

Electricity Power Market:

Competitive and Non-competitive
Markets

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Competition and Markets

- Competition is a term that, economically, is related to the structure of a market. Market structure refers to the **number of firms** involved in supplying a market and the **relationships among those firms**.



Competition and Markets

- Markets differ in two important dimensions:
 - the number of sellers
 - Product differentiation
- There are two extremes
 - Perfect Competition
 - Monopoly



Competitive Markets

- A competitive market generally refers to one in which there are many buyers and sellers
 - Each firm is a price taker
 - Homogeneous Goods
 - Perfect Information
 - No barriers to entry and exit
 - equal access to resources
 - No externalities in production and consumption



Monopoly

- In economics, a monopoly exists when a specific individual or an enterprise has sufficient control over a particular product or service to determine significantly the terms on which other individuals shall have access to it. Each firm is a price taker
 - Single Seller
 - Market Power: the price of the product is set by the firm



Monopoly: Determinants

- Economic Barriers to entry
 - Economies of scale
 - Capital requirements
 - Technological Superiority
 - No Substitute Goods
 - Control of Natural Resources
- Legal Barriers



Monopoly and Market Power

- Natural monopoly : Self destruction of competition
- a natural monopoly if it is able to serve the entire market demand at a lower cost than any combination of two or more smaller, more specialized firms
- Possible causes:
 - High start up costs



Electricity Power Market I

- What makes the Electricity Market special?
- In economic terms, electricity (both power and energy) is a commodity capable of being bought, sold and traded. An electricity market is a system for effecting purchases, through bids to buy; sales, through offers to sell; and short-term trades, generally in the form of financial or obligation swaps
- There are different functions that make up electricity delivered to the consumer. Some of these functions can be supplied competitively, whereas others are more difficult to liberalise



Electricity Power Market II

- Commodity: Energy
 - a. Electricity: Which cannot be economically stored. This means that Generation (and transmission) capacity needed to cope with peak demand is partly unused in periods of lower demand
 - b. Generating technologies are also characterised by their relatively high capital intensity, and technical and economic longevity, including long lead and construction times



Electricity Power Market III

- “Market”: Transmission and Distribution
 - a. **Transmission** refers to transportation over an interconnected network, which is shared by all end users, whereas
 - b. **Distribution** refers to transportation from the interconnected network to a specific group of end users
- Distribution lines are often considered a natural monopoly since duplication of distribution lines would be inefficient due to the large fixed costs of the investment.



Electricity Power Market IV

- System Operation: Refers to the co-ordination of transportation services to ensure that the system is constantly in state of static electrical equilibrium. In particular, equilibrium requires that **power supplied equals power demanded** at each node of the network.
- Regardless of the market framework (monopoly or competitive), system operation always remains a monopoly.
- Interconnection and its associated benefits of increased reliability and lower costs are only possible under a centralised system operation.
- There is a need however for regulation



Electricity Power Market V

- End-user supply refers to the delivery of electricity to end users. It includes the procurement of energy and transportation services and the metering and billing of consumption.



Need for Reform

- a) Attract and encourage private sector participation
- b) Attract capital to fund the sector and
- c) Ensure a level playing ground for all investors.



Restructuring Power Markets

Why Restructuring and Competition in Electricity Markets?

- Electricity sectors were vertically integrated geographic monopolies that were either state-owned or privately-owned and subject to price and entry regulation as natural monopolies. The primary components of electricity supply—generation, transmission, distribution, and retail supply—were integrated within individual electric utilities
- In many developing countries, the sectors were characterized by low labour productivity, poor service quality, high system losses, inadequate investment in power supply facilities, unavailability of service to large portions of the population, and prices that were too low to cover costs and support new investment



Restructuring Power Markets II

- Regulators and policy makers implement competition in the utility markets by
- removing legal and technical barriers to entry,
- monitoring anticompetitive conduct,
- restructuring the sector, and
- providing access to essential facilities



Restructuring Power Markets III

- Restructuring (Unbundling) the industry generally involves:
 - a) separating the potentially competitive portions of the sector from the non-competitive or natural monopoly portions
 - b) providing rivals with access to the non-competitive portions, which should be considered essential facilities.



Restructuring Power Markets IV: Unbundling

- With structural separation, the competitive and non-competitive components of the sector are provided by separate entities
- With functional separation the competitive components and non-competitive components are provided by the same operator, but the personnel and operations are separated
- Accounting separation involves keeping separate accounts for generation and transmission activities within the same vertically integrated entity.



Role of the Regulator

- Ensuring a level playing ground for all participants
- Involvement in setting of tariffs, access rates etc
- Setting of Market rules and determination of appropriate market structure



Electricity Markets: Wholesale Markets

- A wholesale electricity market exists when competing generators offer their electricity output to retailers. The retailers then re-price the electricity and take it to market
- Examples include:
- Nordpool, England and Wales Pool,
- One format involves:
 - All generating companies being “obliged” to supply electricity to a pool: a centralised wholesale market
Electricity buyers pay the pool selling price and then reprice for their buyers
 - It can also be a voluntary market



Electricity Markets: Spot Markets

- Spot Market: The physical nature of electricity does not allow for a true electricity spot market—a market for immediate electricity delivery
- There are also risks involved
- In reality pricing is done “ex ante” by an auction that tries to price electricity in the future
- It can also be done “ex post” based on actual supply and demand
- Benefits from improved technology



Benefits of Reform

- Increased economic efficiency gained by minimising the cost of electricity supply and ensuring that electricity prices are in line with costs (gain of private motivation)
 - Lower prices resulting from competition
 - Lower prices resulting from increased electricity trade
 - Savings in investment costs
 - Higher labour productivity
 - Development of new energy services



Costs of Reform

- Increase costs due to added regulatory costs and functions in maintaining the grid
- Increased transaction costs due to “middlemen”

