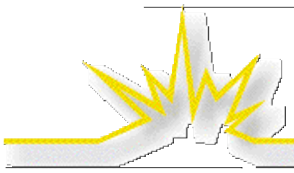
REPORT ON THE ESTABLISHMENT OF SERC
The State Electricity Regulatory Commission

Prepared by

The Regulatory Assistance Project (RAP)

On Behalf of
The World Bank And
The Energy Foundation
China Sustainable Energy Program



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Preface

China is moving forward with power sector reform and has correctly concluded that the creation of a modern regulatory structure is an essential step in the process. The purpose of this report is to provide China's policymakers a complete description of the necessary functions and organization of a central, or state level, energy regulatory agency, the State Electricity Regulatory Commission (SERC). The functions and duties of a modern regulatory agency are described in Chapter 2. Chapter 2 also discusses the division of the various regulatory functions among the different levels of government. Legal and administrative issues are covered in Chapters 3 and 4.

When describing the important regulatory functions, we refer to particular decisions and issues confronting China. This report does not recommend particular outcomes and does not purport to be a detailed discussion of the techniques of regulation. It does, however, articulate general principles that are essential to the success of a regulatory institution, in particular one that will guide the restructuring of an entire electric sector.

The World Bank and the Energy Foundation's China Sustainable Energy Project jointly commissioned this report. The Regulatory Assistance Project (RAP)[1] has prepared the report, which builds upon a joint project on a possible "Zhejiang Electricity Regulatory Authority," conducted by RAP and representatives of the Zhejiang Electricity Research Institute (ZERI) and the Zhejiang Economic and Trade Commission (ZETC), under the auspices of the Energy Foundation's China Sustainable Energy Project. In addition, this report relies on a white paper entitled "Strategies for China's Electricity Reform and Renewable Development" (hereafter "White Paper").[2]

This paper is designed to assist in the creation of an agency based on the needs of the industry and international 'best practice,' with the goal of establishing a 'best practice'

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[1] RAP is a not-for-profit non-governmental organization located in the United States. It consists of former utility regulatory commissioners. RAP provides education and training for utility regulators in the US and many other countries.

[2] The White Paper was prepared with the assistance of RAP and under the direction of The Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. Chapters were contributed by the State Power Economic Research Center, the Chinese Research Academy of Environmental Sciences, the Beijing Energy Efficiency Center, the Institute of Market and Pricing at the State Development Planning Commission, the Center for Renewable Energy Development, the Institute of Quantitative and Technical Economics at the Chinese Academy of Social Sciences, and the Department of Legal Affairs at the State Power Corporation of China.

regulator. This is a major opportunity to establish an effective Regulator in China and a mere codification and transfer of the functions currently performed by the SETC into a new agency would be a seriously wasted opportunity. The prioritization of tasks to this end should be based on, and synchronized with, the restructuring of the power sector.

Based on international experience, the paper stresses that the detailed specification of SERC's functions and authority, and the development of power sector regulations, will be an iterative process that will require: (a) full access of the Chief Regulator to decision makers to ensure timely decisions on important matters and to avoid regulatory gaps as the sector reform proceeds; and (b) continued consultation with a broad range of stakeholders to ensure clear delineation of SERC's activities, and their coordination with activities of other agencies that have authority over to the sector.

This paper is intended to assist those responsible for organization of SERC by providing a framework for understanding how a regulator should be organized and the key tasks it must undertake to be successful.

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Executive Summary

1.1. Overview

Because of the need for expertise, independence, and transparent, open decision-making, regulatory commissions have come to be considered essential components of reform. International experience shows that restructuring the power sector and establishing a competitive power market require the constant oversight of a professional regulatory body separated both from the industry and from the rest of government. This report discusses the policy foundations associated with the need for an independent and transparent regulatory body.

1.1.1. Structure and Functions of SERC

The functions of a regulatory agency are determined by the country's goals and objectives. China has identified several important goals that are especially relevant to the design of SERC:

- Improved efficiency and reduced costs;
- Lower electricity prices;
- Economic development of Western China; and,
- Environmental improvement.

There are clear opportunities for China to reduce costs through greater grid integration, with fewer and larger markets. In many cases the lack of adequate transmission prevents low-cost generation in one province or region from reaching a neighboring area. In many other cases, the protective behavior of local or provincial power plant owners inhibits trading. There are also important opportunities to restructure and regulate the power sector in ways that further China's economic development and environmental goals.

The suggestions in this report are designed to meet these goals while taking into account the specific conditions in China. Special consideration has been given to the status of the judicial system, continuing government ownership and control, the shortage of officials experienced with regulation, and the relationship between reform of the electric sector and the environment.

China's electric sector has gone though many stages of reform. Although the reforms led to new investment, they left some problems unaddressed and created new problems that bear directly on the need for a competent and independent regulatory agency. To continue attracting private investment at reasonable cost, investors must see that there is a viable market structure with reasonable rules, and they must have confidence that the rules will be implemented and enforced

fairly. The creation of a strong, independent, and transparent regulatory system is a vital step in this process, a step widely acknowledged by the independent power producer (IPP) community and others.

1.1.2. China's Current Regulatory Structure

China's current regulatory authority is dispersed among several departments. As a result, the complex functions of regulation are not coordinated and sometimes are contradictory. Government is the regulator of the electric sector and it is also the owner. These roles often conflict.

Under the current system, regulation is not transparent. Information is not made public. Few understand the pricing methods, which often are not economically rational. The opportunity to participate in the regulatory process is unclear, as are the process and the right to appeal regulatory decisions. While the approval process for new generation might be considered transparent, it is nevertheless complex. Approval from as many as eleven agencies at several different levels of government is needed.

1.2. International Trends

There is a clear international trend toward independent regulatory agencies and away from regulatory functions being performed by government ministries. Generally, creation of strong regulatory agencies has coincided with restructuring efforts that have included wholesale and, in some cases, retail competition.

Independent regulatory agencies vary from country to country but some key elements are shared by most agencies. The role of regulators includes setting prices and the terms of access in the monopoly segments of the power sector, avoiding anti-competitive impacts of these segments on generation and supply, and setting service standards.

1.3. Central versus Decentralized Regulation

Electric regulation in most countries is performed at the national level. However in many large countries, regulation is bifurcated, with different balances between national and more regional regulation.

Experience shows that the division of responsibility between different levels of government can be a continuing source of difficulty. Nevertheless, there are many options for allocating regulatory authority vertically among China's levels of government. Even where

authority has been placed at the local level, some options allow central regulators to exercise an overriding authority when needed. This report recommends that economic regulatory oversight of the power sector be consolidated in one agency with regional branches to avoid confusion over jurisdiction.

1.4. Independence

The new regulatory agencies will need to be more independent and thus be very different than existing government agencies. In order to provide necessary assurances to prospective investors in the power sector, regulators must possess a sufficient degree of independence from both utilities and the political process. SERC's ability to preserve confidence that its decisions are not being made on a political basis depends heavily on the regulators being able to make decisions on the merits of the matters before them.

1.5. Regulatory Functions

China has set as its most immediate power sector reform task the creation of a competitive generation market that can attract investment needed to meet growing electricity demand in an environmentally sustainable fashion. The following regulatory functions should be given to SERC to assure that this high priority goal is achieved.

1.5.1. Market Structure, Market Design, and Market Oversight

SERC should oversee and approve the fundamental characteristics of competitive electricity generation markets including the number of competitors, ease of entry and of exit, equal access to all essential facilities, equal access to market information in connection with the use of essential facilities, an opportunity for load response and other demand-side initiatives to compete on fair and equal terms, recognition of the unique advantages of renewable resources, and environmental standards applicable equally to all entities.

1.5.2. Review, Amend, and Approve All Market Rules

SERC should be responsible for overseeing the development of market codes, or rules. Such codes apply to all aspects of the power market including market design, bidding and dispatch rules, transmission pricing and access terms, financial settlement procedures, and governance.

Regulators should be authorized to review and approve (or reject or modify) the market codes and all amendments to assure that the code is consistent with and encourages environmental improvement, fair competition, increased energy efficiency, load management, distributed resources, demand response, and renewables.

1.5.3. Market Power

Identifying and preventing market power abuse is a key function of SERC. Market power has been a serious problem in most countries and our observations in Zhejiang suggest the serious potential that market power problems exist in China. Monitoring the market and regulating mergers and acquisitions are important practices used by regulators to control market power.

1.5.4. Vertical Market Power

Separation of generation interests from control of the grid is an essential step in creating a competitive generation market. SERC's responsibility will be to oversee and implement separation in a way that is fair and efficient, addresses questions of stranded expectations, and does not raise consumer prices.

1.5.5. Reform Existing Contracts

One necessary step to an efficient power market is the reform of existing contracts that are inconsistent with an efficiently competitive market. Reforming existing contracts in ways that promote efficient use and dispatch should be a high priority task for SERC.

1.5.6. Stranded Cost

Currently, the average generation price appears to be near competitive generation costs, which suggests that the potential for stranded costs (the difference between current and market prices for generation) may be a problem, although not as serious a problem as it was in the US.

1.5.7. Risk Management

Restructuring in many countries has encountered difficulty in the form of customer resistance to rapid price fluctuations, especially increases. SERC should set standards governing consumer exposure to market risk and utilities' exposure to spot markets.

1.5.8. System Reliability, Safety, and Adequacy

SERC will need to determine a reasonable national standard of reliability.

1.5.9. Transmission Pricing, Access, Planning, And Expansion

SERC rules must make clear who is responsible for undertaking the necessary planning and construction and it must also set out the regulatory principles that will assure that transmission is paid for. These guidelines should include full participation of demand-side and distributed generation options to ensure that least-cost solutions to transmission problems are implemented.

1.5.10. System Planning

SERC should set guidelines for comprehensive system reliability assessments and expansion plans. The results of the planning should be publicly available and should be submitted to relevant government agencies engaged in other planning and investment activities. The planning function of SERC needs to consider the full range of supply and demand resources, not merely the conventional power plant and wires solutions.

1.5.10.1. End-Use Efficiency

SERC should make special efforts to promote end-use efficiency because the potential for cost-effective end-use efficiency in China is large and end-use efficiency can contribute greatly to China's environmental, sustainability, and economic efficiency goals.

1.5.10.2. Distributed Resources

New and small sources of generation such as micro-turbines and fuel cells are rapidly changing the nature of many grids. These resources are increasingly providing the low-cost solution to consumer energy needs.

1.5.10.3. Renewable Energy

China has abundant renewable energy resources. Often renewable energy sources can provide cost-effective sources of power with far less environmental risk than conventional supply sources. The special technical and operating characteristics of renewables should be taken into account when designing markets, approving market rules, and adopting transmission pricing and access rules.

1.5.11. Pricing

Setting tariffs, or prices, for distribution and end-use sales is a basic function of electric sector regulation everywhere in the world. Pricing includes setting generation prices for non-

market-based units, setting or approving transition generation contracts, establishing transmission and other grid prices, and setting retail prices.

