International Restructuring and Privatization Experiences: Lessons Learned

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ABSTRACT

This paper provides a brief review, of some international experiences in restructuring electrical utilities. It gives of restructuring experiences in a dozen countries, some at advanced stages, and others just starting. The discussion will generally focus on status before change, date of change, motivation, action taken, and results. The study cases will highlight success and failures of deregulation experiences. The paper will present current reform status in Kingdom of Saudi Arabia electricity sector.

Keywords: Deregulation, restructure, power market.

1. INTRODUCTION

Since the early 1990s, many countries throughout the world have embarked on efforts to reform their electric power sectors. The reforms and efforts were driven by many factors. These factors vary from political ideologies, to purely economic and financial reasons. The reforms took various approaches. They vary in degrees of deregulation and restructuring.

It is important to note the distinction, between deregulation and restructuring. Deregulation is a change in government control, while restructuring is reorganization, of what is essentially, a vertically integrated utility. Recently, the two terms have been used interchangeably in referring to power sector reforms. Each reform process has its own procedures and format, and has shown some strengths and weaknesses. Each utility has its own structure and environment, and may design its reform plan differently. As a result, there is no unified restructuring model, which can be adopted for all utilities. Traditionally, electric utilities have been vertically integrated entities. An electric utility, in most countries, has the responsibility of electricity generation, transmission, and distribution within its franchise area. It is a virtual monopoly. This is true whether it is a government owned entity, or an investor owned unit (IOU).Deregulation has taken different forms in various countries that included one or more of the following [1]-[5].

- Break-up of vertically integrated utilities into specialized industries such as generation, transmission, distribution, etc.
- Opening of municipal monopolies for competition.
- Creation of an Independent System Operator (ISO) to run and control the various system components and coordinate the activities of the different participants. In some reform paradigm, the ISO is merged with transmission business to form one entity which is responsible for network operation and transmission network operation and expansion.

In a deregulated market, the information and money flow between various participants of the sector, namely generators, transporter(s), service providers, and the consumers. The price of electricity to the consumer is traceable to its basic elements such as the price of energy generation, price of energy delivery, and the price of ancillary services such as voltage and frequency regulation, etc. The World Bank has set some key steps, to measure the extent of power reforms in a country [1]. These reform indicators are tied to the following steps:

1. Incorporation/commercialization
2. Restructuring
3. Legislation
4. Independent regulator established
5. Independent power producers (IPPs) introduced
6. Generation privatized
7. Distribution privatized

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It is important to note, that these are not sequential steps. However, they provide a measure of how a country is progressing towards power reforms. It is also essential to note, that power sector reforms are not limited to developed and industrialized countries, which reached advanced stages of deregulation and commercialization of their electric power systems. In fact, many Middle Eastern and Asian countries have taken reform steps to varying degrees. It will be noted that the Emirate of Abu Dhabi [6], and India have taken impressive stride. Also many countries have allowed IPPs to enter the power sector [1].

Section II, gives a brief of restructuring experiences in a dozen countries, some at advanced stages, and others just starting. The accounts generally focus on status before change, date of change, motivation, action taken, and results. Actions taken by Kingdom of Saudi Arabia to reform electricity sector is discussed in Section III, Section IV discusses the recommendations of the paper.

2. REVIEW OF SOME INTERNATIONAL EXPERIENCES

This summary provides a brief review of international experiences in restructuring of the electricity sector. Table 1 shows a comparison between the countries considered in this paper. The discussion will start with restructure experience in North America, followed by Europe, Latin America, Asia and Africa.

2.1 North America

2.1.1 The United States

Situation before reform: US utilities were mostly private. The Public Utilities Regulatory Policy Act of 1978 (PURPA), allowed non-utility generators (NUGs), to sell power. Utilities were required to buy from NUGs. The NUG share, increased from 42,000 MW in 1989, to 98,000 MW in 1998.

Motivation for reform: The factors underlying the restructuring are [5],[7]-[12]:

- Re-evaluation of regulated industries, such as the banking sector, and the telecommunications industry.
- Consumer pressure regarding price
- Differential prices among states
- Industrial consumers in high-priced states feel their products may lose market-share
- Technological advances:
  - High efficiency units.
  - Low capital and operating costs.
  - Environmentally clean power plants.
  - Gas turbines are least-cost option.
  - No need to build large plants to exploit economy of scale.
  - Combined cycle turbines can be used as source for base load.

