# The Regulatory Assistance Project

**Comments at the International Symposium on Restructuring and Regulation of China's Electric Industry, hosted by the State Council Office for Restructuring Economic Systems (SCORES)**

**Regulation or Competition:**
**The California Experience Shows Both Are Needed**

The Regulatory Assistance Project
China Sustainable Energy Program

## Introduction

Does successful restructuring of the power sector need regulation or competition? The answer is both. Indeed, it is impossible to achieve the benefits of competition without effective regulation. This paper focuses on the critically important role of regulation in restructuring, lessons learned from the California crisis, and a few critical aspects of the creation and operation of a regulatory agency.

The role of regulation in a competitive generation sector is mainly to assure the efficient and fair operation of the market and that the benefits of the market are seen by consumers. To fulfill this role, the regulatory agency must be established very early in the restructuring process; it must have sufficient scope of authority and responsibility to oversee the market structure, design, rules, and operation; and it must have the authority to correct problems quickly.

The transmission and distribution parts of the business will remain monopoly services for the foreseeable future. Here, the regulatory role is to protect consumers from monopoly behavior, assure fair and non-discriminatory pricing and access, and assure that needed capital can be attracted at reasonable costs.

China's progress and success in restructuring will improve if the basic regulatory structures needed for the future are put in place now. There is no single right or wrong way to restructure the power sector. The best approach for China will be the approach that best meets its goals and constraints. Once agreement is reached on the basic goals and constraints, a power sector regulatory agency can provide the necessary expertise, information, and analysis to guide the restructuring process to a speedy and successful conclusion.

## Know China's Goals and Constraints

The most important step in the successful restructuring of China's power sector is having a very clear understanding of the goals China seeks to achieve through restructuring as well as a

realistic assessment of the political and practical constraints imposed on restructuring. We have yet to see a comprehensive and prioritized statement of China's goals and constraints. Preparing a document that clearly states China's goals and constraints should be a top priority for SCORES.

Lower Costs

A full list of goals and constraints does not exist, but some goals are known. For example, one goal is to reduce the cost of electricity. Based on our knowledge of China's existing power sector, there are definitely large costs savings that can be achieved for existing and new power plants though increased use of competitive market mechanisms. As explained by the World Bank, many of the easiest and quickest savings can be achieved through restructuring existing power contracts and rationalizing power plant dispatch.

Lower Prices

A second related goal is lower electricity prices. Here we can begin to see the vital role of regulation. Almost any approach to restructuring and increased use of markets will lower costs, but lower costs can result in higher profits for generators or lower prices for consumers, or both. Lower costs will only produce lower consumer prices if 1) the transition for existing plants is well designed and 2) the restructured power sector does not have market power problems. Satisfying these conditions means China needs to establish a strong central regulatory body with sufficient authority and resources to solve the very serious market power problems that may be created by the new competitive generation market.

The California experience, as well as experience in many other countries, shows that market power in competitive generation markets is very serious. Even concentration of generation far below the level of 20% or 25% can produce serious market power problems, preventing the lower cost produced by competition from translating into lower prices for consumers.

Economic Development of Western China

China has other goals as well which relate to the restructured power industry. For example, economic development in Western China is a high priority goal. Western China is blessed with large amounts of renewable resources including hydro and wind, as well as clean burning natural gas. Meeting these economic development goals means restructuring the power sector in ways that assure the renewable and clean resources are, at a minimum, not disadvantaged and, preferably, are advantaged.

Environmental Improvement

Environmental improvement is also high on China's list of priorities. Increased use of natural gas for power generation is one option being pursued to reduce air pollution emissions. Plans to install more than 10,000 MW of flue gas de-sulphurization is another goal being pursued. The environmental improvement sought to be achieved by increased use of natural gas

and flue gas de-sulphurization can easily be undermined through a lack of careful design of the competitive generation markets. In all competitive generation markets, plants are dispatched based on bid prices. Natural gas and coal fired units with FGD generally have higher operating costs, and as a result, unless special care is taken, these kinds of plants will not be dispatched even if they are built. If they are not dispatched, the desired environmental benefits will not be achieved.

Attract Investment

A fifth goal may be attracting increased investment in transmission and distribution. Currently China's transmission and distribution system suffers from under-investment. Ensuring increased investment in transmission and distribution also requires the creation of a sound regulatory structure that can ensure consumers are treated fairly and transmission and distribution companies are capable of recovering costs and attracting new investment.

Other Goals

The discussion above shows how important it is to have a clear and prioritized understanding of China's goals. Knowing the goals will make the restructuring decisions easier and more successful.