Recent restructuring plans in China would limit SERC's pricing responsibility to making "suggestions" to other agencies. Pricing responsibility would stay with existing pricing bureaus and the SDPC. This division of responsibility would be unique among the world's regulatory structures, and it poses serious risks. We believe the pricing functions must be one of the first high-priority functions given to SERC.

1.5.12. Environmental Improvement

SERC should be involved in the formulation of environmental standards as they affect the power industry and should assure that generators do not gain any competitive advantage through an ability to emit pollutants to a disproportionate degree. SERC bidding guidelines and guidelines covering system dispatch should also reflect China's environmental goals and standards.

1.5.13. Licensing Of Competitive Generators

The existing licensing process in China is complex and involves many different government agencies. Consolidating the licensing of competitive generators in SERC will simplify the process. A more predictable licensing process will reduce market power and make generation markets more efficient.

1.5.14. Dispute Resolution

Disputes between market participants (for example, between generators, between generators and market operators, or between generators and transmission entities) are inevitable during any utility industry restructuring. The integrity of the competitive marketplace requires that such disputes be resolved fairly, with a minimum of delay and expense.

1.6. Administrative and Legal Processes

International experience shows a very wide range of options for structuring a regulatory agency. The extent of public participation varies among the countries that have undertaken restructuring as well. Nevertheless, there are some minimum goals that must be met.

The process needs to be understandable to customers and investors. The basis for SERC decisions should be in writing and clearly stated. The agency's decisions must be consistent and

predictable. SERC will need to adopt rules for, among other things, the conduct of its processes, parties' filing requirements, evidence, etc.

1.6.1. Service Standards

SERC will need to adopt rules setting service standards to be observed with regard to utility customers. Separate rules may address technical and non-technical service standards. Technical standards will address matters such as voltage level, outage frequency, and metering requirements. Non-technical service standards will address matters such as payment responsibility, billing frequency, and dispute resolution.

1.6.2. Ethical Rules

In order to assure high confidence in the regulatory agency and to assure that employees have clear guidance as to acceptable behavior, ethics rules should be adopted.

1.6.3. Ex Parte Rules

Ex parte rules establish the limits and conditions on permissible communication between those who are affected by SERC decisions and the decision makers.

1.7. Legal Effect and Enforcement

Regulatory decisions are binding and must be followed unless a higher authority reverses the decision. Chinese law should provide that failure to comply with Commission orders could result in any of several actions: fines, other penalties (such as a reduction in rates of monopoly providers), or even revocation of a firm's permit to operate.

The regulatory agency needs clear powers of enforcement. These include an ability to get all necessary information, to inspect as necessary, to audit the records as well as the management and the operations of regulated entities, and to compel compliance through the courts or other means.

1.8. Reconsideration and Appellate Review

If a participant in a case believes a SERC decision to be unjust or unlawful it may ask SERC for reconsideration. If a participating person believes SERC has erred, he may, after SERC has dealt with a request to reconsider, appeal the decision to a higher court or tribunal.

1.9. Organization Issues

Expansion from the initial appointment of senior personnel to a fully functioning agency with both regulators and staff should be undertaken as quickly as possible. Closely associated

with staffing requirements is the development of a working budget and implementation of a funding mechanism for the budget. Finally, significant training and skill development will be required.

1.9.1. Organizational Structure and Funding

The organizational structure of a regulatory commission should follow from a clear understanding of the agency's mission and functions. The Commission is best made up of multiple commissioners who function in the mode of a decision-making board of directors – detached from the day-to-day management of the agency and with limited responsibility for personnel matters. Multi-member regulatory commissions are generally preferred to a regulatory agency headed by a single individual.

1.9.2. Staff Organization

The Director of Staff is responsible to the Chairman (and ultimately to the Commission) for the administration of the Commission. The Director of Staff would oversee each of the agency's divisions, which are recommended to include an Administration Division, Legal Division, Policy Division, Planning Division, Power Market Division, Pricing Division, and Dispute Resolution Division.

1.9.3. Funding

The funding of regulatory commissions in most countries is based on an assessment (set by the government) on the regulated industries calculated to raise the necessary amount for the Commission. Among the most administratively simple and fair methods of funding the regulatory agency is to collect the monies on a per-kilowatt-hour basis.

The government often approves the overall budget and salary scales, but this approval does not depend on the decisions made by the Commission. The salary levels should be set high enough to attract capable people with the necessary skills and good judgment.

1.10. First Year Tasks – The Ten Most Important Substantive Issues

The ten most important substantive issues that SERC will address in the first year are:

- Development and adoption of market structure and market rules;

- Development and adoption of guidelines to measure and monitor market performance and to inform the market participants of the measures that will be used to maintain competitive markets;
- Separation of generation interests from the grid in a way that is fair and efficient, addresses "stranded expectation" issues, and does not raise consumer prices;
- Reformation of existing generation contracts;
- Creation and enforcement of the obligation of the distribution companies to meet demand with a reasonable mix, or portfolio, of short-term, long-term, demand-side, and supply-side resources;
- Adoption of rules or license terms setting forth revenue and pricing methods and principles and rules concerning transmission access, pricing, and planning methods and principles;
- Reformation of power sector environmental standards to assure that generators do not gain any competitive advantage through an ability to emit pollutants to a disproportionate degree and should adopt bidding and system dispatch guidelines that reflect China's environmental goals and standards;
- Licensing competitive generation;
- Adoption of guidelines for comprehensive system reliability assessments and expansion plans; and
- Adoption of procedural rules that define the SERC "process."

1.11. Conclusion

The success of electric sector restructuring is highly dependent on the creation of a strong and independent regulatory body. SERC must be created and granted clear and adequate authority to answer the challenges of restructuring and to provide on-going regulation of the sector. The key steps to move the process forward are to give SERC necessary legal status, identify and select Commissioners and key staff, and to identify and prioritize first year tasks.

Chapter 1. Introduction and Background

1.1. Introduction

Internationally, governmental oversight of electric utilities has two basic models. The most common model has been government ownership of the utilities. The other model is private ownership with government regulatory oversight. In the second model, the regulatory commissions were considered to be "surrogates for competition" in industries that were "natural monopolies". Their mission was largely to replicate the prices and conditions of service that would have existed if customers were able to choose among several suppliers. In countries that permitted private ownership of public utilities, regulators granted a service territory – sometimes exclusive – and a limited power to take property in return for the power to set rates and conditions of service. Regulatory agencies were expert agencies, structured to be independent from political pressure on the one hand and monopolistic acquisitiveness on the other. But this model of regulatory oversight of utility industries was relatively rare. Most of the world, including China, opted instead for full government ownership of public utilities such as the electric, without regulatory commissions.

In the last twenty years, the shortcomings of both models have led to increased interest in new forms of utility ownership and governance, and the role of regulatory commissions has evolved correspondingly. Today, regulatory commissions serve multiple functions including:

- Overseeing transitions in industry structure and ownership,
- Safeguarding emerging markets from anticompetitive structures and conduct, and,
- Setting prices, service standards, and conditions of entry and exit in the parts of the sector that retain monopoly characteristics.

The functions of a regulatory agency are determined by the country's goals and objectives. Countries on every continent have initiated electric sector reforms during the past decade. Each country has adopted a different approach based on the country's specific conditions and its broad public policy goals.

China's approach to power sector reform generally, and regulation in particular, will be shaped by the goals China seeks to achieve. China has identified several important goals that are especially relevant to the design of SERC.

- **Goal 1 - Improved Efficiency and Reduced Costs.** Lowering energy costs while increasing efficiency constitutes one of China's high priority goals.

Based on our knowledge of China's power sector, there are large cost savings that can be achieved for existing and new power plants through the increased use of competitive market mechanisms, restructuring existing power contracts, and rationalizing power plant dispatch.

Increased end-use energy efficiency, however, offers probably the greatest opportunity for cost reductions. International experience shows that the cost of end-use efficiency is often less than the cost of operating existing power plants and far less than the cost of new power plants.[3]

- **Goal 2 - Lower Prices.** Related to the goal of lower costs is the goal of lower electricity prices. China, like many countries, believes that electricity prices are already too high; China also believes that restructuring will fail if it results in significant price increases for consumers. Of course, investors cannot be attracted to a sector in which prices fail to cover costs, so the avoidance of price increases or government subsidies will depend on achieving efficiencies that offset cost or price increases.

  Increased use of competitive markets offers the opportunity to lower costs, but lower costs do not automatically lead to lower consumer prices. 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 a number of other steps are taken. Especially important are (1) a well-designed transition for existing plants from the current pricing system to competitive market pricing, (2) power markets designed to attract investment and produce stable prices, and (3) control over market power problems. These are some of the core responsibilities of SERC.

- **Goal 3 - Economic Development of Western China.** The economic development of Western China is a high priority goal. Western China is blessed with large amounts of natural gas as well as renewable resources including hydro and wind. SERC will need to restructure and regulate the power sector in ways that assure that renewable and clean resources are developed.[3]

- **Goal 4 - Environmental Improvement.** Environmental improvement is also high on China's list of priorities. Restructuring and regulating an electric power system invariably affects the environment. Supporting China's environmental goals will need to be one of SERC's responsibilities.[4]

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[3] See, for example, information provided by the American Council for an Energy Efficient Economy (http://www.aceee.org/energy/), detailing the cost-effectiveness of end-use efficiency in relation to supply. Significant savings are available at US $0.03/kWh and less.

[3] For example, transmission planning and pricing, if not handled carefully, can hinder development of cleaner resources, particularly those found in remote locations.

[4] For example, China has a goal of installing of more than 10,000 MW of coal generation with flue gas de-sulphurization. However, in competitive generation markets, plants are dispatched based on bid prices. Cleaner

Because of the need for expertise, independence, and transparent, open decision-making, regulatory commissions have come to be considered essential components of reform, even in countries like China, which have not committed themselves to privatization.

International experience shows that restructuring the power sector and establishing a competitive power market require the constant oversight of a professional regulatory body separated both from the industry and from the rest of government. There are at least four reasons for this:

- Competitive generation markets must be carefully designed, monitored, and improved to prevent the exercise of market power from reducing competition or preventing the benefits of competition from flowing to customers.
- Access to large amounts of capital at reasonable costs is only possible when investors have confidence that electric sector decision-making and enforcement is being carried out in a professional and an impartial manner, well separated from excessive political influence and free of corruption, two forces that have often undermined power sector reform throughout the world.
- The transmission and distribution portions of the power sector will remain monopoly industries delivering an essential service. Regulatory oversight is needed to assure that the transmission and distribution industry that supports the competitive generation market also serves customers reliably, safely, and efficiently.
- The size of the power sector, its vital role in the economy, and the large environmental consequences of the industry define a need for continuing governmental oversight. Further, the transitions inherent in restructuring can have negative economic, social, and environmental impacts, which should be anticipated and mitigated from the outset.