Date of reform: The reforms started in 1978. However major changes were introduced in 1992. Subsequent revisions were introduced in 1996 and 1999.

Action taken: The Energy Policy Act (1992), and the Federal Energy Regulating Commission (FERC), 1996 have stipulated:

- Open transmission access.
- Non-affiliated entity uses transmission facilities
- The FERC Order 888, seeks to:
- Eliminate non-competitive practices.
- Use universally applied open access transmission tariff.
- Ensure the recovery of standard costs.

Transmission owners unbundled their services. The owners face same transmission tariff as other users. Utilities are entitled to recover standard costs. Recovery is linked to open access tariff and loss of wholesale power.

Promoting transparency of information: Accurate day-to-day information must be available. The use of open access, same-time information system (OASIS) is encouraged. It is an interactive Internet based system, which contains:

- Available capacity.
- Capacity reserve.
- Ancillary services.
- Transmission prices.

FERC Order 888 also requires the formation of an ISO. However, the ownership of facilities remains with the utility, but the operation is transferred to the ISO. Following FERC Order 888 several problems appeared, transmission congestion increased and transmission planning became more difficult. As a result FERC issued Order 2000 in December 1999. The features of the order are:

- Voluntary formation of Regional Transmission Organizations (RTO).
- Transmission owned/controlled by unaffiliated RTO.

Table 1. Summary of Restructuring activities in a Number of Countries

Activity	NA		Europe		Latin America			Asia			Africa	
	US	CA	UK	Sweden	Argentina	Chile	Brazil	India	Korea	Singapore	South Africa	Egypt
Generation	C	C	C	C	C	C	C	C	C	C	M	M
Transmission	C	M	M	M	M	M	M	M	M	M	M	M
Distribution	C	M	C	C	M	M	C	M	M	M	C	M
ISO Established	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N
Regulator Exists	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
Market PX	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	N
Tariff regulated	Y	Y	N	N	Y	Y	N	Y	Y	N	Y	Y

Key: C: Competetive, M: Monoply, N: No, Y: Yes

The results: The potential benefits of RTO are:

- Eliminate discriminatory practices.
- Improve calculation of available transmission capacity.
- Improve management of parallel path flow, and system reliability. An RTO can set congestion pricing. An RTO may develop mechanisms to measure congestion costs
- Improve transmission-pricing methods such as rolled-in average costs. Postage stamp rate does not reflect cost of scarcity and bottlenecks. It does not recognize transmission distances. There is a need to develop equitable pricing methods and eliminate "pancaking."

Only a few ISOs are now in operation, namely, in California, Pennsylvania, New Jersey, Maryland (PJM), New England, New York, Texas, and the Midwest.

Several trading hubs, and power exchanges have emerged. A hub is a location on the grid where power is sold, and ownership changes hand. Utilities submit bids to sell power. New York Mercantile Exchange (NYMEX) has developed future contracts to eliminate risk due to price changes.

Because of the restructuring, several mergers, and acquisition and divestiture of investor-owned utilities (IOUs) took place. The mergers have two categories between IOUs and IPPs to increase share in market, or between electric utilities and natural gas companies, i.e. convergence mergers. The reasons for mergers and acquisition are that larger utilities are more competitive. It will also help to eliminate redundancies, and reduce overlapping activities. It will diversify generating capability, and will consolidate and acquire, additional managerial and technical skills.

The reasons for convergence mergers between electric and gas utilities are:

- To become more competitive in the energy sector.
- To take advantage, and increase use, of natural gas fired power plants.

There are also some strategic benefits of convergence mergers. These are to strengthen wholesale marketing and trading opportunities. When the activities are similar, risk of price volatility is reduced. Also combined services appeal to customers. This may result in a large customer base, reduction of customer costs, and cross selling of electricity and gas. Companies also seek to expand and strengthen access to fuel supplies. By 2020, 300 GW of additional capacity is needed. Some 90% of this capacity will be natural based. Finally, as a result of restructuring, some divestiture of generation assets took place. Divestiture is defined as sales of assets to another company. About 30% of IOUs divested power assets (156 GW).

A few IOUs changed their business strategy to concentrate on one activity

2.1.2. Canada

Situation before reform: Canada is composed of ten states and three territories. Each state was served mainly by vertically integrated state owned utility which has interconnections with other states and United States.

