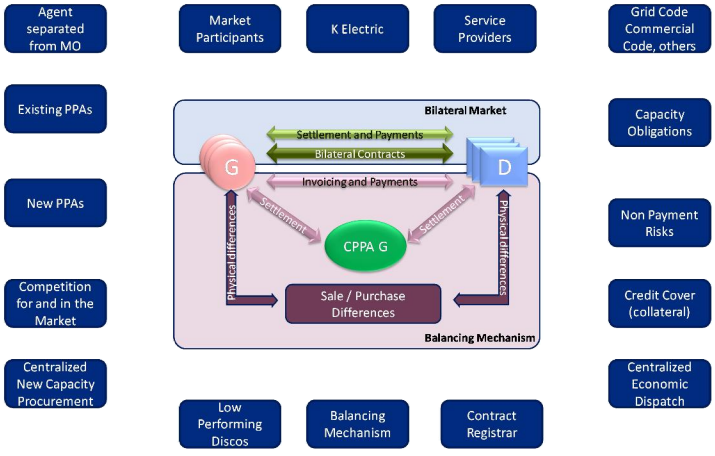
DEVELOPING A COMPETITIVE ELECTRICITY MARKET IN PAKISTAN

A CASE STUDY



This case was prepared by Strategy and Market Development Department of CPPA for discussion during Electricity Market Professional (EMP) Program. The case is developed as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Views and thoughts shared by the fictional characters in this case are depiction of their personality types and may not reflect the reality on ground or author's views.

Mujahid and his friends Danish, Ali and Pervaiz work in different organizations in power sector of Pakistan. Mujahid just returned after receiving a training on Electricity Market Professional (EMP) Program and is very excited to share his experience and the information he acquired with his friends.

Mujahid: "Believe me guys, what an informative session it was. I gained a wealth of information and knowledge about the competitive markets, the proposed wholesale completive market model and roadmap for Pakistan and most importantly how can I contribute in this initiative"

Ali: "Yes I have heard about the competitive power market that is going to be implemented in Pakistan. But come on guys, we have other problems to deal with in the power sector that should be on the top priority of the government. Not some fancy concepts like electricity markets."

Pervaiz: "Exactly**!** There are already not enough investments in the sector. We are short of generation capacity. There is a huge demand supply gap. And this gap will be widened further in future[1]. The competition will make the situation worse. It will make the investors run away. There will not be any investments in the future. No more power plants. Power sector will be destroyed. A complete disaster! Pakistan cannot afford competition in the market when we have other pressing problems like Circular Debt."

Danish picked up the newspaper from the table and started reading aloud a headline.

Danish (reading the newspaper): Hey guys check this news, "Energy sector's Circular Debt sours to Rs. 573 billion".

Pervaiz: "See that's what I was talking about. I have been reading this news since childhood, except the figure keeps fluctuating. Although I work in the power sector, still I can do nothing about it. Let the government and higher-ups of the power sector fight with each other over the issue. I would be happy as long as the AC in this drawing room keeps on blowing out some cool air and I am getting the pay…AAAAhhh"

Mujahid: "Brothers, you are partially right. Yes, Pakistan has been facing this problem since long. But it is not right to say that the problem is unrelated to us in particular and other stakeholders in general and that we can do nothing about it. Everyone is important and has a role to play, what we need to ensure that we make best use of our available time. On the other hand the efforts were made by GoP to add generation capacity and achieve supply adequacy, now reforming the sector has become inevitable. Efforts have been going on, although not in a perfect and coordinated manner, but moving ahead. It is only the matter of time that we would get rid of these problems once and for all, otherwise the power sector losses can take even the whole economy down."

Ali: "Mujahid my friend, what an optimistic guy you are. Do you really believe in such reforms? Don't you remember the nice stories from unbundling of WAPDA in early 90's. We were made to believe that everything will be alright and the power sector will reach to a glory through a well-

[1] Please refer to Appendix-1: Generation Expansion Planning to see whether the claim made here is true or otherwise.

thought reforms process, started right after then. And look what we got, the Rs. 600 billion in circular debt. What a pity!"

Pervaiz: "Way to go my friend. You exactly share my thoughts. There have been major shortcomings at all levels of the reform spectrum. The entities themselves have no aspirations of moving ahead reforms and are happy to maintain status quo. It's only DISCOs who are responsible for the Circular Debt and I am sure nothing can be done about it"

Mujahid: "Well, I appreciate the concerns that you have and to some extent these are valid concerns as well. Although I was with you in University when de-bundling was carried out, but I have learnt it from my seniors that reform was Change to People not by the People, it was pushed by IFIs, no proper transition plan or roadmap was prepared or implemented and neither key stakeholders were informed or taken on-board for implementing that big change.

I acknowledge the fact that we are unable to fully tap the benefits of unbundling, it required a lot of coordination between entities that we lacked so on and so forth. But this time around, Market Reforms seems to be a inclusive process, there is market model on NEPRA's website for approval through consultative process, along with a roadmap to implement it, all stakeholders are not only taken fully onboard but also being immensely trained through EMP program.

Well through this conversation about Circular Debt I also feel that we need to have some discussion on this important topic as I think it's important to know the causes of this problem. I have gained some insights through study of a report by Planning Commission of Pakistan titled "The Causes and Impacts of Power Sector Circular Debt in Pakistan 2013", let me share them with you, over the years to my understanding the causes have remained the same.

CIRCULAR DEBT: A DEEP DIVE[2]

Circular debt is the amount of cash shortfall within the Central Power Purchasing Agency (CPPA) that it cannot pay to power supply companies. This revenue shortfall cascades through the entire energy supply chain, from electricity generators to fuel suppliers, refiners, and producers; resulting in a shortage of fuel supply to the public sector thermal generating companies (GENCOs), a reduction in power generated by Independent Power Producers (IPPs), and an increases in load shedding.

Circular debt at the end of Fiscal Year (FY) 2018 is estimated to be Rs500+ billion. If continued unabated, will increasingly constrain the availability of electricity and slow down economic growth.

PRIMARY CAUSES

The primary causes of circular debt include:

- Poor governance & coordination among de-bundled entities

[2] Source: "The Causes and Impacts of Power Sector Circular Debt in Pakistan", Planning Commission of Pakistan, March 2013.