1.2. China's Electric Sector

China has the world's second largest electric system. At its current rate of growth it will soon be the largest. The grid is not fully integrated. As shown in Table 1 below, there are five regional power grids and several other grids that operate on a provincial level. Some of the provinces, such as Fujian, are not well interconnected to other provinces and others, such as Hainan Island, are isolated altogether.

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plants generally have higher operating costs and, as a result, will be dispatched less than they otherwise should be, or not at all. Reduced dispatch of cleaner plants will mean that desired environmental benefits will not be achieved.

Table 1
Installed Capacity and Electricity Generation in Networks and Regions in 2000[4]

Network & Region	Installed Capacity Total (MW)	Electricity generation Total (TWh)
North China Power Network (NCPN)	42769.1	210.84
Northeast Power Network (NEPN)	37862.1	153.85
East China Power Network (ECPN)	56663.3	259.63
Central China Power Network (CCPN)	45560.6	179.65
Northwest Power Network (NWPN)	19220.6	80.11
Shandong Provincial Grid (SDPG)	19612.5	99.80
Fujian Provincial Grid (FJPG)	10415.3	40.29
Guangdong Provincial Grid (GDPG)	31895.6	135.35
Guangxi Provincial Grid (GXPG)	7390.9	28.84
Chongqing Power Grid	3061.5	13.38
Sichuan Provincial Grid	15932.4	51.05
Yunnan Provincial Grid (YNPG)	6542.3	28.64
Guizhou Provincial Grid (GZPG)	5557.9	29.65
Hainan Provincial Grid (HNPG)	1791.3	4.10
Xinjiang Area (XJAR)	4458.6	18.30
Xizang Area (XZAR)	357.2	0.68

Prices paid to generators differ depending on the year the generator was built. For plants built after 1986, prices are set for each plant individually, based roughly on the unit's capital costs and a minimum dispatch of 5000 or more hours per year. (See Section 2.4.1.7).

There are clear opportunities for China to reduce costs through greater grid integration, with fewer and larger markets. In many cases the lack of adequate transmission prevents low-cost generation in one province or region from reaching a neighboring area. In many other cases, the protective behavior of local or provincial power plant owners inhibits trading.

China's electric sector has gone though many stages of reform. Until the mid-1980s, China's power sector was typical of many government-owned utilities. The power industry was a part of the government and its business, administrative, and regulatory functions were all managed by the same government agencies. The Ministry of Electric Power (along with several other administrative agencies of the State Council) was responsible for electricity policymaking, planning, construction, management, and operation. The government departments also invested in and obtained earnings from power projects.

[4] http://www.sp-china.com/newsp/english/statistics/statistics.htm.

Although government oversight was not fully reformed in the 1980s, some regulatory authority of the central government was decentralized. This led to local protectionism and created a barrier to inter-provincial trading of power.

The regional and provincial power industry structure was similar to that of the central government, with parallel administrative, production and operating counterparts at the regional and provincial level.

The lack of clear definition and separation between the respective responsibilities of government and commercial enterprises gave rise to many problems, the most serious of which was a lack of investment and resulting power shortages. Reforms were introduced in the mid-1980s to encourage new investment in power generation. In 1985, China's State Council promulgated the Provisional Regulations on Promoting Fund-Raising for Investment in the Power Sector and Implementing Different Power Prices in order to encourage investment in the power sector by regional, corporate, and foreign economic entities.

The implementation of these policy changes led to substantial private and foreign investment. By 1997, the nation-wide shortage of power had been almost entirely relieved. The nature and extent of private investment are described in detail in "Strategies for China's Electricity Reform and Renewable Development."[5]

Unfortunately, the reforms that led to new investment left some problems unaddressed and created new problems that bear directly on the need for a competent independent regulatory agency. For example, China added many new Independent Power Producers (IPPs). However, the unequal status of the IPPs relative to State Power and the state and provincial agencies that succeeded the Ministry of Electric Power (in 1998) caused difficulties, especially as the urgent need for new power was reduced. The contract prices paid to IPPs are considered to be high (although by international standards many IPP prices in China are low). The perception of high IPP prices is made worse by the IPP contract structures that combine fixed and operating costs in a single energy price. This distorts dispatch decisions and causes system operators to refuse to dispatch IPP power when it is, in fact, the most economical resource. The IPPs have expressed

[5] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

serious concerns about fair treatment in some of the new markets, and about dispatching and scheduling that failed to comply with contract terms.[6]

To continue attracting private investment at reasonable cost, investors must see market rules and structure and have confidence that the rules will be implemented and enforced fairly. The creation of a strong, independent, and transparent regulatory system is a vital step in this process, a step widely acknowledged by the IPP community and others.[7]

1.3. China's Current Regulatory Structure

The most recent electricity reforms were implemented in 1997 when the State Power Corporation was founded and separated from the Ministry of Electric Power. The Ministry of Electric Power was dissolved shortly thereafter and its administrative and regulatory functions were transferred to the State Economic and Trade Commission (SETC), the State Development and Planning Commission (SDPC), and the Ministry of Finance (MOF).

China's current regulatory authority is dispersed among several departments, as shown in Table 2. As a result, the complex functions of regulation are not coordinated and sometimes are contradictory. Government is the regulator of the electric sector and it is also the owner. These roles often conflict.

Under the current system, regulation is not transparent. Information is not made public. Few understand the pricing methods, which often are not economically rational. The opportunity to participate in the regulatory process is unclear, as are the process and the right to appeal regulatory decisions.

The approval process for new generation might be considered transparent, but it is complex. According to a World Bank publication, approval from as many as eleven agencies at several different levels of government is needed.[8]

Table 2
Major Regulatory Institutions and Their Regulatory Functions

SETC	SDPC	MOF
• Establishes industrial plans, rules and	• Formulates strategic and long-term plans	• Establishes a financial

[6] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

[7] See "The Power Sector and Power Generation in China," World Bank Discussion Paper 406.

[8] *Id*.

regulations, and economic and technological policies • Formulates industry operating standards, technological standards, and benchmarks • Oversees sector functioning and enforces operational regulations • Balances power resources and power supplies on a utility service territory basis	for development of the power industry • Plans distribution of major power projects • Arranges State capital funds for infrastructure • Formulates and reviews pricing policies, and examines power prices • Monitors and enforces prices	management system, structures costs, carries out financial inspections • Manages state capital funds • Supervises payment of earnings of state capital funds • Monitors and enforces financial requirements

According to "Strategies for China's Electricity Reform and Renewable Development", the current governmental regulatory system is incompatible with the power industry's market-oriented reform.[9] In the study, the researchers identified at least four ongoing problems:

- The absence of effective power markets means that the government administers the power industry directly. This leads to high costs and low efficiency. Although the establishment of the State Power Corporation helped to define the roles of government and commercial enterprises, the continued vertical integration of power generation, transmission, distribution, and sales throughout much of the country has slowed the creation of competitive markets.
- Power markets are now organized along provincial lines, compounding the inter-provincial market barriers. In part because of provincial protectionism, low-cost, electricity from clean energy sources has rarely been distributed across provincial boundaries.
- Pricing is not economically rational and the setting of prices lacks transparency. Power prices do not reflect the true relationship between supply and demand.
- Investment incentives (such as power purchase agreements promising fair rates of return on long-term investment) granted under shortage conditions became a central problem after supply shortages were eliminated. Independent power producers and even State-owned power plant were treated unfairly compared to other State-owned power plants when the allocation of power resources again became influenced by non-market factors.

[9] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip

1.4. Recent State Council Action on Electric Sector Restructuring And Regulation of Power Markets

The State Council (SC) oversees all State agencies and sets China's broad policy directions and priorities. In March 2002, the SC issued its "Electricity System Reform Plan" setting forth the direction and scope of power sector reforms. The SC stated that the reforms are intended to encourage the sustainable development of the power industry.

The SC stated that the key tasks during the 10th five-year period include:

- Establishing a new governmental regulatory system;
- Separating generation from transmission and restructuring generation and transmission companies;
- Establishing market operation and gradually establishing competitive and open regional markets;
- Implementing a new pricing method;
- Establishing equivalent emission standards;
- Adopting incentives to encourage clean energy development; and
- Continuing rural electrification efforts.

The SC policy states that the high priority areas of SERC's work will be:

- Establishing and overseeing market rules for competitive bidding rules and fair competition;
- Making tariff modification suggestions;[10]
- Monitoring production quality standards for the power industry;
- Issuing and monitoring power service licenses;
- Settling disputes in power markets; and
- Overseeing the implementation of social universal service reform.

SERC has been established as a result of the State Council Decree Number 5. A law formalizing its responsibilities is expected within the next year or two.

1.5. China's Experience with Provincial Pilot Projects

China's power sector reform is benefiting from pilot reforms at the provincial level. The most extensive pilot project is in Zhejiang, which has almost three years of experience with a competitive generation market. The project has provided a great deal of valuable experience and by most measures is considered a major success. However, a recent World Bank assessment of

[10] As discussed in Section 2.4.1.7, the power to "suggest" prices for non-competitive services such as transmission and distribution services is insufficient. The regulatory body must have the authority to set these prices itself.

the Zhejiang power market has identified a strong need for the creation of a regulatory agency to "address the inconsistent and fragmented approach to market implementation arising from the absence of effective governance and regulation."[11]

The assessment recommended "that the Government establish an adequate regulatory institution with the capacity to oversee market implementation. Such an agency is essential in order to:

- Review and approve changes to the Market Code suggested by the Market Liaison and Coordination Group.
- Develop a basic framework of regulatory guidelines (or rules) to supervise the market.
- Review and approve the generation expansion plan prepared by the Zhejiang Provincial Electric Power Corporation (ZPEPC) and initiate actions (*e.g.*, competitive bidding) to obtain new capacity in the market."

The need for an effective regulatory agency is strongly reinforced by our own observations of the Zhejiang market. Market prices in Zhejiang reach the price caps in approximately nine percent of the hours. The bidders routinely meet and discuss their experiences in the market. Most if not all bidders follow the same bidding strategy of withholding about ten percent of their plant capacity, which is bid at the price cap. Agreed-upon bidding strategies, or even consciously parallel strategies, do not constitute fair competition. Regular meetings and coordinated bidding of this type would almost certainly violate the anti-monopoly laws of most countries.

Our discussions with market participants also revealed that management believes investment in better bidding strategies yields a better return than investment in cutting costs. This too suggests a less than fully competitive market.

The Zhejiang market has not yet suffered seriously from these potential flaws because of several protective measures built into the current market:

- Existing Contracts-for Differences (CfDs) cover 85% of each generator's output and these CfDs are adjusted annually. High profits in one year yield lower CfD prices in the next.
- The market caps hourly spot prices at a relatively low level, roughly twice the average level of spot market prices.
- Generation is mostly owned by the single buyer, ZPEPC, and it is subject to fixed, government-established retail prices. Higher generation prices paid to generators cannot be passed on to the consumers of the parent

[11] "A Review of the Zhejiang Electricity Market", World Bank Working Paper, August 2001.