**Constraints**

Clearly understanding the practical and political constraints is even more important than understanding the goals.

Avoid Price Increases

What are the practical and political consequences if restructuring the power sector results in price increases? Most countries believe that if restructuring results in price increases to consumers, the public and political reactions will cause the benefits of restructuring to be lost. Thus, many countries and many states have required that price reductions or price freezes be part of a restructuring law. If this is one of China's constraints, it must be clearly stated and understood at the outset. If existing consumer prices must be adjusted, it is important that any necessary changes be made well before restructuring begins.

Avoid Tax Revenue Shifts

Another common constraint is that local and state or provincial government tax revenues should not change abruptly. If this is a constraint in China, restructuring will have to be designed to assure a continued level of tax and other revenues without distorting the competitive generation market. Many states and countries have addressed this issue.

**California Crisis - Lessons for Regulation**

The California crisis provides a useful example of what can happen if goals and

constraints are not clear and if the regulatory agency does not have the authority to fix problems. We begin with a description of the cause of the California crisis.

## The Causes of the Crisis

The causes of the California energy crisis are widely misunderstood, and many of the most important lessons have not been learned. Four main factors contributed to the California crisis:

1. A shortage of supply from the Pacific Northwest's vast hydroelectric system due to drought conditions,
2. Rapid increases in the price of natural gas,
3. The exercise of market power by generating companies, and
4. A market structure that lacked a demand response, that is, the ability of purchasers and consumers to respond to increasing high wholesale prices with lower demand.

These four factors explain most of the reason spot electricity prices increased dramatically in California. In addition, under California's market structure practically all electricity was traded or priced at spot market prices. This made the problem very wide spread.

## Common Misunderstandings

There are many inaccurate impressions of the cause of California's crisis. The four most common errors are:

**1.** **Retail rate freeze.** The retail rate freeze was not a cause of the crisis. First, the price freeze was not imposed on unwilling utilities. Rather, it was part of a complex negotiated restructuring plan that included give and take on all sides. Without full utility support, the California restructuring law would not have passed the California legislature on a unanimous vote. It was a deal that went well for more than two years and then turned very bad. The utilities were free to insist that their exposure to certain risks be limited; for whatever reasons they did not do so.

Second, eliminating the price freeze might have helped the financial health of the utilities, but it would not have addressed the underlying problems. If wholesale prices were passed onto consumers immediately, the financial problem for the local distribution company may have been solved, but the public and political problems would have been at least as bad as they are today. Any developing (or developed) country that faces a rapid run-up in fuel prices and the exercise of market power on the scale seen in California will have a crisis with or without a rate freeze.

**2.** **New plant construction.** There have been very few new generation plants constructed to serve California over the past eight years, but the licensing issues are not the problem. Low energy prices for the first two and a half years and uncertain market rules meant there were no significant proposals to build power plants. During the past 10 years,

California regulators approved every proposal that was filed. The California utilities were so certain that excess capacity would persist that in 1995 they asked the federal government (FERC) to overturn a California PUC order requiring the California utilities to buy 1,500 MW of new capacity. The FERC approved the utility requests, and the capacity was not built.

3. **Strict Environmental Laws.** Other regions with siting and environmental laws as strict as California's have had little trouble attracting, siting, and building new plants.

4. **Load growth.** There is a lot of discussion about increased electrical demand, but demand this year is well below demand last year. California is a national leader in energy efficiency. Unfortunately, other western states have not invested in energy efficiency, and as a result, their growth in electricity use has been very rapid. California relied on imports from these states for a significant portion of its power needs (approximately 25%). However, those imports were not secured through long-term firm contracts and, when capacity shortages developed in those states, the amount of power available for sale in California decreased substantially.

   The sudden decrease in supply of hydropower is a much more important factor. The loss, beginning with the May 22 Northwest River Forecast Center stream flow announcement, was about 6,000 average megawatts. Replacing this energy with natural gas production caused a huge (57% through October) increase in natural gas demand.

