Regulatory Reform in Power Market

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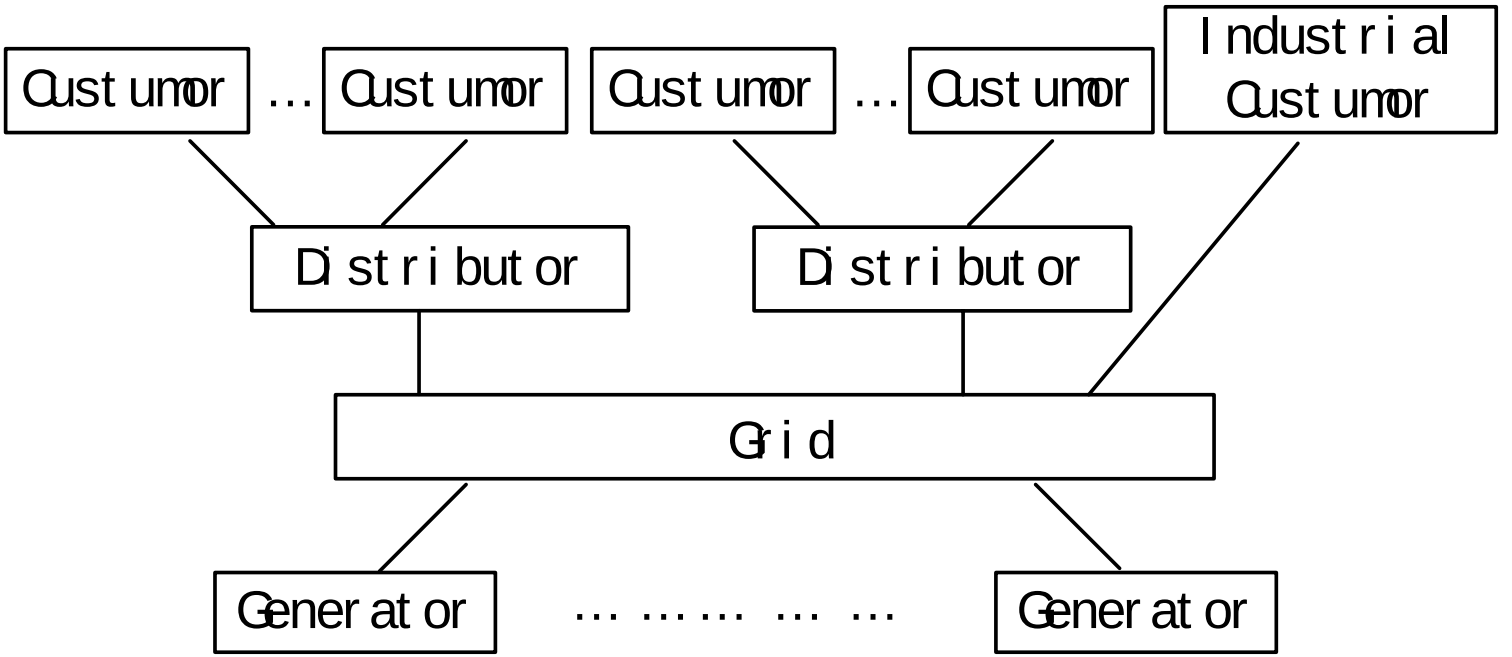
Structure of Power Market



Characteristics of Power Market

Electricity demand and supply

Electricity is a product that is generally nonstorable

Demand fluctuates by time of day and year, as the weather varies, and randomly

Equilibrium between supply and demand must be maintained continuously and throughout the system

Characteristics of Power Market

Electricity generation

Capital intensive and sunk investment costs and capital intensity varies between energy sources.

Increasing returns at low levels of production and approximately constant returns otherwise. Very small generation units are inefficient.

Minimum efficient scale for fossil-fuel generation is around 400 megavatts (MW) capacity

Characteristics of Power Market

Electricity transmission

Capital intensive and sunk costs

Natural monopoly

Electricity is allocated by nature according to physical laws: essentially following the path of least resistance

Characteristics of Power Market

Electricity distribution

Regional distribution companies reduce voltages by transformers to levels appropriate for industrial and domestic usage.

Capital intensity, sunk costs, and natural monopoly cost conditions in any given area: duplication of wires would be inefficient

Why power market is regulated?

In long time, infrastructure industry, such as electricity, telecommunication and natural gas, is considered as natural monopoly.

Natural monopoly is a kind of market failure, so government should regulate these industries

Natural monopoly

A industry with large fixed cost and small marginal cost is natural monopoly.