> company. This greatly reduces the incentive to exercise market power, since any increase in prices and profits for ZPEPC's generators results in equivalent reductions in the profits of its retail operations, and no change whatever in the company's overall profitability.

When the protective measures are removed from the Zhejiang market, abuse of market power is likely to become a serious problem unless effective regulatory oversight is established.

1.6. Other Important Conditions in China

In our suggested approach to regulation, we have taken into account several other conditions in China.

1.6.1. Judicial System

The judicial system in China, unlike those in many other countries that have restructured their electric sectors, is not highly developed. It is in the process of being reformed, and entry into the WTO is accelerating these reforms. Currently, however, the judiciary may not have the independence and transparency needed to provide sufficient oversight of regulatory agency decisions.[12]

1.6.2. Government Control

Most of the power sector will remain government-owned for at least five years. This leads to two considerations. First, with the government involved as a seller, transmitter, and buyer it will be especially important that the regulator be as independent as possible. Second, during this time, the Chinese government will continue to have the unconditional power to replace top management. Regulatory decisions critical of a firm's behavior can quickly lead to a change of management. This is a very powerful oversight tool.

1.6.3. Market Support

China is rapidly gaining experience with a market-based economy, but competitive markets, concepts, and behavior are still very new. China is proceeding with power sector reform even as it develops a legal structure able to define and protect property rights. Strong antitrust laws and accounting systems and standards do not yet exist. Reforms that depend on these tools cannot be implemented before they are in place.

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[12] http://www.china-laws-online.com/china-WTO/WTO-chinese-legal-system.htm.

1.6.4. Experienced Officials

China currently lacks people with the training and experience necessary to staff a regulatory agency. Staffing commissions in each province will be even more difficult at the outset.

1.6.5. Environment

China suffers from very serious local and national environmental problems. The power sector is a major and growing contributor to these problems. The large environmental impacts caused by electricity production are experienced locally, nationally, and globally. Utility regulatory decisions can have significant impacts on health costs and agricultural production. Such environmental impacts should be taken into account as an integral part of utility regulation, when the electric system is planned and expanded, rather than after the fact when the environmental harm has occurred and large vested financial interests resist change.

Chinese experts and others have estimated that air pollution in China has caused huge economic losses.[13] For example, Xia Guang suggested that the cost of air pollution in China was RMB 58 billion in 1992 alone. [14] The Chinese Social Science Academy estimated that pollution caused China RMB 83 billion worth of damage in 1993.[15] The World Bank suggested that urban air pollution and acid rain in China cost in the range of US$16 to 37 billion annually.[16]. The Science and Technology Daily reported that the 1995 economic losses caused by the effects of acid rain and SO_2 on crops, forests, and human health reached about RMB 110 billion, close to two percent of the gross national product.[17]

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[13] See also Chapter 3 "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

[14] Xia Guang, "Economic Measurement and Study on Environmental Pollution Loss in China," Beijing, Environmental Sciences Press, 1998.

[15] Xu Songling, "Economic Loss Measurement of Environmental Destruction in China: Cases and Theoretical Study," Beijing, Environmental Sciences Press, 1998.

[16] The World Bank, "Clean Water and Blue Sky," World Bank Publication, 1998.

[17] *Science and Technology Daily*, May 2, 2000.

Chapter 2. Structure and Functions of SERC

2.1. Introduction

This chapter describes the structure and functions of a modern regulatory agency. The necessary functions of a modern and efficient regulatory agency are now divided among many different Chinese government agencies and departments. Furthermore, some necessary functions are not performed by any government agency.[18]

Besides the specific duties of SERC, there are three elements of regulation that are crucial to its success:

- **Credibility**. If power sector reform is to be successful, SERC must maintain the trust and confidence of the public, the financial community, and those whom it regulates. Credibility is gained by independence, transparency, and the quality and competence of the regulators.
- **Environment.** Most regulatory decisions, including those relating to market structure, market rules, pricing, and investment, have large environmental consequences. If SERC does not consider the environment as it makes its many important decisions, the outcomes will almost certainly be bad for the environment. Restructuring is an opportunity to assure that cost-effective end-use energy efficiency; renewable sources of power, and environmental improvement are made part of every regulatory consideration.[19]
- **Stranded Expectations, Subsidies, and Programs of Public Benefit**. Restructuring the power sector can have significant social and economic effects that cannot be ignored. The possibility of rapid elimination of subsidies for favored industries or needy consumers, employment losses, and rural electrification issues all need to be taken into account.

  At least four responses are possible: (1) Consumer and public expectations can be ignored; (2) the restructuring can be designed so the needs are met in a way that is more useful to the entire society[20]; (3)

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[18] Specific conditions in a country may affect the importance or the priority of a particular regulatory activity, but in our view, there is only limited flexibility in what the agency does. In contrast, there is substantial flexibility in how the agency operates and how it is organized. Chapter 3 describes the process the agency might use to carry out these functions. As described later, there is a wide range of processes that could be used, from very formal to very informal. Chapter 4 describes how the agency might be organized. Again, there is a wide range of options for how one might organize the agency.

[19] See http://www.ofgem.gov.uk/docs2002/42eap.pdf for a discussion of efforts to incorporate environmental considerations in its regulatory function in the UK.

[20] For example, many large state-owned enterprises now receive electricity at subsidized prices. The best option for China may be to end the electricity subsidy and replace it with energy efficiency improvements that will enable the customer to receive a lower bill even if its rate is no longer subsidized.

expectations can be bought out[21]; or (4) the expectations can continue to be met in the restructured system.[22]

2.2. International Trends

A review of regulatory trends in Organization for Economic Co-operation and Development (OECD) countries prepared by the International Energy Agency shows a trend toward independent regulatory agencies and away from regulatory functions being performed by government ministries.[23] Independent regulation is the approach in Australia, Canada, Denmark, Finland, France, Ireland, Italy, Portugal, Sweden, the United Kingdom, and the United States.

Generally, creation of strong regulatory agencies has coincided with restructuring efforts that have included wholesale and, in some cases, retail competition. Australia, Italy, New Zealand, the UK, and the US provide examples of independent regulatory agencies with relatively broad powers.

Independent regulatory agencies vary from country to country but some key elements are shared by most agencies. The role of regulators includes setting prices and the terms of access in the monopoly segments of the power sector, avoiding anti-competitive impact of these segments on generation and supply, and setting service standards.

Formal safeguards of the agency's independence generally include fixed terms for officials (with early removal only in extreme circumstances, such as serious misconduct or physical or mental incapacity) and a separate budget with a stable source of financing and managerial autonomy. Costs can generally be recovered from end-users, network users, or license holders.

The procedures of regulatory agencies in the OECD countries show significant similarities. These include:

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[21] For example, U.S. utility investors who feared that their money in older plants would be lost if customers were free to choose to buy from newer, less expensive units were safeguarded against such losses through "transition charges" on the use of the transmission and distribution systems.

[22] The fourth option is often chosen with respect to programs that have particular social benefits -- such as assuring electric service to all (especially low-income) customers, funding research and development, or providing service from renewable energy sources. Some countries choose to fund such programs through tax revenues, which allow electricity prices to be accurate indicators to customers of actual system costs. Other countries choose to generate funds for such programs from within the electric system. In the United States, when the costs of such programs are treated as a surcharge on the remaining monopoly parts of the electric system, they are commonly called system benefits charges. In the case of renewable energy, some systems require that a percentage of the electricity supplied to customers be from renewable or non-fossil-fueled energy.

[23] "Regulatory Institutions In Liberalized Electricity Markets," International Energy Agency, 2001.

- A decision-making process, typically including an obligation to conduct hearings and consultations with affected parties and to make reasoned and public decisions.
- An appeals mechanism, typically establishing either an administrative court or an ordinary court of justice as the appellate body.
- Mechanisms to make these institutions accountable to government, typically including an obligation to submit a report of activities to the parliament or other political body, and some form of auditing and control of performance by the relevant administrative body.

2.3. Central versus Decentralized Regulation

Most of this report describes regulatory functions without regard to whether these functions are carried out at the central, provincial, or local level.

Electric regulation in most countries is performed at the national level. In many large countries, regulation is bifurcated, with different balances between national and more regional regulation. Examples include the United States, Canada, India, and Australia:

- **United States**. The division of regulatory functions among federal and state government was established more than seventy years ago. The US constitution gives the federal government specific responsibilities and functions such as national defense and control over interstate and international commerce. The fifty states have all powers and functions not expressly given to the federal government by the Constitution.

  The requirement that privately owned utilities buy from independent generators was set in federal law in 1978. The requirement for open access to transmission lines was set at the national level in a 1992 law and continues to be implemented by the Federal Energy Regulatory Commission (FERC).

  State regulators set prices for end-use customers. About a third of the states have implemented various forms of retail competition. This trend has been halted and even reversed as other states study the causes and consequences of the California crisis

  Major national level restructuring laws are being considered, but none has been adopted. One of the major disagreements is how authority over the industry should be divided between state and federal regulators. The electricity crisis in California in 2001 has highlighted this question.

- **Canada**. Canada has no national restructuring law. Under the Canadian constitution, electric power and electricity regulation are provincial responsibilities. Canada's electrical industry is organized along provincial lines. Government-owned corporations generate

about 80% of the country's electricity. The remainder is divided among investor-owned utilities, municipal utilities, and industrial establishments that generate their own power. The federal regulatory role is restricted to nuclear energy and international and inter-provincial trade. Of Canada's ten provinces, Alberta and Ontario are the most active with respect to electric industry restructuring.

- **Australia**. Australia also began restructuring at the provincial or state level. Prior to the reforms of recent years, electricity was supplied by vertically integrated, publicly owned utilities meeting the needs of individual states and territories. The electricity industry had never operated on a national basis. Interstate grid connections were weak and electricity trade had been limited between the interconnected states. The state governments were responsible for operational and planning activities and tariff structures. The national government's only direct involvement in the industry was through its shareholder status in a particular hydroelectric plant. Some regulatory controls by the central government were exercised through control over state borrowing limits, taxation, foreign ownership, and environmental regulations.

  Electricity reform has occurred at both the state and national levels. Australia's dual path to electricity reform bears some similarities to current developments in US electricity markets. One result of Australia's approach to electricity reform is that each state has pursued different reforms, with reform efforts at the national level providing more guidance than direction. This has resulted in complaints that the roles of existing market institutions are unclear and overlapping, thereby leading to added costs and uncertainty for market participants.[24]

- **India**. India has been pursuing restructuring at the central and state levels. The most significant impediment to restructuring in India has been the bankrupt, or nearly bankrupt, position of state level utilities. In addition, India has had some difficulties with jurisdictional separation in its federal-state regulatory scheme, with many state regulatory bodies being at odds with the Central Energy Regulatory Commission.