- Delays in tariff determination by an inadequately empowered regulator compounded by delay in notification by the Government of Pakistan (GOP)
- A fuel price methodology that delays infusion of cash to the power sector
- Poor revenue collection by the DISCOs
- Delayed and incomplete payment by the Ministry of Finance (MOF) on Tariff Differential Subsidy (TDS) and Karachi Electric Supply Company (KESC) contract payments
- Prolonged stays on fuel price adjustments (FPAs) granted by the courts
- High Transmission and Distribution (T&D) losses and commercial losses

SECONDARY CAUSES

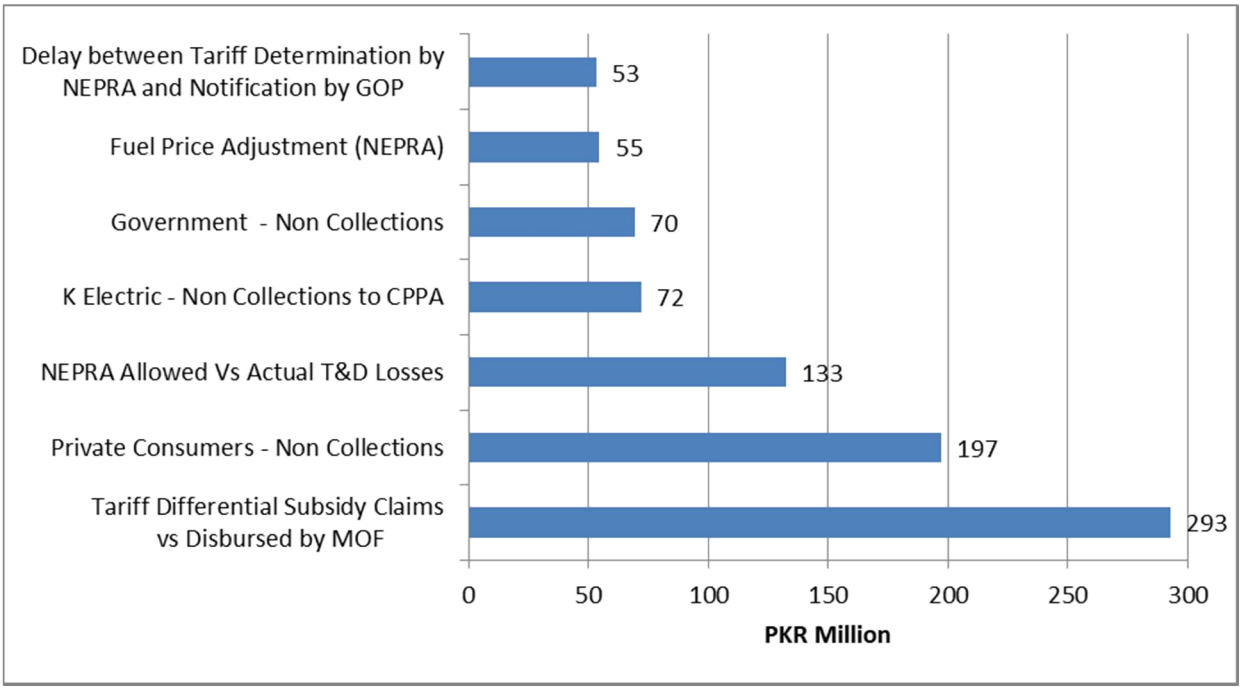
There also are several secondary causes to circular debt, including:

- The need to improve the thermal efficiency of the GENCOs and for NEPRA to set tariffs based on actual vs. estimated heat rates
- Inadequate budgeting of the TDS, which delays payment and increases financing costs
- Unfavorable generation mix of the GENCOs, due largely to the GOP's fuel allocation policy that diverts natural gas to other non-economic uses
- Non-commercial/non-professional approach to load shedding; non-improvement in tariff terms and conditions; impact of court decisions that have delayed payments to the DISCOs
- Late payment surcharges (LPS) paid by CPPA to the IPPs resulting from the inability of the DISCOs to fully pay CPPA; the GOP's neglect in promoting demand-side management, energy efficiency and renewable energy resources
- The need to settle payment arrears (both disputed and undisputed) in a comprehensive manner; and the need for expanded authority of CPPA to collect payments from the DISCOs through formal and enforceable power purchase agreements (PPAs)

BREAKDOWN OF CIRCULAR DEBT

Following is the breakdown of Circular Debt into various components[3]:

[3] At the end of FY 2012, Circular Debt was estimated to be Rs872 billion (Source: Planning Commission Report on Circular Debt)



Mujahid: " One cause direct or indirect cause that is not mentioned here is the burden of long of very inflexible long term PPAs / EPAs backed with sovereign guarantees from GoP. You know high risk demand high returns, due to high legal, regulatory, market and business risks the investors wants sovereign guarantees with long term agreements having take or pay conditions. All risks are parked to the buyers. The least cost procurement process[4] is also not thoroughly followed, all of this results in shortages and surplus, higher tariffs and 100% captive consumers. These inefficiencies also contribute in increasing the Circular debt too."

THE BLAME GAME

Mujahid Again: "So folks, who do you think is responsible for all the causes in the power sector contributing to Circular Debt?"

Danish: "If I were a DISCO guy, I would easily save my face by putting all the blame on the shoulders of others. First of all, the private consumers get the lion's share in the Circular Debt. They need to clear all their previous dues and should timely pay their bills. Then there is regulator who pushes the DISCOs to have a "seamless supply of electricity" even to those consumers who are involved in electricity theft let alone not paying their bills and on the other hand the losses targets are impossible to achieve. On the other hand the regulator is unable to pass the costs to the consumers in-time and we fall short of revenues, what a DISCO could do? The Government is also equally responsible as they don't engage law enforcing agencies to help DISCOs recover their bills and subsidy injections are delayed as well"

[4] Please refer to Annex-3 for the complete flowchart of PPA/EPA process

Ali: "Very Clever DISCO guy! If I were the regulator, I would charge penalties on your DISCOs who are contributing to the Circular Debt by not doing any efforts in reducing their line losses, controlling the theft and active recovery from their customers. If a consumer is not paying his bills, why not DISCOs recovery team go door-to-door for collection or disconnect them for non payment. It is DISCOs responsibility to recover the revenues. It is not the solution to shutdown electricity of the whole area, without thinking about those consumers who pay their bills regularly. And also, the DISCOs themselves should seek the help of law enforcing agencies if needed. It's not the responsibility of the regulator or even the ministry to provide the services of the police."

Pervaiz: "I would say that everything is a mess. Nothing can and will happen here. No one can change the fate of power sector. It is evident that no one is playing their own role. Tell me who amongst us or the champs in our office has ever even read the Grid Code, Distribution Code or the other regulatory documents even once. Are we not under a regulatory regime are these documents not supposed to be followed. Well to be honest I have heard that these documents are imported! Lol! Tell me, are all entities performing their expected role for the betterment of the country? I can't do anything here unless the government or the big guns do their job. I think let's change this boring subject and discuss why France after beating my favorite Argentinian team won the World Cup? I was all in for Croatia, I mean they deserved it"

Mujahid: "Pervaiz my dear friend, unfortunately you are the only football lover in this room, therefore, lets continue with our discussion. My dear friends, it's very easy to play this blame game, shifting the responsibility to the shoulders of other and do not contribute to the solution of the problems by fulfilling our own duties in an honest way. Unfortunately, every single person and the institution in the sector thinks that they are fine, but it is the others not performing.