Lessons to be Learned

Lessons from the California crisis are quite clear:

1. Keep the size of the spot market small. China's pilot programs for competitive power generation restricted the size of the spot market to roughly 15% of total generation. In the case of California it was almost 90%. Keeping the size of the spot markets small, as China has done so far, does not mean the spot market will work well. A small spot market means that, if there are problems in the market, the financial consequences will be limited in size.
2. Incorporate demand response in the wholesale market design. Large consumers, energy service companies, and distribution utilities should all be in position to quickly respond to high spot market prices in a way that helps all customers save money.
3. Retail competition has not been successful so far. Retail competition should be studied and evaluated but not implemented.
4. Do not split regulatory jurisdiction. In California, jurisdiction was too divided between various state and federal agencies. As a result, once the problem occurred, nobody was in a position to solve the problem. Instead, each regulatory agency pointed to the other as the culprit.
5. Another lesson from California relates to what they did correctly. California's restructuring included continued and very substantial investment in end-use energy efficiency and renewables. Without the energy efficiency and renewable programs that California pioneered years ago and continued through restructuring process, the

California crisis would have been much worse.

Applying California's Lessons to China

China and California are clearly very different places, and China will not necessarily experience the same problems seen in California. However, there are several aspects of China's power sector that could lead to similar problems.

1. China's electricity sector is undergoing very rapid growth. Any perception that the country is currently in a surplus capacity condition quickly evaporates when one looks at the rate of growth of electricity use. This is the time to begin designing and implementing aggressive end-use energy efficiency programs. It is important to implement and integrate the conservation and clean production laws to reduce energy growth while expanding the economy.
2. It appears market power may be a problem as China moves toward a more competitive generation market. We have read that China will limit generation ownership of any single company to no more than 20-25% of the total generation. One of the lessons in California is that this level of concentration is far too great to avoid market power problems, particularly during periods of low reserves.
3. Natural gas is entering the generation marketplace and it is likely to become the fuel source that will often set market prices in a bidding system. The substantially higher running costs of natural gas facilities means that care must be taken in establishing the new market and dealing with stranded costs issues to assure that the owners and operators of existing coal and other non-natural gas fired facilities are not overcompensated.
4. China, like California, has a highly fragmented regulatory and energy policy responsibility. We strongly urge policy makers in China to consider consolidating responsibility for power sector restructuring and power sector regulation into a single central agency.
5. Finally, like the original restructuring in California, it appears that the important goals and practical constraints are not being built into the power sector reform process. Environmental goals and economic development goals should be important factors in designing the restructured power sector in China.

**Recommendations**

We have eleven primary recommendations.

1. The single most important recommendation is to start with a clear, comprehensive, and prioritized list of China's goals and constraints.
2. Create a strong and central regulatory body with a broad scope charged with implementing reforms to meet China's goals and constraints. This regulatory agency should be set up early and should be directly involved in the restructuring process.
3. Institutionally, the regulatory structure should be designed to minimize the possibility of future conflicts between central, regional, and provincial levels of government. Initially, electricity markets in China will be regional in nature and some of these markets may be relatively small. Over time, as the system grows and as transmission expands, markets

will combine to form fewer and fewer markets with the distinct possibility that a single national market may ultimately develop. Structuring the regulatory institutions as well as the transmission institutions in ways that minimize the possibility of provincial conflicts between different regions will make the transition to larger and larger markets easier to accomplish.

4. The scope of the regulatory agency should be broad. It should include oversight of competitive generation markets; anti-monopoly authority; distribution and transmission prices; access; service quality, reliability, and resource planning for captive customers; and environmental performance.
5. There are substantial opportunities to reduce the cost of existing generation with or without more extensive restructuring. Dispatch rules and the approach to contracting and privatization provide the main opportunities to reduce costs and prices in the near term.
6. Demand response by consumers, distribution companies, and energy service companies should be built directly into the structure of wholesale markets. This was one of the strongest lessons to come out of California and other markets that have suffered similar kinds of price level and price volatility problems.
7. Include some sort of capacity feature in the electricity markets. This is needed to send early price signals for investors to reduce price volatility.
8. Retail access has caused more problems than it cured. One critical, but overlooked, aspect of retail competition is that, with retail access, electricity prices are much more volatile than with more traditional approaches. If increased price volatility is unacceptable to the public, retail access may not be a practical option.
9. Regulate transmission and distribution utilities in a fashion to encourage end-use energy efficiency as well as improvement and expansion of the transmission and distribution system. Every reform will create a new set of incentives, some of which will be intended and some unintended. Our experience shows that there are two basic options: price caps and revenue caps. Price caps promote increased electricity sales and discourage utility investment in end-use energy efficiency. Revenue caps encourage cost reductions without giving the incentive to increase sales.
10. Incorporate environmental and economic goals in the restructured markets. Market rules and market structure need to be consistent with the increased use of renewables, the development of Western China, and reformed environmental rules. Without specific consideration of the environment, restructuring is likely to lead to increased use of the oldest and most polluting sources.
11. Coordinate with the other closely related laws in China, including the energy conservation law and clean production law.

