the 1980s. Privatization of state-owned businesses has been used to reduce that debt in Victoria with the sale of assets at the generation and distribution levels.

Run-up to the reforms

The history of the electricity industry in Australia since federation is characterised by two distinct stages.

- The first stage, representing the period from the early years of federation until the 1970s was characterised by the evolution and rapid growth of vertically integrated, state-owned, monopoly electricity commissions. In Victoria, the State Electricity Commission of Victoria (SECV) was the monopoly responsible for the generation, transmission and delivery of electricity to all Victoria consumers, domestic and commercial.
- The second stage, from the 1980s onwards, has been characterised by rapid and extensive change. Across Australia, during the 1980s, all state-based electricity utilities were corporatised and/or commercialised to varying extents.

Concentrating on the second stage of reforms as being more relevant to this report, these reforms took place over a period of 25 years beginning from 1980. Until then, the vertically integrated SECV was responsible for the generation, transmission and delivery of electricity to all Victorians. The success of this traditional approach, however, was challenged through the 1980s as the SECV encountered a range of problems. The major issue was the over estimation of electricity demands for the 1980s done in 1960s and 1970s, leading to drastic oversupply of electricity. Further, the SECV had large problems with debt-funded construction and difficulties with labour disputes leading to productivity inefficiencies. In 1982, the SECV's debt stood at approximately \$3.4 billion.

In successive years, a slew of measures were taken (including appointment of a CEO in 1983 for whom commercial viability was a prime concern). Nevertheless, significant debt remained an ongoing problem for the SECV. As a result, in 1990, the SECV pushed publicly for a private sale of its major browncoal power station. In 1992, a new Liberal Government came to power with a mandate to reform Victoria at both the micro and macroeconomic levels.

Central to the new economic agenda was the goal of liberalising utility markets. The electricity industry was singled out as one of the first targets of reform. The primary goal was to create an openly competitive electricity market for the sale of electricity to consumers. The anticipated result was lower prices and improved services.

Basic features of the retail competition and associated restructuring

The salient features of the restructuring were:

- 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 (NEM) organized as a centralized, market-based trading pool for buying and selling electricity; and
- Establishment of appropriate regulatory regimes.

The principal rationales for change in the EPI were the related needs of enhancing international competitiveness, improving productivity, and lowering electric rates. Reducing public debt through privatization also played an important role.

Major issues debated (and their resolution)

The most significant functional issue that policy makers were required to address at the distribution level was whether the retail function should be integrated with the natural monopoly wires function.

- Key uncertainties:
 - Unknown level of risk that the retailers would be exposed to and whether a retailing company would in fact be 'privatisable'?
 - Whether a combined entity would represent a barrier to entry for other retailers?
 - Whether breaking the entity would create operational difficulties with respect to such things as supply restoration, connection and public lighting?
- Key decisions:
 - The Government decided that the distribution business would combine the functions of retailing and wires distribution.
 - Financially the businesses would be strengthened by the low risk regulated cash flows of the wires businesses.
 - Ring fencing of accounts would be put in place, although this was somewhat redundant due to the decision to establish a pre-determined MUT (Maximum Uniform Tariff) price path.
 - In any event commercial drivers and the form of regulation would minimise any tendency to cross-subsidise retail and distribution.
 - The Office of Regulator General was responsible for monitoring possible cross-subsidization between regulated and unregulated services, and between franchise and non-franchise customer services. The cross-subsidization concern arises because the distribution businesses also have retailing arms. The distribution businesses are required to maintain accounting separation between the regulated and unregulated businesses, keeping books of account that would allow the ORG to investigate for cross-subsidization.

Regulatory interventions

Imposition of a ceiling retail tariff i.e. Maximum Uniform Tariff

A decision was taken in 1994 by the Government laying down a specific franchise tariff path (Maximum Uniform Tariffs viz. MUTs) to contestability. This was to be contrasted to the UK approach of regulating or subjecting to competition the major elements of electricity prices rather than regulating the ultimate franchise tariff. The Victorian approach was designed to deliver guaranteed real price reductions, unwind at an approximate level the larger known inter class cross subsidies (e.g. commercial to large business), retain the rural urban uniformity and provide some certainty as to prices until customers were contestable.