No matter whose fault is this, the real victim is the consumer in the end. It is the paying-consumers who actually pay their bills timely. In another perspective, these consumers are actually paying for the salaries of the entire power sector and even for these biscuits that we are enjoying with tea and in return they want good service. Unfortunately, in return they get hours of load-shedding, voltage fluctuations, over-billing, poor customers' service?"

WHY NOT TREAT ELECTRICITY AS A COMMODITY[5]

Danish: "I agree that the paying customer is the victim. But don't you think the non-paying customer is the biggest enemy of the paying customer. Only if non-paying consumers start paying their bills in a timely manner, half of the power sector problems would be reduced."

Mujahid: "Why do you think some consumers are not inclined towards paying their bills?"

Danish: "I think that the consumer feels it's their privilege to get the electricity, they think it is their birth right. This is the reason most of them who are involved in the electricity theft not have even a remote regret. And the problem is that they are billed after they have consumed the electricity. Can you do this with some other products that you are consuming and not paying for it? Can you go into

[5] Please refer to Appendix-2: Difference between Electricity and a Commodity for more details on this topic.

a restaurant to have a lunch and leave without paying? Can you put petrol in your car without paying? Can you purchase groceries from retail store without paying? I believe not. Unless you have a gun with you when you go shopping which you can show to anyone who demands payment."

Mujahid: "From your point, I understand that electricity is not treated as a commodity which can be traded. And if we start treating electricity as commodity and trade it in the market, it could be beneficial."

Ali: "But all the materialized products such as cement, petrol, sugar etc. are classified as commodities while electricity is surely not."

Pervaiz: "Electricity as a commodity? Come on, what you are talking about? If electricity truly were a simple commodity, kilowatt-hours could be stacked on a shelf – like kilograms of flour or television sets – ready to be used as soon as the consumer turns on the light or starts the industrial process. Despite recent technological advances in electricity storage and micro generation, this concept is not yet technically or commercially feasible. The reliable and continuous delivery of significant amounts of electrical energy still requires large generating plants connected to the consumer through transmission and distribution networks. Am I right?"

Mujahid: "Yes you are right and I thank you for coming back to the topic for which we have gathered so that I can share some insights from the EMP course. With the arrival of concepts of electricity markets, the production and trading of electrical energy can be separated conceptually from the operation of this power system. The kilowatt-hours or Kilowatts can then be treated as a commodity and traded in an electricity market. This will also break the monopolies of the dominant institutions and will bring competition in the market, which would ultimately benefit the sector in general and consumers in particular. Let us explore why competition in the power sector becomes unavoidable."

WHY COMPETITION?[6]

Globally speaking, for most of the twentieth century, when consumers wanted to buy electrical energy, they had no choice. They had to buy it from the utility that held the monopoly for the supply of electricity in the area where these consumers were located. Some of these utilities were vertically integrated, which means that they generated the electrical energy, transmitted it from the power plants to the load centers and distributed it to individual consumers.

In other cases, the utility from which consumers purchased electricity was responsible only for its sale and distribution in a local area. This distribution utility in turn had to purchase electrical energy from a generation and transmission utility that had a monopoly over a wider geographical area. In some parts of the world, these utilities were regulated private companies, while in others they were public companies or government agencies. Irrespective of ownership and the level of vertical integration, geographical monopolies were the norm.

[6] Source: "Fundamentals of Power System Economics, Daniel S. Kirschen | Goran Strbac

Though this model worked well, in 1980s some economists started arguing that, this model had run its course. They said that the monopoly status of the electric utilities removed the incentive to operate efficiently and encouraged unnecessary investments. They also argued that the cost of the mistakes that private utilities made should not be passed on to the consumers. Public utilities, on the other hand, were often too closely linked to the government. Politics could then interfere with good economics.

For example, some public utilities were treated as cash cows, and others were prevented from setting rates at a level that reflected costs or were deprived of the capital that they needed for essential investments. These economists suggested that prices would be lower and that the economy as a whole would benefit if the supply of electricity became the object of market discipline rather than monopoly regulation or government policy. This proposal was made in the context of a general deregulation of western economies that had started in the late seventies.

Before attention turned toward electricity, this movement had already affected airlines, transportation and the supply of gas. In all these sectors, regulated market or monopolies had been deemed the most efficient mean of delivering the "products" to the consumers. It was felt that their special characteristics made them unsuitable for trading on free markets. Advocates of deregulation argued that the special characteristics of these products were not insurmountable obstacles and that they could and should be treated like all other commodities. If companies were allowed to compete freely for the provision of electricity, the efficiency gains arising from this competition would ultimately benefit the consumers. In addition, competing companies would probably choose different technologies. It was therefore less likely that the consumers would be saddled with the consequences of unwise investments.

BACKGROUND OF ENERGY MARKETS

For most of the twentieth century, electricity sector remained a natural monopoly business of electric utilities. This means that when consumers wanted to buy electricity, they had no choice but to buy form the only utility that held monopoly in the geographical area where the consumers were located. Though this structure of electric business worked well, however some economists started arguing that this model had run its course and were of the view that the monopoly status of the electric utilities removed the incentive to operate efficiently and encouraged unnecessary investments. These economists suggested that prices would be lower and that the economy as a whole would benefit if the supply of electricity became the object of market discipline rather than monopoly regulation or government policy.

As such, deregulation of electricity from monopoly to competitive structure started in 1980s.

Being convinced with the global practices, in 1992, Pakistan also approved WAPDAs Strategic Plan for the Privatization of the Pakistan Power Sector. This Plan sought to meet three critical goals:

- Enhance capital formation

- Improve efficiency and rationalize prices, and
- Move over time towards full competition by providing the greatest possible role for the private sector through privatization.

Establishment of a Competitive Trading Bilateral Contract Market (CTBCM) in Pakistan was envisaged at that time and a broad roadmap was envisioned in the NTDC Transmission license in 2002. Though, this plan could not be materialized in accordance with those timelines. However, consistent with the expected market development, in 2009 CPPA-G was legally created as a power company to take over the CPPA (of NTDC) and market development functions from NTDC as expected in 2002 NTDC License. The commercial operation of CPPA-G started in mid of 2015 when the transfer of functions was formalized and completed between NTDC and CPPA-G.

ELECTRICITY MARKETS IN OTHER COUNTRIES

Pervaiz: "Come on! Don't teach me theory. I don't think that this idea of electricity market is even remotely practicable or feasible. This cannot be successfully implemented anywhere at all."