Motivation for reform: Canada is restructuring its electricity sector to facilitate competition. Its is expected that creating competition would allow for better service and reduced energy prices

Date of reform: 2001

***Action taken**:* The movement toward restructuring the electricity industry has been going slowly, as each province reviews its own distinctive regional circumstances and issues. Alberta restructured its network on January 1, 2001 . Ontario has launched the Independent Market operator and allowed competition in generation level in May 2002 [13],[14]. Most other provinces, including New Brunswick, Québec, Manitoba, Saskatchewan, and British Columbia implemented, or are planning to implement, wholesale access. Aside from Ontario and Alberta, no other provinces are planning to implement full retail access.

The results: Since restructure of electricity in Canada is relatively recent, no conclusive results can be drawn at this stage. Historical prices are posted on Ontario Independent Market operator (IMO). The latest report published by IMO shows that , during three years of market operations, wholesale prices in Ontario have been consistently lower than those in neighbouring U.S. jurisdictions. Other parties are concerned with the stability and security of transmission grid since opening competition in generation in USA and Canada will increase the amount of energy traded between the two countries significantly.

2.2. Europe

A Majority of electric systems in Europe has undergo a restructuring process and most of those systems are in a well developed stage [15],[16]. This subsection introduces the experience of Swedish and English market.

2.2.1. Sweden

Situation before reform: The electricity sector was dominated by one company *Vattenfall,* which owned about 50% of the total generation and also managed the 400 kV and 220kV transmission lines. *Vattenfall* also managed some large networks at lower voltage levels, down. Beside *Vattenfall,* there were about a dozen other large generating companies and more than two hundred and fifty distribution companies, which operated the networks at lower voltage levels

Motivation: To promote competition in the electricity market and to open up the national transmission network and interconnections to companies other than the large generating companies which will ultimately reduce the electricity bill.

Date of reform 1991.

***Action taken**:*

- In 1991, transmission activities have been removed from Vattenfall and a state owned transmission company, Svenska Kraftnät, has been created to manage the national transmission network.
- In 1995, a transmission tariff based on *point of connection* , which aimed at promoting competition on the electricity market has been introduced. The basic principle was that with a single payment, at the point of connection, a customer could access the entire network system and thus get into trading arrangements with any player on the system.
- In 1996, Sweden has joined Nordpool to trade energy with neighboring countries
- In 1999 the requirement for specific electricity meters or other extra charges for ordinary customers have been removed in order to make it easier for customers to choose a new supplier freely. [17]-[19]

The results: Sweden has successfully liberalized its electricity market in a balanced way which mixes governmental intervention with market roles. As part of Nordpool, Sweden has one of the least-regulated most market-driven electricity sectors. Current challenges include a growing concentration of generation companies, a tightening supply-demand balance and constraints in the interconnection capacities between countries. It is also useful to note that the existing situation of Swedish electricity network and existing infrastructure in addition to political and social stabilities had a great influence on the success of the restructure model adopted by Swedish government [17]-[19].

2.2.2 United Kingdom

Situation before reform: The Central Electricity Generating Board (CEGB) was in charge of generation, and transmission in England and Wales. Twelve area boards were responsible for distribution.

Motivation of reform: The origins of the privatization of the energy sector were political ideology, criticism of the existing system, and the dissatisfaction of major customers.

Date of reform: Reforms started in 1989.

Action taken: The Electricity Act 1989 broke the Central Electricity Generating Board into three generation companies, and the National Grid Company (NGC), which is a government monopoly. It also transformed the electricity area boards into twelve Regional Electricity Companies (RECs). The act also emphasized the separation of infrastructure (wires), and power sales and purchases. In addition it created the Office of Electricity Regulation (OFFER).

The wholesale market was transferred to full retail by 1998. The Competition Act of 1998 established the Office of Gas & Electricity Market (OFGEM), and a Director General of Electricity Supply (DGES). The act prohibits agreements that prevent, restrict or distort competition, and prohibit abuse of dominant business position. However it maintained the existence of transmission and distribution monopolies. It stressed that there is a necessity to continue the unbundling and business separation of utilities. Subsequently, the Utilities Act of 2000 removed the distinction between private, and public supplier franchise areas. It supported the creation of a gas and electricity market authority.