Reduction in cross subsidies over time

Distribution/retailing was encumbered with existing retail prices containing a complex array of cross subsidies including inter and intra class distortions and most significantly a uniform urban/rural tariff structure. At the heart of the problem was the political pressure to maintain uniformity of prices but to do so in a way that enabled competition to be successfully implemented, even on a transitional basis.

The Victorian approach adopted involved the concept of a single one-off revaluation adjustment to the businesses. The cross subsidy would in effect be capitalised as a one-time adjustment but enable over time (until the existing asset base was fully depreciated) distribution prices to gradually become cost reflective. Whether the one off adjustment would, as the rural politicians expected, last for decades or be more rapidly washed away because of the potential for network competition was an issue contemplated by the Office of the Regulator General. At the time of structuring the businesses for sale, there was little doubt that the underlying poles and wires businesses were anything other than natural monopolies.

Having locked in the concept of an asset adjustment it was determined that the maximum differential should be set at 1.25¢ per kWh. The final pricing model contained a series of one off adjustments and cross subsidies. The distribution businesses would be free to unwind the inter-class cross subsidies, largely from small to large customers, who were the most susceptible to contestable price shock. **The Tariff Order however limited the speed at which this could be done by capping any individual maximum increase to CPI +2%;** an increase which has generally been fully utilised by the distribution utilities since privatisation.

Post-reform impact and effectiveness of the competitive market

In 2004, the Essential Services Commission of Victoria (ESC) undertook a review of the effectiveness and performance of energy retail competition for small customers. The ESC found that the market is currently effective in those sub-markets 'where sufficient margin exists or has emerged to make market contracts attractive to those customers and the customers profitable to serve for retailers'. The ESC estimated that those sub-markets account for about 40% of small customers.

Case study III: Argentina

The Argentine economy in the 1980s was in the doldrums and was beset by severe problems of hyperinflation, sluggish economic growth and a massive national debt. Under the new economic plan prepared to deal with the economic problems plaguing the nation, privatization was considered to be a solution to several of Argentina's problems, such as rising debt and deteriorating infrastructure.

Privatization directly addressed the problem of rising debt by divesting inefficiently-operated assets and companies. In addition, it was expected that the new owners of privatized assets would improve the state of these assets, thereby upgrading Argentina's infrastructure. Further, privatization indirectly addressed the country's economic problems by providing Argentina's treasury with a financial cushion while the government's fiscal reforms worked through the economy. Privatization was also a solution for a number of other problems (such as the absence of competition to spur the reduction of production costs) that tend to drain the national treasury and that are often attributed to publicly-operated companies as opposed to similar privately-operated companies. Finally, as in the Australian state of Victoria and the United Kingdom (UK), a surge in foreign investment accompanied electricity privatization in Argentina, which was a welcome development for the country.

Therefore, spurred by the need for reforms to deal with its economy's problems, Argentina became one of the first countries to restructure the electricity industry, following Chile and UK.

The reform process

In 1989, Argentina had 3 state owned utilities offering generation, transmission and distribution services. Some provincial utilities (distributors) and electricity cooperatives also existed. Electricity spot market prices were high (around \$45/MWh in 1992) and T&D losses were to the tune of 25%.

The reform process consisted of restructuring of the electricity industry in order to make it amenable to privatization, and then privatizing certain parts of the industry in line with industry-specific privatization laws. Hence, Argentina first restructured the federal electricity companies and then privatized them. In 1990, the Government was removed from direct operation in electricity industry and introduction of competition. In 1992, an Act was passed to restructure and privatize industry. The Act divided the electricity industry into generation, transmission, and distribution.

The restructuring began in 1992 with the creation of a national regulatory body, ENRE, for the soon-to-be privatized Argentine electricity industry. Also during 1992 a national electricity wholesale market was organized and the privatization of companies began, within the new rules established by the various treaties and privatization laws. The first three federally-owned electricity companies (Segba, Ayee and Hidronor) that were privatized produced a total of about 80 percent of the nation's supply of electricity.

Before the companies were privatized, they were restructured by separating them vertically, and, to a lesser extent, horizontally. First, power generation was separated from transmission and distribution. Then, the constituent power generation facilities were separated from one another resulting in separate companies. Hence, Generation became competitive, while Transmission and Distribution functions became regulated private monopolies.