Mujahid: "Dear, not only it is practicable but it has been already implemented in many other countries. Let me give you some examples."

In economic terms, electricity (both power and energy) is a commodity capable of being bought, sold, and traded. An electricity market is a system enabling purchases, through bids to buy; sales, through offers to sell; and short-term trades. Bids and offers use supply and demand principles to set the price. Long-term trades are contracts similar to power purchase agreements and generally considered private bi-lateral transactions between counterparties.

Global transformation of the power industry started at the beginning of the 90s, with the restructuring of the power sectors in the UK and Argentina in 1992, although an earlier process had been implemented in Chile about one decade before. In less than 10 years, many countries followed the path, especially in Europe, Latin-America and the US.

In practically all cases this transformation included:

- The unbundling of the generation, transmission and distribution activities.
- The establishment of an independent regulator, in charge of overseeing the development of the sector, determine the end-user tariffs, solve the disputes, issue standards and instructions, etc.
- The creation of a power market, under very different models and scope, allowing the creation of an environment where the competitive tension takes place.

The objectives pursued for such transformation, always included following elements:

- Security of Supply: Assure that there is enough capacity, at all times, to supply the existing and future expected demand;

- Efficiency improvements: Understanding efficiency in its broader sense, both in the short and long run;
- Appropriate energy prices: Provide customers with electricity tariffs at a level which permits the sector sustainability, assuring at the same time they are affordable for the population; and (introduced recently)
- Progressive de-carbonization of the power industry: To achieve the compromises associated with Climate Change.
- A fifth element existed also in several developing countries, although not in all, which was to relief the Treasury (TDS, investments, sovereign guarantees) of the burden imposed by the development of the power industry.

The relative weight put in each of these objectives, led to quite different ways of organizing the power markets, in which, in many cases, ideological conceptions were not absent. Broadly narrating, two, quite different, approaches, were followed for market organization:

- **Competition "for" the market**: In this approach, emphasis is put in the security of supply. Developers compete for obtaining long term contracts for power supply, in an organized way. Once these contracts are obtained, they are not exposed to further competitive pressures. In this kind of market (also known as Single Buyer, or Principal Buyer, models) the purchaser (in many cases a governmental entity) takes the volume risks (and, hence, the efficiency objective is somehow diminished), which is later transferred to the end-user customers. This type of models was often used in developing countries, in which the degree of maturity of the sector is not enough to provide investors with enough certainties about the recovery of their investments;
- **Competition "in" the market**: In these cases, emphasis is put in efficiency. Developers compete in the market for selling their products (electricity), either in the short and long run, without any pre-assurance from the demand side that this product will be purchased (other than the contracts they may freely negotiate). The risk is, partially, transferred from the demand side to the offer side. More mature markets tend to follow this approach.

Needless to mention, many organized markets developed hybrid approaches, taking elements from each of these two "pure" models, intending to catch the advantages of each model minimizing their drawbacks. Also, in many cases, the market evolved from one conceptual approach to the other.

TYPES OF MARKETS

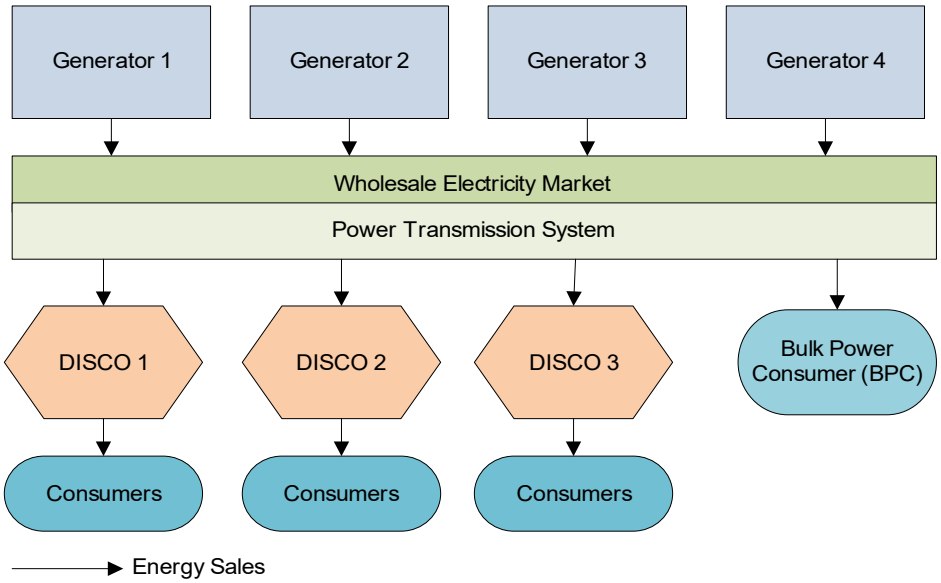
Energy Markets are broadly categorized into (i) Wholesale Markets, and (ii) Retail Markets.

WHOLESALE MARKET

In this type of market, which is shown in the Figure below, no central organization is responsible for the provision of electrical energy. Instead, DISCOs purchase the electrical energy consumed by their customers directly from generating companies. These transactions take place in a wholesale electricity market. The largest consumers are often allowed to purchase electrical energy directly on the wholesale market. This wholesale market can take the form of a pool or of bilateral transactions.

At the wholesale level, the only functions that remain centralized are the operation of the spot market, and the operation of the transmission network. At the retail level, the system remains centralized because each DISCO not only operates the distribution network in its area but also purchases electrical energy on behalf of the consumers located in its service territory.

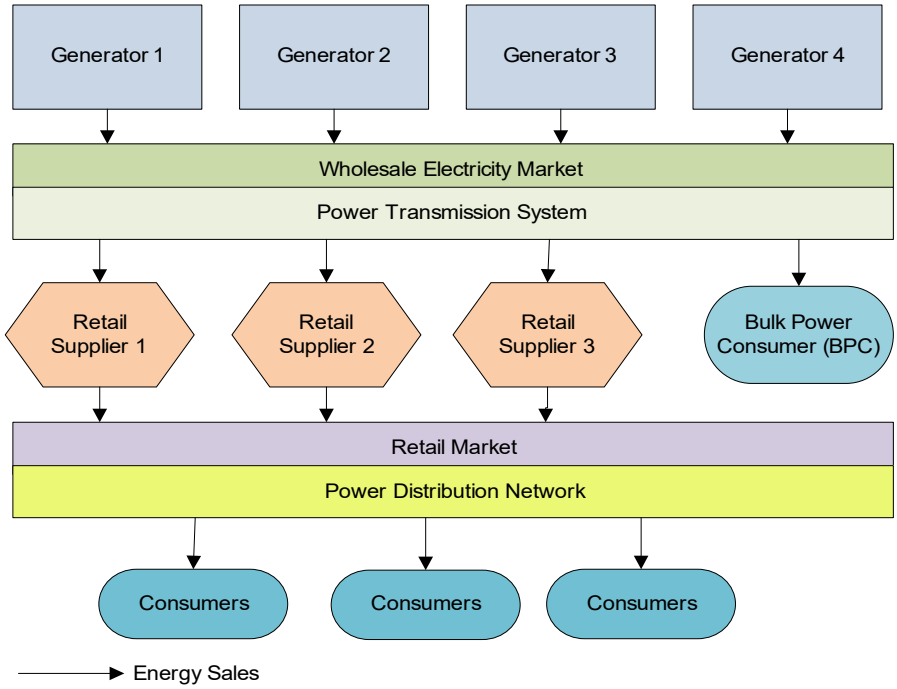
This model creates considerably more competition for the generating companies because the wholesale price is determined by the interplay of supply and demand. On the other hand, the retail price of electrical energy must remain regulated because small consumers cannot choose a competing supplier if they feel that the price is too high.