Also consumers were made aware of the available competitive opportunities. The creation of Consumer Councils, to assist consumers in choosing alternate gas and power suppliers was encouraged.[20]-[22]

The results: The UK market is characterized by the following successes:

- All customers are able to select a competitive power provider.
- Approximately 1500 MW of new capacity added annually.
- New generating company built approximately half of new combined cycle gas turbines.
- Entry price for new generation 20% lower than forecast.
- Real electricity prices were reduced (commercial & industrial).
- 93% of industrial customers satisfied with reliability.[20]-[22]

Concerns:

- Number of generation companies is small.
- Price gaming and manipulation of capacity payments.

2.3. Latin America

Latin American countries are considered pioneer in restructuring of electricity sector. The reform had took place mainly to attract direct foreign investors. This subsection briefly introduces the experience of Argentina, Brazil, and Chile.[23]-[30]

2.3.1 Argentina

Situation before reform: The power system in Argentina was composed of the following: four national utilities; one international hydro utility, and nineteen provincial and federal corporations

Motivation for reform*:* The reforms were initiated as a result of severe power shortages, and widespread blackouts. Also government attempt's to attract the large investments needed for the sector.

Date of reform: Argentina started power reforms in 1992.

Action taken*:* The government undertook the following steps:

- Creation of national regulatory agencies;
- Unbundling of state companies and creation of strategic business units in generation, transmission, and distribution. The reforms have made the generation sector a free market, in which competition has developed. The transport sectors for both transmission (500 kV), and distribution (132-230 kV) are monopolistic activities. The transport tariff is based on the economic cost of losses, and the network operation and maintenance costs.
- The electricity market is run by a private company whose shareholders are the generators, transporters, large consumers, and the state.

The results: The restructuring of electricity sector in Argentina was considered model to be followed by countries which has similar situation to Argentina. Argentina success was evident by increased investment in new generation activities during nineties of last century; Argentina's electricity market is now characterized by numerous producers in a highly competitive generation market. The power pool aggregates electricity supply from all generation sources, including independent power producers, federal generators , and foreign interconnections to Argentina's power grid. The number of Generation Company has increased from 23 company as in 1993 to 43 company by 2000. The installed capacity as in year 2000 are more than 1,000 MW. On-line system information is available on Company Administrator of the Wholesale Market Ele'ctrico S.A website. The country demand as of 18/4/2006, 19:00 is 14232 MW with a spot price which is between 52 $/MWh to 59 $/MWh.
It must be stated that recent political and economical changes in Argentina has affected Argentina experience and put some doubts regarding its reform agendas.

2.3.2 Brazil

Situation before reform: Brazil, one of the largest countries in the world, started deregulation of the electricity sector relatively late. Electrobras, a federally owned entity, dominated the sector.

Motivation: The reform objectives were to reorganize the vertically integrated company, and to facilitate private sector participation.

Date of reform: 1996

Action taken: Brazil undertook the following steps: Creation of a regulatory body (ANEEL) in 1997; Establishment of a wholesale market and an ISO in 1998; Spot price determined by hydrothermal scheduling, as 95% of capacity is hydro; and reorganization of Electrobras as a holding company. The holding company established generation, transmission, and distribution companies.

Separate generation companies were formed. Limits were imposed on cross-ownership of the companies. Limits were also set on the amount of energy a distribution company could take from a generation company of the same ownership.

Several states owned transmission companies were also formed. Several distribution companies were created. State generation and transmission companies were separated from the distribution company. However, generators can seek customers directly. The size of the distribution companies is dictated by bulk energy purchases, economy of scale, and competition.The reform in Brazil, stipulated the separation of the distribution (wires), and retail activities. The distribution, and retail company is required to keep separate accounts, for distribution and retail activities. Distribution activities are regulated while the retail activities are deregulated.

The results: The reforms in Brazil are still evolving, and many issues remain to be addressed and resolved. After nine years of the first privatised utility Brazil faced a severe electricity shortage and had to take some corrective measure to fix its model of reform. Electric generation in Brazil is dominated by hydro generation which tends to keep spot price for electricity low. The problem mainly originated because market spot price does not send the correct signal to the investor to invest in building more generation. Brazil energy crisis resulted largely due to the absence of national energy planning and energy policy guidelines that should shape clear regulation which are needed for private investors to assess their risks and returns on investments. The end result was the lack of investments in generation and transmission lines that have not come in the expected speed and amount. Brazil has taken some steps toward fixing its model of restructuring and pricing mechanism via Power Purchase Agreement, details of this agreement is discussed in [27].