**Functions and Responsibilities of a Regulatory Commission**

The structure, scope, and powers of a regulatory commission are key to successfully restructuring the industry. The key characteristics of a good regulatory commission include:

1. Independence from the political process;
2. Independence from the regulated enterprises;
3. A broad mandate to protect the public interest;
4. Technical expertise in the functions and business of the regulated enterprise; and,
5. Continued monitoring and enforcement of rules and orders.

Attachment 1 provides a summary of the regulatory structure in use internationally. The summary shows that there is a very wide range of systems. Our review of the international experience shows that there is a clear trend is toward independent, multi-person agencies funded through assessments on the regulated industries.

Key Regulatory Considerations

Based on our extensive experience (RAP principals have more than 100 person-years of direct experience as regulators) the most important considerations for China are as follows:

1. Independence

Independence is the most important characteristic of a successful regulatory commission. Independence for an administrative agency is often a difficult concept to understand. An agency must be independent from the industry it regulates and from short-term political influence, and yet it must accountable to the legislative and judicial branches of government.

Independence is necessary to gain the trust and confidence of the public and investors. Capital markets carefully evaluate the political and regulatory environment faced by any company. Investors prefer companies that are regulated by independent agencies that are insulated from short-term political issues.

Because regulators will often be faced with tough pricing decisions that may not be well received by the public, the commission must achieve a high level of institutional acceptance by the public. Members of the public are often highly skeptical of their government. As a result, the new commission may be viewed as just “window dressing” to obscure an underlying short-term political or governmental activity. The ability to demonstrate independence from politics is a necessary component of achieving public acceptance.

2. Independence and Competence the Commissioners

The public must have confidence in the individuals who serve as commissioners. A commissioner must maintain a high degree of judicial stature in the eyes of the public. This means maintaining a special degree of integrity through both rhetoric and action. The commissioners should be bound by a strong ethical code. The key components of such a code

include:

a. Prohibition against any ownership, gratuity, or other material economic interest in the regulated utility;
b. Prohibition against any ownership, gratuity, or other material economic interest in any consumer or consumer group affected by any commission decision;
c. Prohibition against *ex parte* communications with parties in a pending matter; and,
d. Prohibition against political influence or interference.

3. Accountability

Independence does not mean the regulator is unaccountable. Accountability of the regulator is assured in at least three ways.

a. **Regulators can be removed from office.** Although regulators are generally appointed for fixed period of time, they can be removed from office for misconduct or violation of standards set forth in the laws creating the Commission.
b. **Regulation is accountable to the legislative process.** The structure of the commission is designed to protect the commission from short-term political influence and from the influence of individual or small groups of legislators. The commission, however, is accountable to the full legislative process. The legislature can adopt, modify, or repeal the laws the regulatory commission administers. The regulatory commission is created by the legislative process and it can be modified or even abolished by the full legislative process.
c. **Decisions are reviewable by courts.** The commission must follow the substantive and procedural requirements of the laws it administers. Its decisions are reviewable by courts. Judicial review generally defers to regulators expertise on factual and policy matters and more closely examines regulators' legal interpretation and process.

4. Scope, Functions, and Authority

Successful restructuring means developing market structure and rules that meet a country's wide range of goals and constraints. Concentrating authority in a single regulatory agency will help assure that the goals and constraints are fully reflected in all parts of the industry. The scope of the regulatory agency should be very broad and include the following:

a. **Market Oversight.** The regulatory agency should have the authority to oversee the market structure and market rules including all necessary authority to address market power issues. The goal of the regulator's oversight of the competitive market is to assure the competitiveness of the market. Regulators will need the authority to identify and cure structural and behavioral market problems. The procedural requirements should allow the regulator to fix problems quickly.
b. **Monopoly Services.** The regulator should have rate setting authority (often called

tariff setting) of all monopoly services including transmission pricing and access rules and retail pricing for all captive customers.

c. **Resource Planning.** Unless and until a fully competitive wholesale and retail market exists, the regulator must oversee utility planning. A combination of Integrated Resource Planning and competitive resource acquisition is the best approach to use.

d. **Environment.** The industry's economic and environmental performance are closely related and cannot be efficiently addressed separately. Market structure and market rules will strongly affect what types of power plants are built and operated. Likewise, environmental rules can strongly affect what is built and operated. Successful restructuring requires careful incorporation of environmental goals in the restructuring process. This means that the utility regulator's responsibility is to coordinate its decisions with environmental goals and environmental regulation.

e. **Energy Efficiency.** Power sector reform should be guided by the goal of providing energy services in the least-cost manner. The cost of the energy service is the combination of the price of kWhs and the number of kWhs needed to produce the desired energy services, that is, lighting, motor drive, cooling, etc. This means that increased energy efficiency is as important as reduced electricity prices.