RETAIL MARKET

The following figure illustrates the ultimate form of competitive electricity market in which all consumers can choose their supplier. Because of the transaction costs, only the largest consumers choose to purchase energy directly on the wholesale market. Most small and medium consumers purchase it from retailers, who in turn buy it in the wholesale market. In this model, the "wires" activities of the distribution companies are normally separated from their retail activities because they no longer have a local monopoly for the supply of electrical energy in the area covered by their network. In this model, the only remaining monopoly functions are thus the provision and operation of the transmission and distribution networks. Once sufficiently competitive markets have been established, the retail price no longer has to be regulated because small consumers can change

retailer when they are offered a better price. From an economics perspective this market is the most satisfactory because energy prices are set through market interactions. Implementing this market, however, requires considerable amounts of metering, communication and data processing. The cost of the transmission and distribution networks is still charged to all their users. This is done on a regulated basis because these networks remain monopolies.



IMPLEMENTING ELECTRICITY MARKET IN PAKISTAN

Danish: "OK so now we have seen that the electricity market is not a new concept and it is here around since many decades. We have also seen that the electricity markets are implemented mostly by developed and developing countries of Europe, South America and North America. It doesn't mean at all that it can be implemented here in Pakistan.

Pervaiz: "Exactly! Thinking about implementing such idea of an electricity market for Pakistan seems like an impossible task. You see, Pakistan is not USA, Australia ,UK or not even Chile or Columbia to implement an Electricity Market. Competition in Pakistani environment, you must be joking."

Also, we have seen so many similar projects been envisioned and initiated but lack of consistent policy and other peculiarities of Pakistan do not let such plans be implemented. Rather we end up wasting time and monetary resources in doing such exercises. As an example, we can see that we have failed to privatize even a single DISCO despite many attempts. Also, I can bet that none of the IPPs would give-up its PPA and enter into such fancy market where there is so much risk related to payment culture."

Danish: "I also fear that with our payment culture, none of the new entrants will be interested to get in the market without sovereign guarantees? Rather if we don't allow long term PPAs (with sovereign guarantees) in near future, I fear we might not be able to procure new capacity and end-up with shortages again? How could an investor enter in such a non-liquid market?"

Mujahid: "Brother, yes we cannot compare Pakistan with USA and UK but shouldn't we compare it with our neighboring country India. India is as young as Pakistan, and they are operating an electricity market since 2008, almost one decade. And the competition will surely attract investors to bring investment in the power sector. That's how all the international markets run. On pure competition! There are no sovereign guarantees provided anywhere but still you can see the power sector keeps flooding with private investment and the energy sector is booming in those countries. He key things that investors look for in a market are transparency, predictability and proper accountability among others. The implementation of the market is not a rocket science. Are you forgetting the decade of reforms, it was the same nation who became the economic leaders in the region. We have the potential and ingredients to do become one of the great nations. It is the power sector's poor performance the biggest threat to Pakistan's economy, we need to team-up and be part of the solution to implement such reforms"

Ali: "Yes we can! But implementing such reforms is only possible through the government's will?

Pervaiz: "You are right Ali. Nothing would happen in Pakistan. Government ever does nothing. All they can do is just talk, talk and talk and no real actions. Tell me, are there any actions taken by Government so far to lead Pakistan in the way of developing and electricity market for itself?"

Mujahid: "You always keep blaming others without having any real facts and figures my friends. Your information is outdated Pervaiz. Government is really very serious this time. Following concrete steps are already taken by the Government for establishing a competitive power market in Pakistan"

GROUND BUILDING FOR COMPETITIVE POWER MARKET IN PAKISTAN

Economic Coordination Committee Decision: In 2015, the ECC of the Pakistan Cabinet has resolved a decision to transform the electricity market of Pakistan from single-buyer model to competitive trading bilateral contracts market (CTBCM). Consequently, CPPA-G was directed by ECC that within two years of the notification of Market Rules and associated operationalization of CPPA-G, CPPA-G shall prepare a comprehensive plan for transition of the power market to a CTBCM in consultation with stakeholders and subsequently approved by NEPRA.

Power Market Operator Rules: Subsequently, NEPRA issued the Power Market Operator Rules 2015, whereby CPPA-G was directed to play a central role in power market transition, in-line with the ECC's decision.

NEPRA Act Amendment: NEPRA Act has been enacted, NEPRA Act 1997 (as amended vide 2018 Act) fulfilling the legal and regulatory framework for operation of CTBCM. It now provides

more solid legal basis for establishing CTBCM. Now CPPA as the Market Operator has been tasked to organize and administer trading in wholesale market, while NEPRA is tasked to promote competition in wholesale and retail market. Both the entities are working very closely to establish the CTBCM in their own roles and capacities.

CTBCM Model by CPPA: Based on this given mandate by ECC, CPPA-G started market model development efforts by forming an internal team and then hiring internationally recognized market development consultants. A strategy was devised for the preparation of the future market model and later the transition plan (CTBCM Plan). The plan outlines the actions that ought to be taken for the transition to a fully competitive wholesale electric power market. The process towards the creation of CTBCM has gained momentum and is expected to start commercial operation by 2020-21. The model has been submitted to NEPRA for approval. Once approved by the Regulator, all entities of Power Sector will have to play an important role to implement the CTBCM Plan.

Training and Capacity Building by CPPA: Envisioning the importance of role of all stake holders, and as part of this transition effort, CPPA-G is continuously working on the capacity building of the market participants so that the participants and service providers completely understand the CTBCM Model. As such, CPPA-G has so far arranged a number of training sessions of all market participants for enhancing knowledge base. Now CPPA has initatiated a comprehensive capacity building program "Electricity Market Professional (EMP) Program" followed by the creation of an Electricity Market Team (EMT) with membership across the sector, for smooth launch, implementation and operation of CTBCM.