The experience of these four countries shows that the division of responsibility between different levels of government can be a continuing source of difficulty. Nevertheless, there are many options for allocating regulatory authority vertically among China's levels of government. Even where authority has been placed at the local level, some options allow central regulators to exercise an overriding authority when needed.

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[24] See "Creating A More Certain Environment For Customers And Investors In The National Electricity Market", ESAA, March 2002, http://www.esaa.com.au/store/page.pl?id=1475.

2.3.1. Benefits of a Centralized Regulatory Structure

There are at least three reasons to favor a strong central regulatory approach:

1. **Avoiding Jurisdictional Conflicts**. Successful and sustainable power sector reform requires a careful integration of many complex parts of the industry. It makes sense to avoid organizational structures that encourage jurisdictional conflicts. In particular, provision should be made to assure that SERC participates in energy planning and in environmental decisions affecting the electric sector.
2. **Power Markets Will Be Regional**. Power markets will be regional (*i.e.*, consisting of more than one province) and may eventually become national. As a general matter, larger markets are harder to manipulate or to dominate. China has several regional utility groups and organizations but it has no regional government institutions. This means that careful attention must be given to establishing sensible lines of authority between the national regulatory agency and provincial regulators. In particular, the national regulator should be capable of involving the provincial regulators in solutions to regional problems, and – if the provincial regulators cannot resolve a problem within a reasonable time – the national regulator should be empowered to do so.
3. **Provincial protectionism has been a historical problem**. In China, and in other countries, the historical protection provincial governments give to provincial businesses is one of the main problems power sector reform is designed to overcome.

2.3.2. The Benefits of A Decentralized Model

There are at least two reasons to favor a meaningful provincial role:

1. **Value of experimentation**. Experimentation and diverse experience will produce new knowledge. China has already benefited from the restructuring experience of other countries and from its own pilot programs. Creating provincial or regional regulatory bodies with some degree of independence is one way to encourage experimentation. It may also be possible to achieve the benefits of experimentation under a more centralized approach by deliberate decisions to try different approaches in different regions.
2. **Regional needs**. China is a very large and diverse country. The needs of some regions may be very different than those of others. Finding the best solution to local or regional issues will be difficult to do even with a very well staffed and trained central regulatory body.

2.3.3. Suggested Structural Model

The above considerations lead us to the specific recommendations below. However, regardless of what structure is chosen, it is important that there is a clear delineation of

responsibilities, strong arrangements for coordination and information sharing, and a clear method to resolve jurisdictional disputes.

2.3.3.1. Consolidate Regulatory Functions in SERC

As previously described, China's current electricity governance system is dispersed among too many agencies and departments; the approval process for investment is complex; much information is not made public; and existing methods of regulation are inefficient and not transparent. Therefore, economic regulatory oversight of the power sector needs to be consolidated into one agency with regional branches.

Confusion over jurisdiction should be avoided. Disputes between agencies that share authority create many problems. For many issues such as market structure, market rules, pricing, and licensing, SERC's authority should be primary and exclusive. In other areas, such as environmental protection, worker safety, and taxation, primary authority will be with another agency but SERC should have the responsibility and the obligation to consider environmental, labor, and other national goals and policies in making its decisions.

Concentrating authority in a single agency serves several purposes. First, it allows the agency to develop the full range of skills and expertise needed to make difficult decisions. It also tells market participants and customers where they should go to get matters resolved. Finally, it prevents market participants from taking their disputes from one agency to another, hoping to find a favorable result in one place if they are denied it in another.

Consolidation of all of the functions described below does not need to occur at one time. The most important functions to begin with are the high priority functions described in Section 2.4.1. Other functions can be transferred gradually as China gains experience with markets and regulation.

2.3.3.2. Structure - Central Regulation with Branch Offices

China's plan for power sector reform creates a strong need for a central level regulatory authority. The national regulatory agency should establish governing principles for issues that are national in scope or that require uniformity among all of the provinces. This will include matters such as generation market structure, market rules, market oversight, transmission pricing and access, and approvals of major investments.

Many specific functions such as distribution quality, customer service, and licensing small generators can be carried out at the provincial level. Indeed, given the diversity of China's power systems with many remote weakly interconnected provinces (such as Fujian) and the isolated system of Hainan Island, provincial regulation of such specific functions, with minimal involvement of the central regulatory body, may be most efficient.

However a mechanism should exist whereby problems involving more than one province, but not the entire nation, can be resolved at the national level if no regional resolution can be achieved. The same mechanism can be used where actions by regional or provincial regulators create a conflict between provincial and central decisions.

There are different ways to structure the relationship between the central regulator and the provincial regulator. One option would have a central agency with regional or provincial branches. This model has been adopted in China's banking sector. This structure is also consistent with the basic governmental structure, experience in China, and the suggestion of many Chinese experts.[25]

Another option is to allow provincial governments to create regulatory agencies that meet central level guidelines. In this model the SERC guidelines could specify the functions delegated to the province. The guidelines could also describe SERC's ongoing role in resolving inter-provincial disputes and other matters of national importance. We recommend a structure in which SERC has the power to refer such matters to the provinces involved for resolution within a specific time period. If the matter is not resolved within that period, then SERC itself will decide the matter.

Given the structure of governance in China, the federal/state issues that have arisen in the U.S., India, Australia, and Brazil are not directly applicable. A Chinese provincial government does not have the same degree of autonomy as those in other large countries, so provincial regulatory commissions will inevitably take substantial direction from the SERC. The pilot regulatory project in Zhejiang, for example, is working on the assumption that the provincial agency, once fully functional, will become part of SERC. In order that China benefit as much as possible from the lessons of different provincial regulatory approaches, we recommend a framework of central guidelines that allow for flexibility where national or regional issues are

[25] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

not directly involved. Under such an approach, regional regulators would be something more than mere branch offices of SERA, though less than the independent commissions that exist, for example, in the U.S. or in India.

2.3.3.3. Independence

Although the relationship of central and provincial level regulators is similar to the existing governmental structure, the new regulatory agencies will be more independent and thus be very different than existing government agencies.

In China, the central and provincial governments were historically the sole or primary builders, owners, and operators, of the power sector. Government agencies controlled electricity planning and pricing. Government-owned industries are also major electricity consumers and are the beneficiaries of significant electricity price discounts. Power sector reform to date includes substantial progress toward separating the business functions of the power sector from its governmental functions, but the separation so far is inadequate to support a competitive generation market that attracts outside private capital.

From the perspective of outside investors and possible new competitors, the same government that owns most generation will be making the new laws, market rules, and establishing the new regulatory agency. Persuading new "competitors" to invest capital with returns dependent on market success will not be possible until the newcomers are confident that their rights will be determined and protected by an entity with the stature and the competence to ensure fair treatment.

Independence is achieved through the selection of the regulator for fixed terms (three to seven years), removal of regulators only for serious violations of laws, regulatory decisions made in writing and based on information and communications made part of a public record, limitations on private communications with parties, public access to information and proceedings, an effective appellate process, and funding through fees or charges on the regulated industry.[26] (See Section 4.2 and Appendix 0 for a recent review of funding options.)

Of course, SERC cannot be completely independent of the rest of the government. Fundamental national policy issues are involved in the energy sector, and legitimate ways must exist for these issues to be communicated to the commission and to be reflected in its decisions.

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[26] See also Section 1.6 of " Power and Gas Regulation – Issues and International Experience," World Bank Draft Working Paper, April 2001.

Government direction can be provided through changes in law, through the appointment process, and through communications to SERC that are available to the public. SERC's ability to preserve confidence that decisions are not being made on a political basis depends heavily on the regulators being able to make decisions on the merits of the matters before them. What must be avoided if independence and transparency are to be maintained are secret communications from the government to SERC seeking to influence decisions.

2.4. Regulatory Functions

China has set as its most immediate power sector task the creation of a competitive generation market that can attract investment needed to meet growing electricity demand in an environmentally sustainable fashion. We have identified a group of regulatory functions that should be given to SERC to assure that this high priority goal is achieved. This first group of functions should either be carried out at the central level or at the provincial level under guidance from the central level.[27]

2.4.1. High Priority Functions

2.4.1.1. Market Structure, Market Design, and Market Oversight

The fundamental characteristics of competitive electricity generation markets are well understood. They include a viable number of actual competitors, no one of whom is in a position to control pricing in any market sector, ease of entry and of exit, equal access to all essential facilities, equal access to market information in connection with the use of essential facilities, an opportunity for load response and other demand-side initiatives[28] to compete on fair and equal terms, recognition of the unique advantages of some renewable resources, and environmental standards applicable equally to all entities.

The ability of a competitive generating sector to meet growing demand in a reliable and environmentally sustainable manner depends on the design and operation of the generation market, and on the use of long-term contracts with financially strong distribution utilities. A

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[27] The high priority functions described in sections 2.4.1.1.3 and **Error! Reference source not found.** will only be exercised during the transition period. The remaining functions will be a continuing responsibility.

[28] A recent study of US markets by the US Federal Energy Regulatory Commission showed that the benefits of fully incorporating demand-side management in power markets were five times larger than the benefits of expanding regional markets. "Economic Assessment of RTO Policy," prepared for FERC by ICF Consulting, February 26, 2002. For a summary see http://www.ferc.fed.us/calendar/commissionmeetings/Discussion_papers/ 02-27-02/rtostudy-presentation.pdf.

basic role of SERC is to oversee the creation and operation of the market without protecting any particular group of generators.

SERC will require the power and the skills to implement structural market reforms, including separation of generation from transmission and divestiture of generation in markets with excessive concentration.

Near-term tasks that must be overseen by SERC include several issues relating to the separation of generation from the grid.

2.4.1.1.1. Market Power

Identifying and preventing market power abuse is a key function of SERC. Market power has been a serious problem in most countries and our observations in Zhejiang suggest the serious potential that market power problems exist in China. The special characteristics of electricity, especially the fact that it cannot be stored, mean that conventional measures of market power risk, in which four or five equal size competitors are presumed to be sufficient to avoid market power problems, are not reliable.

Market design and market monitoring are likely to be two of SERC's most important functions. Many tools are available to reduce the possibility of competitors gaining market power, to remedy market power problems, and to reduce the consumer harm resulting from the exercise of market power. Necessary tools include the following:

2.4.1.1.1.1. Market Monitoring

SERC's rules should delineate the basic parameters of competitive markets and should require strong market monitoring capabilities in each of the regional power markets. SERC itself should have the power to investigate and punish anticompetitive market power practices.

The SETC has been developing anti-monopoly proposals, but currently China has the "Law of the People's Republic of China Against Unfair Competition" its application, both theory and practice to the electric sector has not been clear. Efforts should be undertaken to either aggressively apply existing laws to the new wholesale markets or to develop new laws that provide for comprehensive anti-monopoly prohibitions or associated enforcement. With respect to the power sector, this function should be given to SERC. Later, if new anti-monopoly agencies are given responsible for preventing anticompetitive practices throughout the Chinese economy, this function may be shared.