An independent market regulator (ENRE) was created, along with a wholesale electronic market (MEM) and its independent operator (CAMMESA). ENRE was charged with enforcing laws, regulations and concession terms, setting distribution service standards, resolving disputes between electricity companies, overseeing CAMMESA, and setting maximum electricity prices. The MEM is a power pool aggregating electricity supply from all generation sources, comprising:

- A term market consisting of agreements for which quantities, prices and conditions are negotiated directly between buyers and sellers;
- A spot market with hourly prices taking into consideration economic production costs; and
- A balancing market.

Post-reform industry structure and regulatory framework

Between 1992 and 1995, 25 state operated companies were privatized. The generation market was made highly competitive and by 2000, there were 43 companies owning 96 plants (60 Thermal, 34 Hydro and 2 Nuclear). Wholesale spot prices fell to ~ \$27/MWh by 2000 and T&D losses were down to an impressive 7% in 1999. Supply hours to consumers have also improved as result of the reform process.

Argentina's electricity regulatory framework took lessons from reforms carried out earlier in the United Kingdom. The federal regulator of Argentine electricity is ENRE, which regulates all stages of the electricity industry, but most extensively transmission and distribution. ENRE mediates disputes between electricity companies and enforces federal laws, regulations, and terms of concessions. ENRE also establishes service standards that distribution companies must meet and sets the maximum price that transmission and distribution companies may charge for their services ("price-cap regulation"). However, the generation companies are not subjected to price-cap regulation. ENRE also oversees the operator of the wholesale electricity market, CAMMESA, and the generation companies.

The following electricity industry structure is currently in place in Argentina:

- Power generation companies are not allowed to own majority shares in Argentina's three transmission companies.
- The transmission and distribution companies have to provide open access to their systems for the power generators on a regulated basis.
- Distribution companies are organized as regional monopolies and permitted to buy electricity from the MEM or through contracts with power generation companies.
- The energy market was liberalized for customers with demands greater than 5 MW, this has been successively reduced to 30KW. These customers are free to contract directly with generators and can participate directly in the generation market.
- Tariff for Regulated customers (below 30 KW) is calculated by a formula that takes into account the wholesale prices, seasonality, capacity and local charges, if any.

Generation

The post-privatization Argentine power generation industry (conventional as well as non-conventional power facilities) is composed of independent, largely unregulated power generation companies. The companies are essentially unregulated because electric power generation is considered a competitive market. The nearly 40 generating companies operating in Argentina are assured by the national electricity regulatory body ENRE of having open and equal access to the national grid and receive unregulated prices. Nonetheless, some restrictions have been placed on power generators. In order to avoid market concentration difficulties, generation companies are legally restricted to a market share of 10 percent or less of the national electricity sales volume. They also are prohibited from owning majority shares in electricity transmission facilities.

Generation companies receive income from providing actual electricity and reserve capacity to the transmission network. All generators whose power is dispatched by CAMMESA receive a price equal to the marginal cost of the last generator whose power is dispatched. Generators whose production costs are too high to be dispatched by CAMMESA receive a payment for providing the system with reserve power. The payment is based on the power they agree to provide, effectively creating a price floor for generators. However, the reserve payment is sufficiently low that generators have a dual incentive to reduce their costs – first, to have their electricity dispatched and, second, to increase the difference between electricity production costs and revenues from sales.

Wholesale electricity market

The wholesale market is administered by CAMMESA, a non-profit, independent operating agency jointly owned wholesale by the government and the power generation companies. The board of directors makes decisions based on simple majority rule. CAMMESA has three primary tasks: dispatching power; determining the fixed charges and other fixed fees added to spot, seasonal, and contractual prices to cover the full costs of transmission; and ensuring that the power system maintains adequate reserve capacity.

The wholesale electricity market (also known as a power pool) has both a supply side and a demand side. The supply side of the wholesale electricity market is composed of independent power producers, privatized generators, generators still owned by the federal government (including two nuclear power plants), and foreign producers selling imported electricity. The demand side of the wholesale market is composed of distribution companies, large users, and foreign consumers purchasing exported electricity.

The interaction of the supply and demand sides of the wholesale market largely determines wholesale prices for electricity. Additionally, a fixed charge is added to all of the market-determined prices to cover payments made by CAMMESA to power generators providing reserve capacity to the electricity grid. Three kinds of wholesale electricity prices exist in the Argentine electricity industry: contractual prices, seasonal prices, and spot prices. Of these, seasonal and spot prices are determined directly in the wholesale market, while contractual prices are affected indirectly by the wholesale market.