It's minimum efficient scale (MES) that decides whether a industry is monopoly or competitive. If minimum efficient scale is much small relative to market scale, the industry is competitive

Natural monopoly

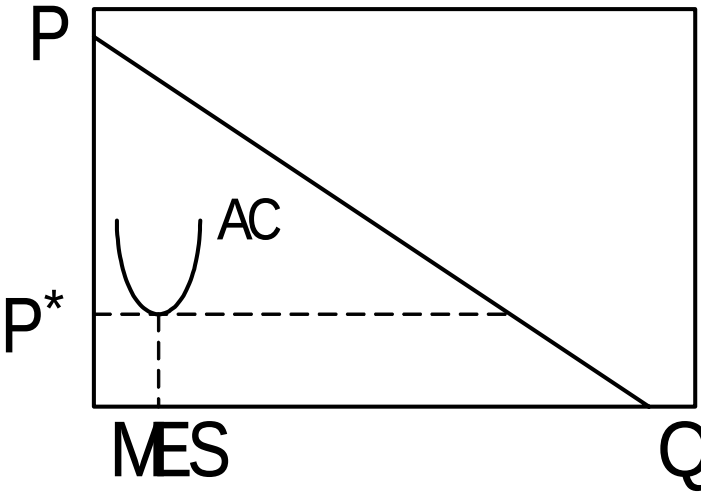


Fig. A

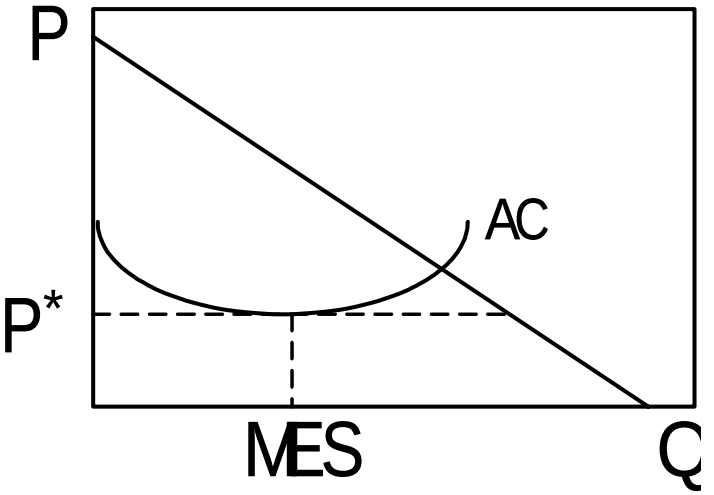


Fig. B

The incentive of regulatory reform

Rethink about natural monopoly condition in power market

Only transmission and distribution are natural monopoly, and generation and supply is competitive. The minimum efficient scale of generation is 400 MW for fossil-fuel and 800 MW for nuclear, which is small relative to the scale of generation market

The incentive of regulatory reform

The effect of regulation

According to the analysis of power prices before and after regulation in American power market, regulation to power market had no obvious effect and price didn't decrease as expected

Reform of power market in the world

Chile 1986

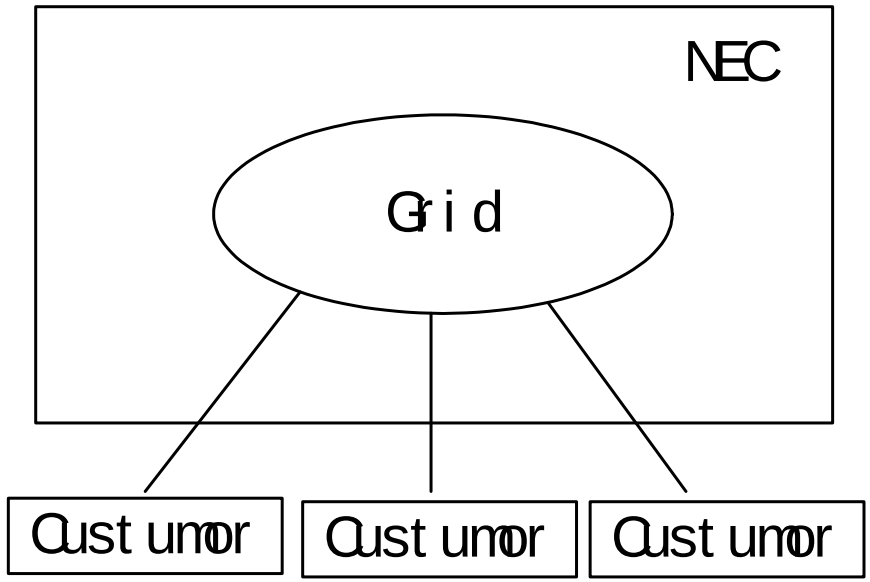
Britain 1990

American 1992

Japan 1993

Case study: power system reform in China

Before reform, generation, transmission and distribution are vertically integrated by National Electricity Company