2.4.1.1.1.2. Mergers and Acquisitions

The ability to constrain market power necessarily includes the power to review and to approve mergers and acquisitions in all sectors of the electric power industry and to make such approvals subject to any necessary conditions. In the US, the electric sector began with many very small utilities. Mergers were often a desirable way of increasing the efficiency of the industry.

In China, the power sector began as one, or a few, large government-owned enterprises. Thus, splitting up the existing utilities is a high priority for power sector reform. However, worldwide experience in all utility sectors shows that with the introduction of competition, entities make proposals to merge or combine. Mergers can lead to elimination of real or potential competition and to the creation of unwise ties between competitive segments of the industry and the bottleneck monopoly transport infrastructure to which all competitors must have equal access. Mergers and other corporate reorganizations can also be used to create corporate structures designed to thwart regulation or to move assets beyond the review of regulators.

Review of mergers and acquisitions involving state-owned enterprises is generally under the authority of the Ministry of Finance. With respect to the power sector, this authority should also be given to SERC. Mergers should be approved only if they further the public interest. SERC should develop merger guidelines indicating the characteristics of desirable mergers. Mergers that clearly meet these guidelines should be assured expeditious and favorable treatment.

2.4.1.1.2. Vertical Market Power

Separation of generation interests from control of the grid is an essential step in creating a competitive generation market. Separation is not a physical process; it is a financial, accounting, and organizational process. SERC's responsibility will be to oversee and implement separation in a way that is fair and efficient, addresses questions of stranded expectations, and does not raise consumer prices.

2.4.1.1.2.1. Reform Existing Contracts

One necessary step to an efficient power market is the reform of existing contracts that are inconsistent with an efficiently competitive market. Existing contracts have two types of problems. First, the prices for some existing contracts may be well above market prices, and the contracts may include minimum take provisions. Second, many contracts include fixed and

variable costs in a single "energy" price. Thus, plants with low running costs may have a high "energy" price. Dispatching them on this basis is inefficient and expensive. Reforming existing contracts in ways that promote efficient use and dispatch should be a high priority task for SERC.

Experience in Zhejiang suggests that the substitution of long-term vesting financial contracts for the existing contracts is one transitional approach. Approximately 65% of the generation in Zhejiang participates in the pilot power market. These plants have replaced traditional generation contracts with CfD-type financial contracts.

Reformation of these contracts should be undertaken in the context of renegotiations or through a more formal industry-wide consultation. Care must be taken to protect vested interested from unfair treatment while removing existing problem provisions.

2.4.1.1.3. Stranded Cost

In 2000, the average generation price of all power generators in China was about RMB 0.29/kWh. The average generation price for generators built before 1985 was RMB 0.24/kWh, and RMB 0.33/kWh for generators built after 1985. The average generation price of 62 generators, whose prices were approved in 1997, was 0.41/kWh, and the average price of 70 generators, whose prices were approved in 1999-2000, was 0.36/kWh.[29] During the same period, the average spot market price in Zhejiang was slightly more than 0.26/kWh.[30] This suggests that competitive generation costs in China are between 0.26 and 0.36/Kwh. Meanwhile, the average retail electricity price in 2000 was about 0.38/kWh.[31]

Currently, the average generation price appears to be near competitive generation costs, which suggests that the potential for stranded costs (the difference between current and market prices for generation) is not as serious a problem as it was in the US.

Meanwhile, transmission and distribution prices, which average about RMB 0.09/kWh, may be too low to cover those costs. We understand that the Chinese goal is that average prices cannot increase as a result of power sector reform. This means separation of generation must be done in a manner that produces a different split between generation costs and grid costs.

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[29] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

[30] "A Review of the Zhejiang Electricity Market", World Bank Working Paper, August 2001.

[31] http://www.sp-china.com/newsp/english/financial/average2000.htm.

Otherwise, separation will produce higher electricity price increases as grid prices increase to cover grid costs.

There are at least three major options available to China to address these issues: debt reassignment, taxes, subsidies or transfers, and vesting contracts.[32]

- **Debt Assignment**. If the market value of existing generation exceeds the cost of existing generation, existing debt relating to transmission and distribution assets could be reassigned to the generating assets. Through this approach, the cost of existing generation could be increased to match its market value and the cost of the transmission and distribution system would be reduced.
- **Taxes, Subsidies, and Transfers**. Taxes, debt restructuring or subsidies of various sorts can be used to address stranded costs. In the UK, the stranded costs of the nuclear plants were recovered partly by an environmental tax on sales and partly by a government write-off.[33]
- **Vesting Contracts**. Many variations of vesting contracts can be used in the transition to a competitive generation market. For example, a plant with costs that are less than the market price may be required to enter into a contract for a period of years to deliver electricity at its low existing cost rather than the higher market price. This approach was used in the US and the UK.

2.4.1.1.4. Environment

Specific separation plans also need to consider the State Council decree placing equal environmental requirements on all generators. Accomplishing this will be easier if each newly separated generation company has similar average emission levels. Separation of generation into groups with similar fuel characteristics (*i.e.*, gas with gas, coal with coal) may increase market power problems and make environmental reforms more difficult. [34]

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[32] A fourth option, asset sale, is not discussed here because it is tied to privatization, which is not part of the next phase of power sector reform. See Working Paper 3 of "New Wave Of Power Sector Reform In China, Workshop Report And Working Papers", February 2001, State Development And Planning Commission, The World Bank, The Energy Foundation, http://www.worldbank.org.cn/english/content/powersec.pdf.

[33] In some U.S. states, the "strandable investment" cost was subsidized by the issuance of "securitization" bonds backed by a surcharge on customer bills. By redistributing costs and risk among taxpayers, investors, and customers, these bonds helped to assure rate stabilization goals, though they did not produce real savings. See http://www.rapmaine.org/secur.html.

[34] See, "New Wave Of Power Sector Reform In China, Workshop Report And Working Papers," February 2001, State Development And Planning Commission, The World Bank, The Energy Foundation, http://www.worldbank.org.cn/english/content/powersec.pdf.

2.4.1.2. Review, Amend, and Approve All Market Rules

SERC should be responsible for overseeing the development of market codes, or rules. Such codes apply to all aspects of the power market including market design, bidding and dispatch rules, transmission pricing and access terms, financial settlement procedures, and governance.[35]

Oversight and amendment of the market codes will be SERC's primary approach to regulating the power markets. An independent Market System Operator may be responsible for the day-to-day administration of the market code, but oversight of the market codes will be an ongoing responsibility for SERC. The actions of the market participants will expose weaknesses in the market rules, which, if left uncorrected, will have undesirable effects on price and perhaps reliability.

Regulators should review the market codes and all amendments to assure that the code is consistent with and encourages environmental improvement, fair competition, increased energy efficiency, load management, distributed resources, demand response, and renewables.[i]

2.4.1.3. Risk Management

Restructuring in many countries has encountered difficulty in the form of customer resistance to rapid price fluctuations, especially increases.[36] SERC should set standards governing consumer exposure to market risk and excessive exposure to spot markets. Regulators should determine how much of a supplier's electricity needs must be hedged through CfDs or other financial or physical contracts. One of the important lessons from the California crisis is the need for a balance of long- and short-term generation commitments. The design of competitive power markets provides many options to assure that efficient dispatch and investment decisions are made without undue financial exposure to spot energy prices.[37]

2.4.1.4. System Reliability, Safety, and Adequacy

As the power system moves from a government monopoly into a complex of privately owned companies, responsibility for setting reliability standards, assuring that they are met

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[35] The Zhejiang power market is governed by an existing market code. The market code currently covers many topics and functions, all of which should be subject to SERC's authority. The ZETC has been involved in the drafting of the market code. The market code has only recently been made public.

[36] Parts of the U.S. as well as Australia, Canada and Latin America have all had problems with highly volatile spot markets.

[37] See "Portfolio Management: Looking After the Interests of Ordinary Customers in an Electric Market That Isn't Working Very Well," Regulatory Assistance Project, July 2002, http://rapmaine.org/PortfolioMgmtReport.pdf.

efficiently, and assessing their costs according to sound economic principles will remain a governmental task. Private entities acting in their own self-interest will not perform this function well. Ultimately, SERC will need to determine a reasonable national standard of reliability, although local differences both as to the level of reliability and tariff principles can be tolerated. Emergency planning to deal with outages from events such as storms should be a provincial matter, though SERC may require that such plans be developed and that they meet certain minimum standards.

2.4.1.5. Transmission Pricing, Access, Planning, And Expansion

Whether the transmission grid is operated as a national entity or as a set of regional grids, the governing principles will have to be set at a national level. The determination that the transmission system is to be operated on a basis that gives equal access to all market participants should be part of the basic restructuring policy established by the government, but the implementation and the enforcement of this policy will be an important part of the regulatory task.

Providing for transmission planning and expansion is, in part, a matter of establishing economically sound tariffs. When such tariffs are in place, they will indicate which parts of the system are facing congestion and how that congestion can best be relieved. However, SERC rules must make clear who is responsible for undertaking the necessary planning and construction and also set out the regulatory principles that will assure that transmission is paid for. These guidelines should include full participation of demand-side and distributed generation options to insure that least-cost solutions to transmission problems are implemented. The guidelines should also seek to assure that uplift charges are applied only to measures bringing widespread benefits and do not result in charging costs to all customers of measures that benefit only a few.

Transmission expansion is an area where coordination with environmental agencies is also important. The direct environmental effects of siting and building transmission lines must be evaluated along with the indirect effects of transmission on what types of generation gets built and operated. In either event SERC should be required to consider the environmental implications of its transmission related decisions as well as to coordinate with environmental agencies.

2.4.1.6. System Planning

An important question raised frequently in China is whether a competitive generation market will provide the necessary incentives to build new generating capacity. The answer depends on many specific issues including how the market is designed, how well the regulatory system works, and whether regulators are able to modify the market rules or design in response to their assessment of the market's performance.

The recent California experience shows the need to assess the energy situation and plan for needed generation, transmission, and distribution. This is especially true for large systems that are experiencing significant growth.

SERC should set guidelines for comprehensive system reliability assessments and expansion plans. The results of the planning should be publicly available and should be submitted to relevant government agencies engaged in other planning and investment decisions. The planning function of SERC needs to consider the full range of resources in addition to conventional power plants. This includes the following:

2.4.1.6.1. End-Use Efficiency

Because the potential for cost-effective end-use efficiency in China is so large and because end-use efficiency can contribute greatly to China's environmental and sustainability goals, SERC should have a mandate to further efficiency in power markets.[38] SERC should adopt guidelines for load management, conservation, and energy efficiency in the transmission, distribution, and sale of electricity. This authority should extend to guidelines for end-use energy efficiency incentives for utilities. Because effective implementation of many end-use efficiency programs requires extensive contact with customers, implementation may be most effectively carried out at the provincial and/or local level.