Power is dispatched to the national electricity grid by CAMMESA. CAMMESA determines the cost of generation for each producer and then dispatches electricity to the transmission grid, sending the cheapest power first until current demand has been satisfied. The price that is paid to each generator is determined largely by the highest cost producer whose power is dispatched, an arrangement similar to the marginal cost pricing systems employed in the United Kingdom and Australia.

Transmission

As in the United Kingdom and Australia, electricity transmission has been defined by ENRE (the national electricity regulator) as a natural monopoly and is closely regulated. Firms may enter the industry only after successfully bidding for a fixed-duration concession for a particular area and may charge no more than regulated prices for their services. Concessionaires are required to allow open access to their transmission network to third parties.

Distribution and Retail Supply

Distribution: In Argentina electricity distribution is defined as a natural monopoly within the geographic area for which a concession is awarded. Firms may enter distribution only after successfully bidding for a concession. Distribution concessions are 95 years in length. As with transmission companies, distribution companies have regulated maximum rates that they may charge for their services and must allow open access to their distribution network to third parties.

Distribution companies provide power to their end users at rates that are capped by regulators. Incentives to reduce operating costs are provided by price-cap regulation, and the benefits of cost reductions are received by the regulated company and its stockholders. Customers, too, eventually save from lower operating costs because the cap is reset every five to eight years. Distribution assets formerly owned by federal electric utility companies generally were privatized or transferred to the provinces, which have begun to privatize the distribution operations. Several distribution companies were created by the restructuring. The two largest, which serve greater Buenos Aires, were the first privatized.

Large Users: Large users (who consume at least 2 MWh of electricity annually) may choose to be supplied by the distribution company serving their area or purchase electricity directly from a generation company. Large users are in one of two categories: major, which consume at least 4,380 megawatt hours of electricity annually, and minor, which consume less than 4,380 megawatt hours annually. Large users choosing to be supplied directly by a generation company pay a contracted price determined through bilateral negotiation with a generation company. Large users who instead choose to be supplied by a distribution company pay the same rate charged any other customer of the distribution company.

Case study IV: Philippines

The Philippines power industry is currently transforming itself under the mandates of the Electric Power Industry Reform Act of 2001 (EPIRA). One of the most significant reforms introduced vide the EPIRA is introduction of the Retail Competition and Open Access (RCOA) regime.

Introduction of competition in retail supply: Timeline

The timeline envisaged in the EPIRA 2001 for various reforms is briefly given as under:

- De-Monopolization and Shareholding Dispersal within 60 days of incorporation of the Act.
- Filing of the revised rates by the NPC to the ERC regarding the unbundled transmission and generation rates within six months of the incorporation of the Act.
- Filing of the revised rates by the distribution utilities to the ERC within six months of the incorporation of the Act.
- The ERC has to approve the rates submitted by the NPC and the distribution utilities for the revised tariff within six months of their submission, i.e. not more than a year after the incorporation of the Act.
- Determination and fixation of the Universal Charge within one year of the incorporation of the Act.
- Formation of Transco within 6 months of incorporation of the Act.
- Transfer of the functions, assets and liabilities to the Transco subject to concessional financing from co-operatives for 20 years in not more than 2 years of incorporation of the Act.
- End users with average monthly peak demand of more than 1MW can purchase directly within 12 months of having implementation of Open Access.
- End users with average monthly peak demand of more than 750 kW can purchase directly within 3 years of having implementation of Open Access.
- ERC evaluation of performance every year after the implementation of 750 kW to check and reduce the threshold.
- For Cooperatives, retail completion not to be implemented before 5 years of the incorporation of this act.
- Recovery of stranded debts between 15-20 years of the implementation of the Act.
- Filing application with ERC by Distribution Utilities for the recovery of the stranded costs within 1 year of the Open Access.
- ERC has to verify the applications for stranded debts' recovery within 3 months of the submission by the utilities.
- Recovery of stranded costs should be done in a time span between 15 and 25 years.
- Review over the status of recovery of stranded costs to be carried out by the ERC every year.