Regulatory Review by NEPRA: The CTBCM Model and Plan is currently under regulatory review by NEPRA. NEPRA has uploaded the CTBCM Model and Plan on its website for stakeholders' review and comments. Once approved, the detailed designing of the proposed market model will began immediately followed by its full-fledged implementation.

MOVING FORWARD

Ali: "Keeping in view these actions that you just mentioned, the government really seems serious this time. They are not taking it light, and indeed pushing very hard for this initiative."

Danish: "So even if the Government is serious, they cannot implement a market in isolation without the help of other entities of Power Sector. You see, the electricity market is not something that can be done in isolation, other power sector organizations must play their role in the effective implementation of the same. The market will certainly have a positive impact on the electric utilities, system operator, transmission network operator etc. and the way they run their business."

Pervaiz: "Yes, these institutions love to operate in silos. They just want to remain in their shells, cut-off from the outside world. They will never be motivated to work as a team. They will never strive hard enough to achieve that one goal on a united platform."

Mujahid: "Not true dear, not true at all. There is always a ray of hope. Most of the people in the sector are highly dedicated, honest towards their work, compassionate about the people and their problems. They have a spark in them to bring a positive change in the way things are being done. They are the true professionals."

Danish: "Right! But individuals, no matter how positive and motivated, cannot achieve such a versatile target of forming a power market in the country, without synergizing their efforts jointly. It is a team job, an activity to be done by a group of highly competitive and professional people from the power sector. Is there any plan for teaming up these professionals? Any platform through which they can work jointly towards the implementation of an electricity market?"

Mujahid: "An "Electricity Market Team" has been formed to achieve this goal. This team includes selected members of the power sector including MoE, NEPRA, NTDC, NPCC, KE and all the ten DISCOs. This team is being trained by international trainers and experts from the global market operators. The training is being offered through an internationally recognized university of Pakistan in a highly professional environment."

Ali: "Electricity Market Team, seems interesting though. What are the roles this team is supposed to play in the implementation of power market?"

Mujahid: "Electricity Market Team has a very critical role to play. They are the Change Agents for this initiative. They will form a strong coalition amongst themselves and other members of the team. These individuals will go back to their organizations and will educate their colleagues, seniors and other staff members about the competitive market and how to be ready to cope with this change. They will not only be involved in making people around them aware about the anticipated change, but will also involve deeply in building processes and associated technology. In this team, everyone will be a Leader."

Danish: "The idea of Electricity Market Team seems neat. But what's in it for them, I mean, for the members of that team? Wouldn't it be an extra burden for them?"

Pervaiz: "You will form an Electricity Market Team. But don't expect their contribution in anything. They will go back and will forget everything the next day."

Mujahid: "Be a little optimistic please! The power sector has much expectation from this team. And the benefits the team will gain in return are huge. It will be a long-term investment for their career. The electricity market is a totally new concept in Pakistan. We don't have any local expertise available here. Therefore, it's a big opportunity to learn and move forward. The team who will be the part of this initiative will be the Pioneers of the largest change in the power sector of Pakistan. They may have the opportunities of global exposure of the power markets through exchange programs. They will become specialists of power markets in the long run in the entirely new subject with high future demand. Therefore, you can expect how much it will be profitable for them in terms of attaining knowledge and exposure, and even for their career advancement within their own organizations. Eventually, when the market is operational, each organization of the power sector

would be required to develop a specific section related to electricity market. These selected professionals will have the highest chances to lead that section or department within their own institute. The possibilities are endless. So the more they will involve, the more they will gain. It's an investment with a very high return."

Pervaiz: "So you get a team, now what. You know power sector, how tough it is to work there with all the barriers, red-tapes and lack of cooperation by the higher-ups. The implementation will not be a piece of cake."

Mujahid: "Well, no pain no gain. Definitely, the environment in the power sector is tough. But not tough as a soldier fighting at the border and sacrificing his life leaving behind his parents, wife and kids. Don't forget the farmer working in scorching heat in the sun from dawn to dusk to earn hardly a meager amount of money and in the end exploited by the feudal landlord. What about a laborer working all day long 7 days a week, 365 days a year, without any facilities, house rent, medical, conveyance allowance, to hardly earn his living. By grace of God, we are far better off and we must put in the maximum effort that we can."

Pervaiz: "Yawwwwn!"

Ali: "You are right. Nothing is impossible but with some motivation, dedication, hard work and belief in one's self. All one has to do is put his or her goal over their ego, realize that achieving the goal not comes in charity and has to be earned from sacrifices. One must not put blame or responsibility on others shoulders that if they are not doing their work, why should I do. One must play his or her own part and put the maximum contribution towards achievement of the target. Remember, when someone asked the pigeon that dropping small drops of water from your beak will not make any impact on the Nimrod's fire for Holy Prophet (P.B.U.H). It replied that I know but I am just making my own contribution in this cause."

Danish: "I agree that competitive market will not provide solution to all the issues that we have discussed. However, it can bring a major positive impact on the sector. Just to mention few things, the competitive market will bring efficiency, generation adequacy, remove the burden of sovereign guarantees, put payment pressure on the DISCOs and will provide an environment for the industry to procure electricity for themselves on their own terms and conditions. All in all the payment culture will be improved. All of these will further contribute to resolve the problem of Circular Debt as well."

"It is important to note that markets can't be established overnight. It is a gradual process and requires continuous efforts for capacity building of all stakeholders in terms of people, process and technology. Process and technology can be built faster but people require time to achieve a certain level of competency and to adopt new practices. So with the initiatives of the government and

power sector entities, let's make it possible by playing our role to implement the competitive market to solve some of the major issues of the power sector.[7]"

Mujahid: "I have a firm belief that Electricity Market Team, with their synergized efforts, will create the competitive market that will help improve the health of power sector. Our role is to make best use of our professional time in the best interest of the sector and leave the results to the Creator."

Ali: "I agree!"

Pervaiz: "Just continue living in your fancy world. No one is stopping you to dream big with open eyes. Nothing is going to change in the end."

Pervaiz looked at Mujahid and others with a sarcastic smile on his face, took the last sip of the tea and stood up for leaving the discussion room, while others continued the discussion. Danish his old school buddy, commented Pervaiz that I still remember from good school days that while doing the homework when it came to solve hard algebraic problems, you always left for playing football and that's was one the reasons that we started calling you Sheeda! You know there are already many "Sheeda's in Power Sector" not becoming part of the solution and I don't want you to have that label again, come and join us.