2.3.3. Chile

***Situation before reform*:** Two vertically integrated power systems operated in Chile.

Motivation: The driving forces behind the reforms were political, and ideological. The state was generally privatizing economic activities. The inefficient electrical sector was saddled with huge debts. The electrical system was also experiencing severe power shortages.

Date of reform: Chile was one of first countries to start electricity reforms in 1982. Despite the fact it did not receive the attention accorded to the UK, the Chilean experience is quoted in many reports, and is referred to by many researchers, and consultants.

Action taken: The reforms took the following paths: creation of a national entity, to regulate the sector, set tariffs, and node prices; thermal companies, and hydroelectric companies were required to coordinate their operation, to minimize operating costs. Generators were required to meet their contractual levels from their own generation, and/or purchased on the spot market. Sales were made according to long or short-term contracts. Companies determine with whom to contract, and duration of contract; transmission companies for transporting the energy operate on an open-access basis, and charge only the wheeling rates. Wheeling rates agreed between the generator, and transmission companies; Distribution companies sell purchased energy to customers. Electricity purchased at node prices, which are classified as capacity and energy prices. The capacity node price includes all costs including capital outlay. The energy node price is based on the short-term marginal cost for satisfying demand. Prices are established every six months. The distribution tariff is determined by the energy purchase cost and a value added cost; and the establishment of SELF, an organization that sets the technical standards of the system

The results: Chile has gone through a long experience with deregulation process which had helped the sector revive during this period with direct foreign investments. Chile is a country with a limited primary energy resources, it is mainly depending on Argentina for natural gas import. This model was working fine until Argentina faced the energy crisis in the beginning of this century and decided to limit the natural gas exports for neighboring countries. This situation has affected directly the long term expansion plans for Chile and opens the door for studying options to make the sector less dependent on Argentina natural gas. This situation open the door for questioning the restructure process as a matter of home land security and how to quantify the risk associated with importing huge amount of cheap energy either on its elementary form or in its final form ‘electrical energy’ across international borders.

2.4 Asia

Reform of electricity supply is still evolving in Asia. This subsection introduces the experience of India, Korea, and Singapore [31]-[33].

2.4.1. India

***Situation before reform*:** There were many state-owned electricity boards. A federal entity also existed, to coordinate transmission activities. It also owned, and controlled some generating plants, and thus sold to the state boards.

Motivation for reform: To restructure, and incorporate state electricity boards, and allow them more autonomy. Also, the aim is to encourage the operation, along commercial lines.

***Date of reform*:** Reforms were started in 1991.
Action taken: The Indian government has undertaken several steps towards the liberalization of the electricity sector. In 1991, India has opened the power sector to private investors. Private sector was allowed to invest in generation. Transmission was accorded independent status. This meant the creation of a central (federal) power grid, and a number of state transmission utilities. Private sector participates in construction, and maintenance of the network.

- 1996: Restrucand incstate electorga.
- 1998: To encourage private investment in the transmission business, the central government enacted the Electricity Laws (Amendment) Act in August 1998, which gave transmission activity independent status and introduced the concept of central and state transmission utilities. Private-sector participation in transmission is limited to construction and maintenance of lines for operation.. Transmission charges payable to the company will be directly linked to the availability of lines. Guidelines for private-sector participation have been prepared.

The results: Since 1991, the total additional installed capacity from the private sector has remained limited. Most of the targets for additional installed capacity, in the Government of India's Eighth five-year Plan and those for the initial years of the Ninth Plan have not been met. The limited private sector participation is attributed primarily to problems associated with bill structure which is designed considering social dimension and the regulatory frame work for the market structure.

2.4.2 Korea

Situation before reform: Korea Electric Power Corporation, (KEPCO), a vertical entity was in charge of generation, transmission and distribution.

Motivation: Energy reforms in Korea are being driven by the political ideologies of a government that would like to deregulate the entire economic sector, and improve the financial system of the country.

Date of reform: South Korea announced a privatization initiative in July 1998, including the sale of 11 publicly owned companies. KEPCO is among the companies to be privatized.