   Experience with utility delivered end-use energy efficiency is compelling. Individual demand-side management programs (DSM) vary in their size and cost-effectiveness, but the overall results of US utility DSM programs over the past decade have been very good. US DSM programs have saved more than 25,000 MW or capacity and associated energy, and have delivered those savings to utility systems at a cost of about 2.1 cents per kWh.

f. **Consumer Protection**. The regulatory agency must assure that consumer interests are protected. Reasonable prices, nondiscriminatory access, safe delivery, reliable supply, environmentally sound service, and dispute resolution are key consumer protection responsibilities.

5. Jurisdiction

Dividing jurisdiction between central and provincial levels of government must be carefully considered. Many approaches have been used. Wholesale versus retail and transmission versus distribution are the most common choices. There are problems with both of these options.

Institutionally, the regulatory structure should be designed to minimize the possibility of future conflicts between central, regional, and provincial levels of government. Initially, electricity markets in China will be regional in nature, and some of these markets may be relatively small. Over time, as the system grows and as transmission expands, smaller markets will combine to form fewer and fewer larger markets, with the distinct possibility that a single national market may ultimately develop. Structuring the regulatory institutions as well as the transmission institutions in ways that minimize the possibility of provincial behavior and conflicts between

different regions will make the transition to larger and larger markets easier to accomplish.

Attachment 1

## Key Characteristics of Selected Independent Regulatory Agencies[1]

| | Australia* | Canada* | Finland | Ireland | Italy |
|---|---|---|---|---|---|
| **Scope** | Energy, telecoms and airports | Electricity, gas and oil | Electricity | Electricity | Electricity and gas |
| **Board Members** | 7 | 9 | 1 | 1 (could increase to 3) | 3 |
| **Length of appoinment (Years)** | Up to 5 years | 7 | Indefinite | Up to 7 | 7 |
| **Possibility of renewal** | Yes | Yes | — | Yes (only once) | No |
| **Staff (1999)** | 370 (of these, 11 deal with electricity | 280 | 10 | ** | 80 |
| **Budget (Million US$, 1997)** | 31.5 | 19 | 0.9 | ** | 9.7 |
| **Main source of financing** | Treasury's Budget | Annual fees paid by the regulated companies (based on volume of regulated activity) | Supervision and permit fees on network activities | * * Paid by electricity undertakings (to be determined) | Tax on utilities revenue not to exceed 1 per thousand of regulated industry income |
| **Main functions** | Network regulation; wholesale market rules; antitrust | Regulation of electricity exports | Licensing of network activities; network price regulation (ex post) | Network regulation; Licensing | End user tariffs; network regulation |

** Federal regulatory agency.*

*** Data not yet available.The Office is currently being established.*

[1]This Table relies in information collected and published by the International Energy Agency.

| | Portugal | Spain | Sweden | United Kingdom | United States* |
|---|---|---|---|---|---|
| **Scope** | Electricity telecoms | Electricity, gas and oil | Electricity | Electricity and gas | Electricity, gas and oil |
| **Board Members** | 3 | 9 | 1 | 1 | 5 |
| **Length of appoinment (Years)** | 5 | 6 | Indefinite | 5 | 5 |
| **Possibility of renewal** | Yes | Yes,one time | — | Yes,one time | Yes |
| **Staff approx. (1999)** | 42 | 118 | *** | 233 (Year 97) | 1377 (Year 97) (ESI only:470) |
| **Budget approx. (Million US$, Year 1997)** | 3.1 | 6.5 | *** | 21 | 154 |
| **Main source of financing** | Surcharge on transmission tariffs | Surcharge on consumption not to exceed 0.5 per 1,000 of electricity revenue | *** | Charge on the income of the regulated parties | Fees for services (filing fees) and annual charges on utilities |
| **Main functions** | End user tariffs | Approves Mergers and Acquisitions of transmission and distribution companies | Network price regulation (ex post) | End user tariffs; licensing | Rules for interstate electricity sales and transmission; transmission and wholesale tariffs;overseeing Mergers |

** Federal regulatory agency.*

**** Integrated within the Swedish National Energy Administration which employs about 160 staff and has an annual turnover of about 1 Million SEK.*