2.4.1.6.2. Distributed Resources

Distributed resources are the fastest growing part of the utility industry. New and small sources of generation such as micro-turbines and fuel cells are rapidly changing the nature of many grids. As cost and performance (including environmental performance) improves, these

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[38] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip, and "Demand-Side Management In China: Barriers And Policy Recommendations", Barbara Finamore, Dr. Hu Zhaoguang, Mr. Li Weizheng, Mr. Lei Tijun, Mr. Dai Yande, Dr. Zhou Fuqiu, Mr. Yang Zhirong, 2002.

resources are increasingly providing the low-cost solution to consumer energy needs. SERC should consider the full range of issues related to distributed resources.

2.4.1.6.3. Renewable Energy

China has abundant renewable energy resources. Often renewable energy sources can provide cost-effective sources of power with far less environmental risk than conventional supply sources. The special technical and operating characteristics of renewables should be taken into account when designing markets, approving market rules, and adopting transmission pricing and access rules.[39]

2.4.1.7. Pricing

Pricing includes:

- Setting generation prices for non-market based units,
- Setting or approving transition generation contracts,
- Establishing transmission and other grid prices, and
- Setting retail prices.

Current restructuring plans in China would limit SERC's pricing responsibility to making "suggestions" to other agencies. Pricing responsibility would stay with existing pricing bureaus and the SDPC. This division of responsibility would be unique among the world's regulatory structures, and it poses serious risks. We believe the pricing functions must be one of the first high priority functions given to SERC.

Setting tariffs, or prices, for distribution and end-use sales is a basic function of electric sector regulation everywhere in the world. We have found no country where basic utility regulation is done by one agency and pricing by another.

There are strong reasons the pricing authority needs to be transferred to SERC:

- The financial viability of power sector reform rests on prices that recover reasonably incurred costs. Consumer benefits are realized if prices reflect the costs of an efficient, competitive, and environmentally sustainable industry. Consumers should be protected from the excessive cost of inefficient suppliers or from the exercise of market power.

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[39] Renewable Energy Development in China: The Potential and the Challenges, 2002, Zhang Zhengmin, Wang Qingyi, Zhuang Xing, Dr. Jan Hamrin, and Seth Baruch, http://www.efchina.org/documents/China_RE_Report_EN.pdf.

- Independence and transparency are two of the critical features of SERC that make it different than other government agencies. Creating an independent and transparent regulatory agency is essential to the next reform steps. One primary purpose of reform is to attract capital to meet growing demand. Independence and transparency in pricing is one of the most important functions to investors. Making SERC independent and transparent will do little good if pricing is done by agencies that lack both independence and transparency. Chinese experts have repeatedly said the existing pricing process is complex, irrational, and lacking in independence and transparency.[40] One option to address this problem is to create two separate regulatory agencies, one overseeing pricing and another – *i.e.*, SERC – overseeing everything else. This is inefficient and assures fragmentation**. Dividing the retail pricing function (state regulators) from the wholesale pricing, market development, and monitoring functions (federal regulators) was one of the main problems during the California crisis.**
- The manner in which prices are set is the fundamental means by which meaningful incentives for investment in generation, transmission, distribution, and end-use-energy efficiency are created. If tariff setting is done in a manner inconsistent with the setting of other regulatory policies, confusion and inefficiency are certain to result.

Considerable effort will be required to address the issue of pricing authority and to assure that there are no on-going disputes among agencies regarding pricing. Until pricing authority is expressly and exclusively given to SERC, provisions must be made to coordinate this function with existing agencies. Initially, a working group of officials from each of the affected agencies should address this issue with an eye toward facilitating pricing during any transition period and eventually transferring this authority to SERC.

2.4.1.7.1. Revenue Setting Methods

The first step in setting a utility's prices is determining its cost structure. Regardless of the theoretical pricing mechanisms used, each utility's financial health and ability to attract capital depends on its ability to recover its embedded costs. The utility's embedded cost level and structure will be affected by the separation of generation from the grid.

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[40] "Strategies for China's Electricity Reform and Renewable Development" 2002, Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C. http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

SERC should adopt rules or license terms setting forth its revenue and pricing methods and principles. As a general matter, rates should be set giving a regulated monopoly a reasonable opportunity to recover prudently incurred expenses (including investment) and a fair return on the remaining cost (the un-depreciated portion) of investment.

In practice, there are several different approaches for achieving this goal. They can be broadly categorized as cost-of-service regulation and performance-based regulation. All revenue-setting methods contain some sort of incentives for performance. Regulators must decide what kinds of behavior should be encouraged and what kinds discouraged. The answers to those questions will help the regulatory agency decide what tariff-setting approach will work best for its purposes. SERC should have the flexibility to use those revenue- and price-setting mechanisms that it concludes will best achieve the desired objectives.

2.4.1.7.2. Risk Management

As discussed in Section 2.4.1.3, one of SERC's tasks will be to decide how much exposure to the spot market distribution utilities should have. Because the risk of market power is greatest in spot markets, low levels of exposure to the spot market also mean low exposure to market power.[41]

2.4.1.7.3. Demand Response

Prices in efficient markets are produced by the constant interaction between supply and demand. A serious flaw in most power markets is that the demand side of the market has little or no means of participating. There are a number of barriers to demand-side participation (also called "demand response"), including the lack of sophisticated metering, the lack of real-time prices paid by consumers, and the lack of load-management and infrastructure. As a result, demand does not respond to changes in system costs. This leads to increased price volatility, reduced reliability, and increased risk of market power. Fully incorporating demand response in generation markets is an important tool to prevent market power problems. Effective demand response does not require the existence of competitive retail markets. The programs and policies

[41] See "Electrical Realities: Volatile Markets and Customer Desire for Stability," Regulatory Assistance Project, October 2001 http://www.rapmaine.org/ElectricalRealities.html.

that support demand response can be applied as easily in regulated retail markets as they can in competitive ones.[42]

2.4.1.8. Environmental Improvement

SERC should be involved in the formulation of environmental standards as they affect the power industry and should assure that generators do not gain any competitive advantage through an ability to emit pollutants to a disproportionate degree. SERC bidding guidelines and guidelines covering system dispatch should also reflect China's environmental goals and standards.[43]

2.4.1.9. Licensing Of Competitive Generators

In most countries, licensing, or permitting, requirements generally include review of financial and technical capabilities, verifying the existence of any necessary environmental permits, and compliance with market interconnection and operation rules.[44]

The existing licensing process in China is complex and involves many different government agencies.[45] Consolidating the licensing of competitive generators in SERC will simplify the process. A more predictable licensing process will reduce market power and make generation markets more efficient.

2.4.1.10. Dispute Resolution

Disputes between market participants (for example, between generators, between generators and market operators, or between generators and transmission entities) are inevitable during any utility industry restructuring. (Consumer complaints are addressed in section 2.4.2.4.) The integrity of the competitive marketplace requires that such disputes be resolved fairly, with a minimum of delay and expense. SERC's expertise can be of great importance in bringing about such resolution.

At the same time, such disputes have the potential to consume immense amounts of the regulator's time and attention, distracting from the resolution of other matters of national

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[42] See "Using A Demand Response to Stabilize Electric Markets," February 2001, http://www.rapmaine.org/demandside2.html.

[43] Likewise, SEPA should be involved in power sector reform and continuing regulation of the power sector to assure that SERC decisions do not inadvertently result in environmental harm.

[44] Generally, licensing does not include pricing. The exception is that licensing of generation with non-market based prices may require review and approval of prices.

[45] See "The Power Sector and Power Generation in China," World Bank Discussion Paper 406.

importance. Consequently, the decision of which types of disputes are to be resolved by SERC and which types belong in other forums is a very important one.

Disputes involving issues fundamental to the functioning of the market or to the regulation of monopoly utilities are likely to be best resolved by SERC. Examples of such issues might include disputes over open access, over anticompetitive practices, and over the dispatch of particular power plants. However, SERC should be careful not to get drawn into the broad range of commercial and other disputes that can arise but that have little or no importance to the basic regulatory mission.

2.4.2. Other Regulatory Functions

2.4.2.1. Transactions between Corporate Affiliates

Transactions between affiliates of the same corporation have a mixed history in the field of utility regulation. Such transactions can be a source of efficiencies, but they are often characterized by an unjustified preference for an affiliate by a monopoly. The monopoly's customers will have no recourse if their service costs are raised or if quality declines as a result of inferior performance by the affiliate.

In China, this function is of special importance because government-owned generating companies have extensive ownership and investment in non-generating businesses. Current plans are to separate these non-generation businesses from the generating companies, but the actual separation may take some time.

Regulators need the power to review and reject – or attach conditions to – transactions between related entities. They also should have the power to review and approve the creation of corporate affiliates of monopoly licensees. Regulators need also to establish "codes of conduct" that assure that such transactions are fair both to captive customers and to competitors.

2.4.2.2. Accounting and Auditing

Accurate information is essential to any regulatory process. It is also essential to investor confidence and to effective public review of energy sector activities. Currently, the responsibility for adopting and enforcing accounting rules in China is with the MOF. The accounting standards vary from industry to industry.

Regulators must have broad powers to develop reporting requirements and formats, to verify through inspection and audit the accuracy of the information, and to penalize those who provide incorrect information. Accounting irregularities have recently been involved in the

collapse of several large U.S. corporations (including several regulated entities). These collapses have cost investors billions of dollars and have dramatically affected public and investor confidence in the U.S. They have also lowered the values and the ability to raise capital of many other companies, even though they have not been directly touched by the wrongdoings.

One of SERC's earliest responsibilities will be the development of a uniform system of accounts and other reporting requirements for the energy sector. The basic financial reporting requirements should be uniform across the country, which will allow for fair comparisons of the financial performance of different companies.

SERC may adopt its own standard accounts and accounting rules that may be applied in addition to the MOF's set of accounts. This is a common practice in other countries and reflects the specialized reporting and accounting needs of regulation. For example, in the US utilities must maintain their books and records in accordance with the Uniform System of Accounts established by the FERC and to keep concurrent accounts in accordance with Generally Accepted Accounting Principles (GAAP). Affected companies simply keep a set books and records in conformance with both set of rules, maintaining dual accounting systems to meet the requirements of each.

2.4.2.3. Information Publication

Electricity markets require three basic types of transparency to function well: financial transparency, commercial transparency, and operational transparency. The California power market crisis involved significant failures of all three. Other examples of excessively volatile electric markets have probably involved at least commercial and operational transparency failures.

Financial transparency means that true and accurate accounting information about corporations whose shares are publicly traded is made publicly available. It is primarily a responsibility of the MOF, but – as to energy sector companies – SERC will want to be sure that these requirements be met. Commercial transparency involves maximizing access to information relating to the workings of the market itself. Regulators are often asked to make most information relating to bids, prices, and market share confidential – even historic information. A consequence of this is to put customers, policymakers, potential market entrants, and the public at a disadvantage to existing market participants in understanding market developments and

monitoring potential abuse. Operational transparency pertains to the workings of the electric system itself – for example, which units are being dispatched when and for what periods of time.