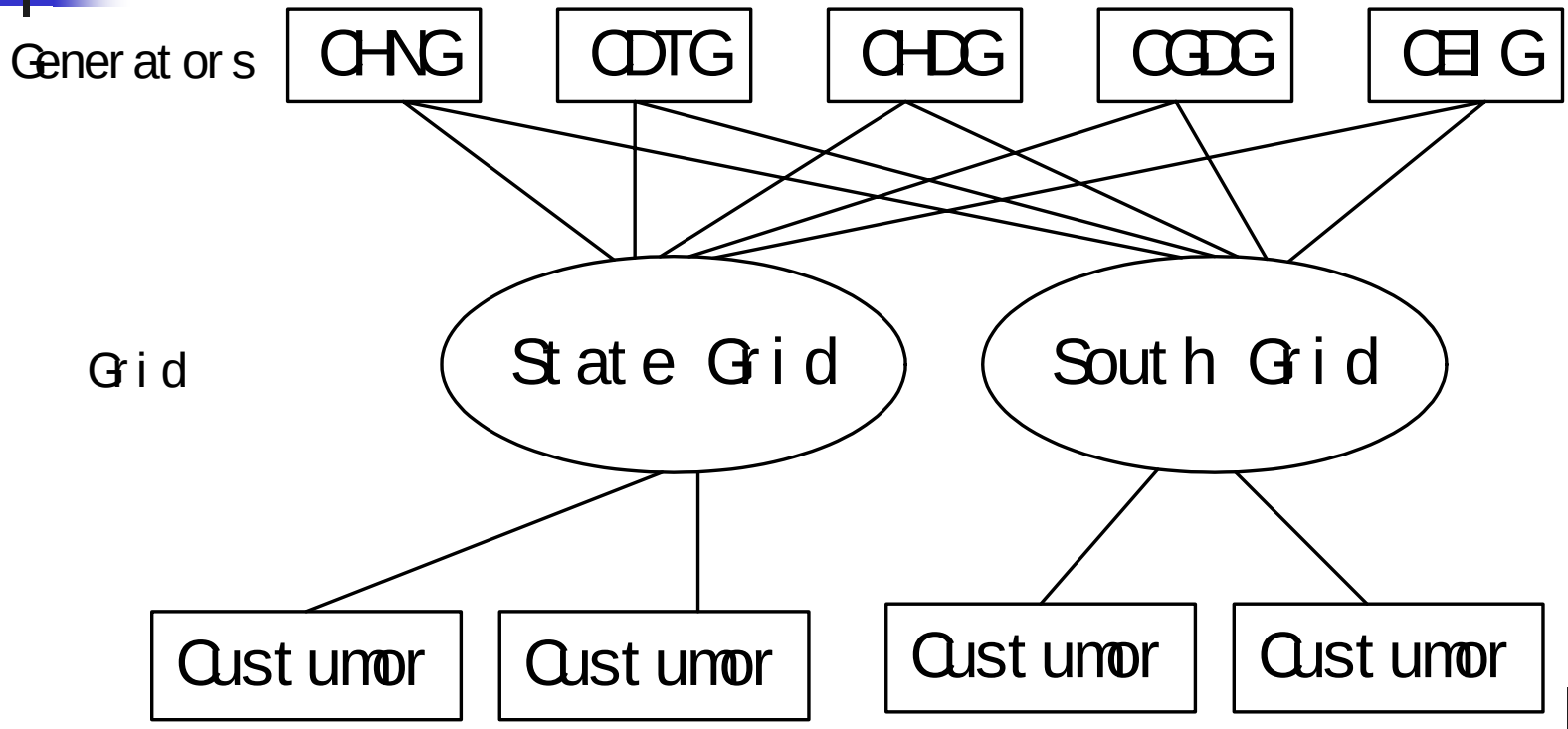


Case study: power system reform in China

The first phase is vertical separation between generation and transmission.

The electricity assets owned by National Electricity Company are divided into two parts: generation and grid. Two new grid companies take over the transmission and distribution activities of the National Electricity Company, and its generation activities are divided between five generation plants at the same scale

Case study: power system reform in China



The issue in generation investment

It is forecasted that electricity demand will increased greatly resulted from rapid increase of Chinese economy. Shortage of electricity will make great loss.

Incentive institute is needed for generation investment in China.


Thanks!