Pervaiz stood there for some time indecisively…

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[7] Please refer to Appendix-3 for the actions required to deal with the Change Management and the associated pitfalls

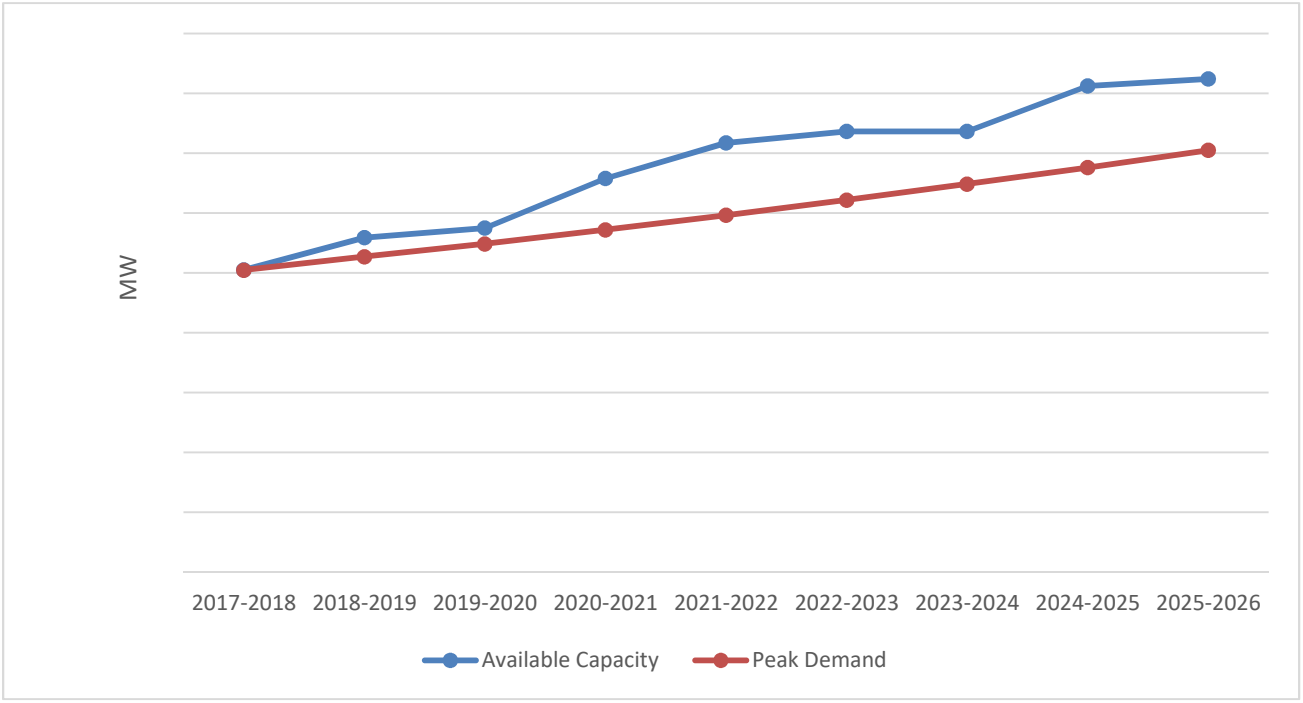
APPENDIX-1: Expansion Planning in Power Sector

Electricity is one of the greatest technological innovations of mankind. It has now become a part of our daily life and one cannot think of a world without electricity. Electricity demand in the world has been growing since its innovation and trends of electricity consumption are very diverse. Further, constructing a generation facility and its operation has a huge economic effect. As such, electric utilities are always working on techniques to optimize the capex and opex while meeting the growing electricity demand in most reliable manner.

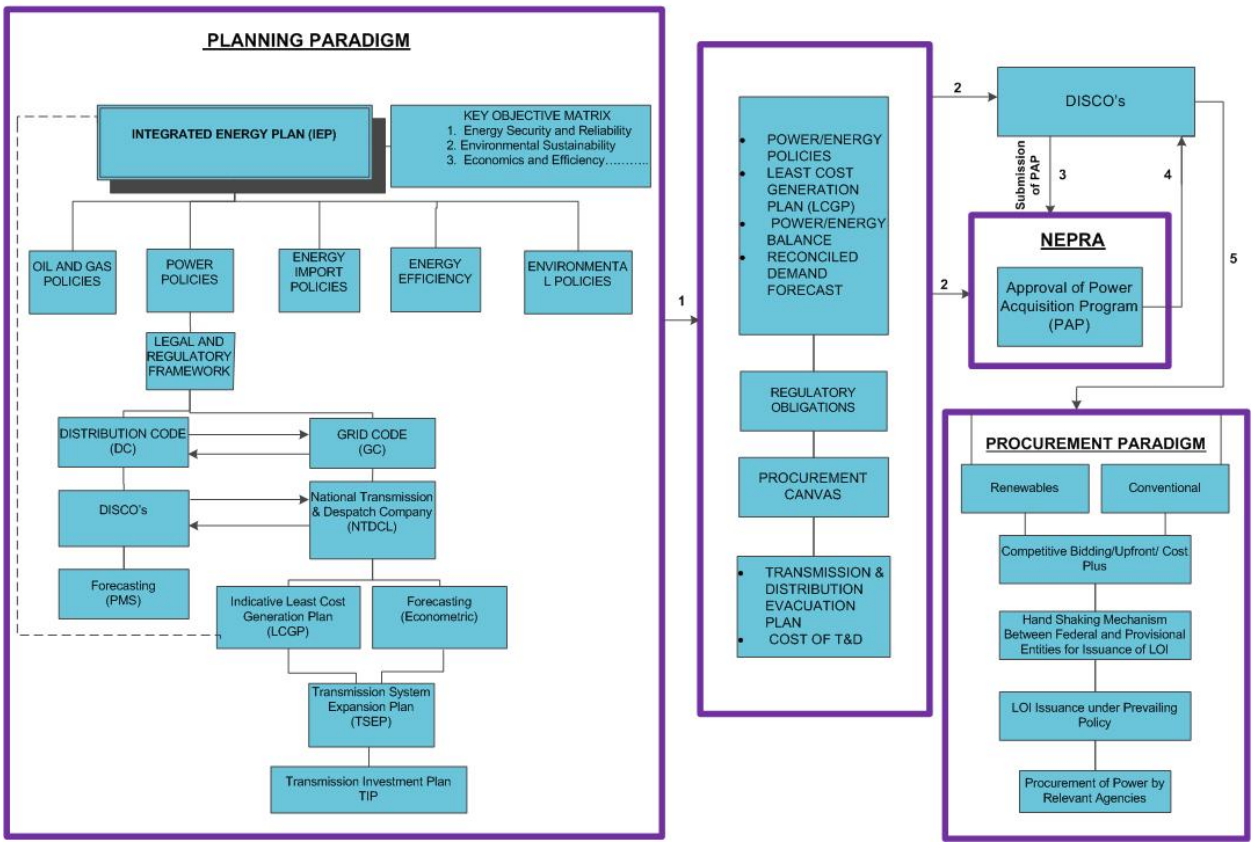
The gestation period for power plants, which are set up to meet consumer demand, typically varies between 4 to 12 years in the case of thermal and hydro plants and 3 to 5 years for gas-based plants. As a result, utilities must forecast demand for the long run (10 to 20 years), make plans to construct facilities and begin development well before the indices of forecast growth reverse or slowdown.