Action taken: The previously vertically integrated company, Korea Electric Power Corporation (KEPCO), has been broken into the following companies:

- Six separate generation companies, five non-nuclear, and the sixth, a nuclear company. The five non-nuclear companies will be privatized in 2002.
- Each generating unit is to be centered on a base load unit. The generating capacity of each company will be balanced with that of others.
- Energy trading is within the Korea Power Exchange.
- Wholesale prices are deregulated.
- Consumer tariff will be deregulated in 2003.
- The transmission and distribution system remains regulated.

The results: The reforms are still evolving.

2.4.3 Singapore

Situation before reform: The vertically integrated Public Utilities Board (PUB) dominated the energy sector in Singapore up to 1995.

Motivation for reform: To create electricity market, and a regulatory framework that supports a competitive industry, while ensuring supply reliability and security.

Date of reform: Reforms started in 1995.

Action taken: In 1995, the government established three generation companies, a transmission, a distribution, and a supply company. In 1998, the Singapore Electricity Pool (SEP) was created as a wholesale electricity market. In 1999, the generation companies were separated from Power Grid, and full retail competition for industrial and commercial consumers was allowed. The formation of an ISO and a market operator for Power Grid, started in 1999. The creation of an Energy Market Authority (EMA), for electricity and gas was announced in 2001. EMA controls or fixes price. Currently, the government regulates the rate-of-return. It is envisaged that competition for all consumers will open by 2003.

The results: Even though the government still regulates the tariff, electricity sales increased by 7.6% in the first quarter of 2001.

2.5 Africa

Most of African countries are in the process of considering restructure of electricity sector along with medical, transportation and other sectors. The higher rate of poverty in Africa and the political instabilities are hindering such efforts. This subsection introduces the experience of restructure process in South Africa and Egypt [34],[35].

2.5.1 South Africa:

Situation before reform: ESKOM, a government corporation, owned the generation and transmission systems. Many small companies, owned by municipalities, and ESKOM were responsible for distribution.

Motivation for reform: To create competitive electricity supply and distribution industries. Also the government is restructuring state-owned enterprises.

Date of reform: May 2001

Action taken: In May 2001, the government approved key reform steps:

- Creation of a transitional holding company owned by the state.
- A holding company holds shares in a number of Regional Electricity Distributors (REDs).
- The transitional period is 3 - 5 Years.
- ESKOM cannot own shares in the holding company, or in the REDs. Each RED should consist of divisions:
- Wire business i.e. network, and operation.
- Retail business.
- Support functions
- The commercial arrangements are set as follows:
- Energy bought from ESKOM at a regulated wholesale electricity tariff.
- Each RED, can also buy in the competitive retail market.
- Estindependent companies.
- Specialclass of cucan choose retail supp.
- The financial issues and the tariff were addressed:
- Electrification should proceed according to a certain rate, e.g., 300,000 connections per year.
- Government should provide REDs with an electrification capital subsidy.
- The tariff is capped.
- Two RED companies will receive transitional financial support from the holding company, namely, the government.
- In August 2001, the government started the incorporation of ESKOM. The management is through a board of directors.

The results: The reforms have just started.

2.5.2 Egypt

Situation before reform: Electricity has been introduced in Egypt in 1893. Electric generation, transmission, and distribution were owned and operated on private basis until 1962. In 1962, the ministry of electricity has been formed and the country has converted the sector to the public domain. The Egyptian Electricity Authority (EEA) which is a state owned entity used to manage the generation, transmission, and distribution activities.

Motivation for reform: Egypt is a developing country with population and economical situation which is very similar to Latin American countries. The motivation of reform is to attract direct foreign investment to the electricity sector to face the large expected growth on electricity demand because of expanding economy.

Date of Reform: August 2000
Action taken:
In 2000, the Egyptian Electricity Holding Company (EEHC) was formed. The government-owned EEHC has 15 affiliated companies: 5 generation companies (4 thermal, and one hydro), one transmission, and 9 distribution companies. Following the European model, the transmission company was given the responsibility for planning, operation and trading of electric energy.

The Egyptian power pool (EPP) has been created during 2002. The pool was given the responsibility of revenue adjustment, cash management and tariff equalization; setting the terms of the purchase and sales agreements; and the basis for allocation of fixed costs and available profit.