Creation of Wholesale Electricity Spot Market (WESM)

The WESM has been created to introduce competition in the electricity market in Philippines. The market provides the mechanism for identifying and setting the price of actual variations from the quantities transacted under contracts between sellers and purchasers of electricity. The wholesale electricity spot market was implemented by a market operator in accordance with the wholesale electricity spot market rules.

The market operator so appointed had to be an autonomous group, constituted by the Department of Energy, with equitable representation from electric power industry participants, initially under the administrative supervision of the Transmission Commission (TRANSCO).

Reduction of cross subsidy

The Electricity Power Industry Reform Act (EPIRA) of 2001 mandates that all types of cross subsidies be phased out within a specified period. Before the passage of the law, three types of electricity cross-subsidies existed in Philippines:

- “Inter-class cross subsidy” i.e. price cross-subsidies between consumers of a utility (industrial/commercial consumers subsidising domestic users);
- “Inter-regional grid cross subsidy” i.e. amount charged to consumers located in a viable regional grid in order to reduce the electricity rates in a less viable regional grid;

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- “Intra-regional grid cross subsidy” i.e. amount charged to distribution utilities and non-utilities with higher load factor and/or delivery voltage in order to reduce the electricity rates charged to distribution utilities with lower load factor and/or delivery voltage located in the same regional grid.

Pending the complete removal of cross subsidies, each cross subsidy rate level is to be shown as a separate item in customer billing statements.

The ERC 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 (other factors being payment for stranded debts, missionary electrification, equalization of taxes, and an environmental charge). The UC was envisioned as a non-bypassable charge collected from all end-users (except threshold and lifeline consumers) every month based on the approval of the ERC. Within a period not exceeding 3 years from the establishment of a Universal Charge (UC), it was mandated that cross subsidies shall be entirely phased out.

The inter-regional grid cross subsidy was removed in 2002 when the National Power Corporation (NPC or Napocor) unbundled its rates. Intra-regional grid cross subsidy was removed in three phases in September 2003, September 2004 and September 2005.

For inter-class cross subsidy removal, the Commission approved a two-phase removal scheme for customers of the Manila Electric Company: 40% of the subsidy was removed in October 2004 and the remaining 60% in October 2005. As per Philippines ERC estimation, the residential rates were to increase by PHP 0.2852/kWh during the first phase and PHP 0.4278/kWh during the second phase. However, the Napocor provided a discount of PHP 0.30/kWh to residential consumers in order to mitigate the cross subsidy removal. Also, poor marginal residential users were already provided lifeline discount rates of as much as 50 percent.

A provision of Lifeline Rate was made for the marginalized end users during the phase out of cross subsidy for a period of 10 year.

B. Retail competition blueprint by Paul Joskow

On the basis of studying four international case studies on separation of wheeling and retail supply businesses and retail supply competition, viz. United Kingdom, Australia, Argentina and Philippines, a blueprint for liberalization, as recommended by Paul L. Joskow, may be observed which is as depicted below:

1. Vertical Separation

- Separation of Potentially competitive (Generation and Retail supply) business segments from the Regulated (Transmission and Distribution) segments

2. Horizontal Restructuring - Generation

- To create adequate number of generators to make a competitive wholesale market and negating market power of a dominant generator.

3. Horizontal Integration – Transmission

- Transmission facilities to encapsulate ‘natural’ wholesale markets. Creation of **Single Independent TSO**.

4 . Wholesale Markets

- Creation of voluntary public wholesale spot energy and operating reserve markets

5. Demand Side Institutions

- Creation of Demand side institutions that allow customers to react to variations in wholesale prices, thus integrating demand side responses into wholesale and retail markets

6. Efficient Transmission Access

- Regulation to ensure efficient transmission access to wholesale buyers and sellers so that scarce resources can be allocated amongst competing network users

7. Unbundling of Retail and Network (Wheeling) Tariffs

- Separation of energy retail tariff from energy network (wheeling) tariff to enable separation of businesses.

8. Policy measures for ‘Regulated’ Customers

- If some market segments (for e.g customers < 300 kW) are chosen not be opened to competition then regulatory and policy measures to ensure supply are needed

9. Regulatory agencies for T&D businesses

- Regulatory agencies to regulate these businesses, their costs, service quality, their standards etc with an aim to define their tariffs .

10. Transition Plan

- A Transition plan is needed for movement between old and new system. Later section of this presentation is an attempt to suggest such a plan.