Because of huge socio-economic impacts, accurate and realistic electricity demand projection has attained greatest ever importance in overall energy planning. In the present era, an underestimate could lead to under capacity, which would result in poor quality of service including localized brownouts, or even blackouts. An overestimate, on the other hand; could lead to the authorization of a plant that may not be needed for several years. Many utilities do not earn enough to be able to cover such a cost without offsetting revenues. The socio-economic costs of over or under contracting electric power are typically so high that they can lead to huge financial losses and bankruptcy in the extreme case.

Following is a graph illustrating the projected future scenario of the demand and supply in Pakistan:



Demand Vs. Supply Projection



Planning Paradigm

APPENDIX-2: Differences between Electricity and a Commodity

#	Characteristics	Electricity	Commodity (e.g. Red Chili)
1	**No Storage/ Inventory**	Electricity cannot be stored like other commodities. Currently, there are technologies that are under research for the storage of electricity. However, it is still not economical to store large quantities of electrical energy.	Other commodities are storable. For example, red chili can be stored easily and can be used on need basis.
2	**Consumption is linked with real time production**	Because the Electrical Energy is not a storable commodity, it must be produced instantaneously when demanded, e.g. when we switch on light, additional generation must kick-in spontaneously.	This is not the case with red chili, e.g. red chili can be stored and consumed whenever needed.
3	**System Operator's Role**	In electric power system, the System Operator keeps the equation "Energy Produced = Energy Demanded" in balance, on second by second basis, otherwise the whole system can collapse. The System Operator also clears the generators for dispatch. The Physical Markets have very tight connection with System Operator who is responsible for the dispatch of electricity on real time basis.	There is no such need for central balancing on a real-time basis like in an electricity's market. Chilis can be stored for use later-on. Even in-case of imbalances between demand and supply, the whole market place does not collapse, as in electricity market
4	**Price Elasticity of Demand**	The short-run price elasticity to demand is low, therefore, balancing supply and demand requires productions facilities to follow large variations in demand. In-order to follow this demand, different generators are run resulting in the changing of marginal cost of electricity to vary throughout the day.	Owing to the availability of the storage facilities, the production does not have to follow the variations in demand on short term basis and thus, the short-run-marginal costs do not change as in electricity
5	**Can't Direct Electricity from a Particular Seller to a Buyer**	Energy produced by one generator can't be directed towards one specific consumer in Grid. The electricity follows the least resistant path. Therefore, the energy generated is pooled and is transferred to consumers following laws of physics.	In case of chili's market, any consumer can be supplied the product from any producer. There is an infrastructure of transportation available which can be used freely between the suppliers and demand

6	**Deviations between Contracted Amounts and Actual Consumptions**	As consumers are connected to electrical grid and one can't limit their consumption in real-time, therefore consumers continue to draw electrical energy as per their instantaneous need e.g. even it is more than contracted amount. Therefore, there will always be differences between contracted and consumed quantities. In all markets around the globe these deviations settlement will require a mechanism to settle through Market Operator	The chili's market does not have any such deviations. The buyer purchases, what is contracted.
7	**Centrally & Self Dispatch Markets**	In wholesale electricity markets there are two types of markets, Centrally dispatched and Self-dispatched. Centrally dispatch market (like Pakistan) requires (non-embedded) generators to be dispatched based on a Security Constrained Economic Dispatch (SCED) by System Operator centrally. In a Self-dispatch market the generators are self-dispatched based on contracts and this also requires System Operator to see the constraints allowing these dispatches. In both cases MO and SO are integral part market.	These concepts are alien for Chilli market
8	**Transmission Network (the Market-place)**	The electrical energy between the buyers and sellers is transported over wires (transmission and distribution networks). The transmission and distribution networks, because of extensive constraints, imposes restrictions on dispatch that would limit/distort free trading. The System Operator also clears the generators for dispatch based on such restrictions & consequently impacts the contracted quantities. Therefore, market designs for trading has to account for all such factors.	There is no such physical network other than transportation infrastructure that is required to deliver the chilies. The roads are accessible to everyone and can be used for the purpose of delivery of the product at any time and thus, free trading is possible.
9	**Electricity Regulator's Role**	The electricity regulator approves the capital investments in transmission and distribution lines expansions, approves the operational costs, provides electricity market rules, monitors markets based on those rules, issues technical codes for operation of grid, commercial code for market settlement, etc.	These concepts are alien for commodities market's regulators

APPENDIX-3: Change Management Matrix

Stage	Guidance on Actions Needed	Possible Pitfalls
Establish a sense of urgency	• Examine markets and competitive realities for potential crises and untapped opportunities • Convince at least 75% of your managers that the status quo is more dangerous than the unknown	• Undermining the difficulty of driving people from their comfort zones • Becoming paralyzed by risks
Form a powerful guiding coalition	• Assemble a group with shared commitment and enough power to lead the change effort • Encourage them to work as a team outside of normal hierarchy	• No prior experience in teamwork at the top • Relegating team leadership to an HR, quality or strategic-planning executive rather than a senior line manager
Create a vision	• Create the vision to direct the change effort • Develop strategies for realizing that vision	• Presenting a vision that is too complicated or vague to be communicated in five minutes
Communicate the vision	• Use every vehicle possible to communicate the new vision and strategies for achieving it • Teach new behaviors by examples of the guiding coalition	• Under communicating the vision • Behaving in the ways unethical to the vision
Empower others to act on the vision	• Removes or alter systems and structures undermining the vision • Encourage risk taking and non-traditional ideas, activities and actions	• Failing to remove powerful individuals who resist the change effort •
Plan for and create short-term wins	• Define and engineer visible performance improvements • Recognize and award employees contributing to those improvements	• Leaving short-term successes up to chance • Failing to score successes early enough
Consolidate improvements and produce more change	• Use increased credibility from early wins to change systems, structures and policies undermining the vision • Hire, promote and develop employees who can implement the vision • Reinvigorate the change project with new projects and change agents	• Declaring victory so soon-with the first performance improvement • Allowing resistors to convince troops that that the war has been won
Institutionalize new approaches	• Articulate connections between new behaviors and corporate success • Create leadership development and succession plans consistent with the new approach	• Not creating new social norms and shared values consistent with changes • Promoting people into leadership positions who personify the new approach