Currently, beside the five generation companies which are owned and operated by EEHC there are a number of IPPs which has been built based on BOOT arrangements. To give intensives to foreign investments, IPPs has long term commitment with the government of Egypt. This long term commitment has provided a shelter for foreign investment against market risk, but it had put a great pressure on Egyptian electricity sector and economy when the value of Egyptian pound has dropped by more than 20% in front of major foreign currencies.

The transmission company is responsible for day to day operation of the system, planning activities as well as trading of energy.

The results: Because of complex cultural, economic, social and political reasons, prices of electricity are still regulated and for some consumers it is below the actual generation cost. Market dynamics is not working properly in the Egyptian model. This situation puts more pressure on the sector since the debts of the sector is expected to be

magnified as the difference between revenues of the sector and investment required to maintain and execute the ambitious expansion plan is increasing.

3. RESTRCUTRING OPPORTUINTIES IN KSA

This section briefly introduces Saudi Plan to restructure the electricity sector. Saudi Electricity and Cogeneration Authority (ECRA) have been formulated by CMD 163 in 1425 H and have been assigned the regulatory responsibility for electricity and cogeneration. Fig. 1 shows the intuitive time line for the restructure process as proposed by ECRA. Fig. 2 shows the tentative Saudi market structure after implementing the planned restructure process [36].

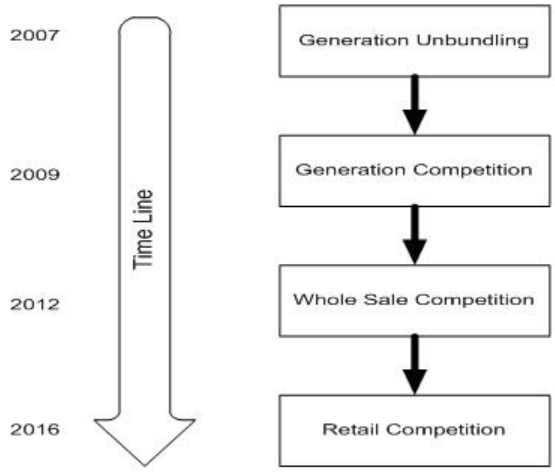

Fig. 1 Proposed Structure Process in S.A.

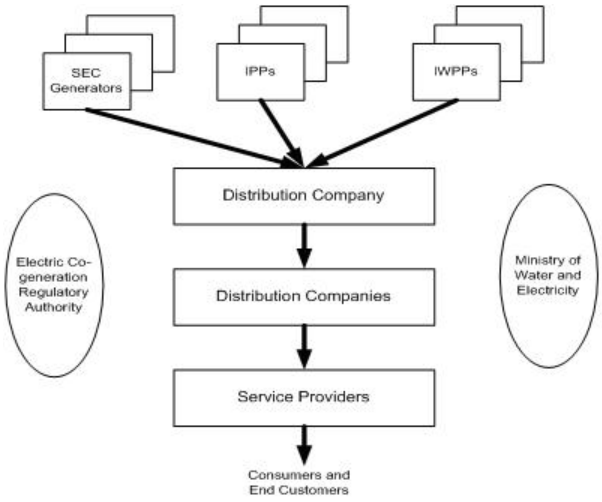

Fig. 2 Restructure process of Saudi Electricity Sector

4. CONCLUSIONS

In any typical restructure process, the electricity industry is unbundled, into its major operational components, i.e., generation, transmission, and distribution. The generation sector, being independent is attractive to private sector investors. The generators deliver their product on a competitive basis. The transmission sector, acts as a neutral broker, delivering power from the most competitive source, reliably and economically, to the customers through the distribution sector. The attention of the distribution sector is focused on enhancing its delivery infrastructure, to successfully deliver a reliable service, to the satisfaction of consumers. The major, "core" objectives, have been increased competition, primarily in generation; increased private sector investments; and reduction in capital and operational cost. This has resulted in a total reduction of cost of services, higher tax revenue to governments, and a higher degree of satisfaction among consumers. Each restructuring process has its own procedures and format, and has shown some strengths and weaknesses. Each country has its own structure and environment, and may design its restructuring plan differently. As a result, there is no unified restructuring model, which can be adopted. In view of the above, and as far as the stated objectives are concerned, the proposed structure process appears to be similar to regionally, and internationally adopted, restructuring and privatization plans. However, attention should be given to create regulatory frame work which will aid and pave the road to the success of electricity market. Several pitfalls which were observed in early design of power markets should be studied carefully to avoid repeating them.

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