SERC should establish a strong presumption in favor of full transparency, and should withhold information from the public only when it is convinced that specific harm is the probable result of disclosure and that that harm outweighs the public benefit that transparency always brings.

2.4.2.4. Consumer Protection and Complaints

A basic regulatory responsibility is to protect small and large consumers from abuse and discrimination by utilities. To fulfill this function, SERC will face a series of tasks including the following:

- Setting basic consumer rights.
- Setting service standards. These standards will address technical matters such as voltage level, outage frequency, and metering requirements and non-technical matters such as payment responsibility, billing frequency, and dispute resolution. These rules may also specify enforcement and penalties for failure to meet service standards.
- Adopting a customer dispute resolution process. Possible approaches for dispute resolution include mediation, arbitration, and the use of a formal complaint procedure.

SERC should have the responsibility to identify, investigate, and resolve consumer disputes.

2.4.2.5. Licensing

In addition to its permitting authority in relation to generation, SERC should have the authority to permit other activities. For example, distribution utilities may be licensed for specific periods of time. Private investors may be licensed to build and operate specific transmission lines, and new entities may be licensed to be retail sellers or providers of energy efficiency services. In any of these situations, the new entities should be required to establish that they have the necessary technical and financial capability to provide service as a condition of receiving a license.

If retail competition is allowed, SERC should have the responsibility to assure that retail sellers are financially and technically competent. Permitting requirements will also assure that retailers are aware of and will comply with all SERC regulations.

2.4.2.6. Financing Approval

In China, over 80% of total power sector assets are government-financed.[46] One of the goals of power sector reform in China is to decrease reliance on government capital and to increase reliance on private sources of funds. Streamlining the investment approval process is one step toward increasing reliance on private capital.

All power sector projects in excess of US $30 million now require approval by SDPC. Smaller projects are approved at the provincial level. The ability of provincial governments to avoid central approval has significantly contributed to the proliferation of small inefficient coal-fired plants. Closing these plants is now a major focus of power sector reforms.

The authority to review and approve financing power sector assets should be transferred to SERC. SERC guidelines for government-financed power sector assets and for any assets financed by a monopoly utility should ensure that the assets being financed are consistent with a reasonable system plan. SERC review should ensure that the cost of the financing is reasonable, and that no onerous terms regarding defaults or encumbrances on property are included in the terms and conditions of the financing.

[46] "Strategies for China's Electricity Reform and Renewable Development," Industrial Economics Research Department, Development Research Center of the State Council of the P.R.C., 2002, http://www.efchina.org/documents/WhitePaper_Fnl_EN.doc.zip.

Chapter 3. Administrative and Legal Processes

3.1. Introduction

This chapter describes the administrative processes SERC could use while performing the functions described in Chapter 2. International experience shows a very wide range of options for structuring a regulatory agency. Certainly, China's traditions of public involvement in governmental decision-making are markedly less inclusive than in many countries. Of course, the extent of public participation varies among the countries that have undertaken restructuring as well. Nevertheless, there are some minimum goals that must be met.

The process needs to be understandable to customers and investors. The basis for SERC decisions should be in writing and clearly stated. The agency's decisions must be consistent and predictable. The information on which its decisions are based should be available to the public. The process should give those affected by the decisions an opportunity to present their positions and facts in support of those positions, and require that the regulators explain if and how those facts bear on their decisions. It should operate in accordance with established rules and principles. An agency that is working in this way is said to be transparent.

In the following material, we have set forth a relatively inclusive model of a type that has worked reasonably well in our experience. China will, of course, develop its own process.

3.1.1. Public Notice of All Proceedings and Intentions

To assure transparency to those affected by SERC's decisions, all formal contested proceedings as well as informal rulemaking proceedings should begin with notice to affected persons and the public of the issues being considered. This notice should describe the matter to be considered and explain how affected persons can participate.

The notice may take, for example, the form of publication of a proposed rule or a proposed rule change, accompanied by an invitation to comment on it. The notice discusses the intention behind the proposal and explains how to participate in the proceeding and the proposed schedule for completing the process. In some cases, the proposed rule may come from a market participant or other person.

Less formal processes may involve open meetings, workshops, and written comments. The procedures may vary from one proceeding to another, with the decision makers employing the combination of steps best suited to giving them the information necessary to make their decision while hearing from those whose interests may be affected by the outcome.

3.1.2. Open Public Interaction

Any regulatory agency needs to allow a reasonable opportunity for those affected by its decisions to provide input. Decisions will be of a higher quality, and they will be more legitimate and acceptable to those who know that they have had a voice in the process. This participation can range from informal comments to formal pleadings and briefs, depending on the nature of the issues and the general procedures in place for the regulatory agency.

3.1.3. Open Information

Effective public participation often depends upon public access to information within the possession of the regulatory agency, the regulated utility, or other applicant seeking SERC action. In the US the general principle is that all such information is public unless it falls into one of several protected categories such as national security, commercial sensitivity, or personnel or customer privacy. There has been a general presumption in favor of releasing information unless good reason exists for withholding it.

3.1.4. Consumer Representation

All consumers should have the right to participate in the regulatory proceedings that may affect them, though the regulatory agency should have the power to chose the types of participation best suited to the matters under review. As noted above, formal public hearings may be desirable in some situations but they can rarely be said to be absolutely essential. Some proceedings may only affect market participants. Other proceedings may affect large and small consumers. Market participants and large consumers are generally capable of participating in SERC proceedings without special efforts being made by SERC. Small consumers, however, rarely have sufficient information or resources to participate effectively in regulatory proceedings. Options for assuring a public voice for these consumers include:

- Assigning this function to some members of the commission staff;
- Setting up a separate consumer advocate agency with this responsibility; or,
- Providing for the funding of nongovernmental organizations to fulfill this function in specific proceedings.

3.1.5. Written Decisions Based on the Information before the Regulators

At the conclusion of all proceedings, the SERC decision should be issued in writing. Commissioners who disagree with the majority may have the right to issue a statement of their views. The written decision should state the result, facts, and the reasoning on which the decision rests. The decision should also discuss the relationship between the case being decided and related decisions that the commission has previously made. These requirements are crucial. They permit effective review by an appellate body and they allow regulated entities and others to understand regulatory principles and to predict the types of proposals the regulators will approve or disapprove.

The decision should be based on the material presented to the commission during the proceeding. The regulatory agency may also use its own expert judgment; however, it should not make decisions on the basis of private communications from officials or participants. Private communications create suspicion that the regulators are not making independent judgments and they undermine the confidence that the regulatory commissions are created to engender. (See also Section 3.3.7).

3.2. Types of Proceedings

A range of procedures can be used for resolving regulatory issues. Some are more formal and "courtroom" oriented than others. These procedures will need to be adapted for use in China, in light of China's own legal traditions and requirements. The approach used for a particular proceeding should be determined by the nature of the issues involved. The administrative rules should state the type of procedures applicable to various proceedings.

3.2.1. Formal Proceedings

Formal proceedings, of which U.S. regulation provides the most extensive examples, adapt court-type procedures to the regulatory context. When such procedures are employed, the utility and other parties proceed as they would in a trial. In the US, this has meant that a case begins with a formal and extensive "filing" by the person seeking a regulatory action. Notice of the filing is given to the general public. Persons with an interest in the outcome are permitted to "intervene", to request additional information, to ask questions during a hearing, to present their own views (with supporting evidence) as to what the outcome should be, and to appeal the regulatory decision to an appropriate body if they feel that the decision is inconsistent with

applicable law or is not supported by the information and evidence presented during the proceeding.

Formal proceedings may take longer than other types of proceedings, but they also allow for more thorough examination of the matters at issue. They are best suited to situations in which important facts are in dispute and the interests of individual companies or customers are being decided. Examples include assessing the performance of particular companies, setting individual license conditions, setting some types of prices, or imposing penalties for violations of rules or orders.

The most important preliminary steps in a formal proceeding are the utility filing, the identification of the parties that wish to be involved in the proceeding, and the process that gives the parties the right to obtain information. The vast majority of formal proceedings never proceed to the trial stage where witnesses are examined. Most cases are resolved by agreement of the parties and the commission is asked to approve or reject the agreement. (See also Section 3.4).

3.2.2. Less Formal Proceedings – Rule Making

A wide range of less formal proceedings is also available to regulators. Such proceedings do not involve courtroom procedures, especially the questioning of witnesses. Instead, regulators rely more heavily on written submissions of several sorts. Less formal proceedings generally involve policy or legal questions applicable to the entire industry or part of the industry. For example, selecting a tariff methodology, implementing open access, amending the market code, setting standards of service to customers, criteria for licenses, interconnection requirements for generators, and filing requirements for particular types of permits could be resolved using less formal procedures.

The adoption of rules is one area where less formal proceedings are used worldwide. SERC will need to adopt both procedural and substantive rules.

Procedural rules tell the public and market participants how SERC operates and how it processes different types of applications. These rules describe the information that must be provided to SERC to process a particular request and how and in what period of time SERC will act on a request. Some of these procedures will govern the handling of matters of broad general applicability, such as the filing of tariffs, the furtherance of competition, or the issuing of licenses. Others will focus primarily on internal matters ranging from the handling of documents

to a code of ethics for agency employees. The procedures must balance the goals of efficient and rapid decision-making with fairness and with providing decision makers all of the information that they need in order to make sound decisions.

Substantive rules set forth agency policies that apply broadly. For example, a rule relating to service standards will set the quality of services utilities must provide and the consequences of violations of the standards. A rule relating to licensing of competitive generators may set the specific rights, duties, operational conditions, and technical interconnection standards for generators.

Many countries, including the US, the UK and Australia, make extensive use of less formal approaches. Proceedings often start with a written discussion paper and a written comment process. Depending on the importance of the issue being addressed there may be multiple rounds of proposals, comments, and workshops before a final decision is made.

3.3. Some Specific Types Of Rules

The following are some of the areas for which the commission will need to have rules or procedures in place as it begins operations:

3.3.1. Minimum Data And Format Requirements For Applications

Often, a utility or other entity will file a request for regulatory action of some kind – a license, a tariff increase, permission to build new facilities, or a complaint against another entity. The filing should be made in writing and should describe in detail the issue and proposed resolution of it. The information that should accompany a filing is typically set out in one of the agency's rules. The absence of that information is usually grounds for not processing the filing, thus requiring the applicant to complete the filing before the regulatory agency will consider it.

Filing requirements are important in order to assure that filings can be processed efficiently and completely. If a proceeding can commence with a superficial filing, much time may be lost while the regulatory staff, the applicant, and any other participants argue back and forth as to what additional information is necessary.

3.3.2. Rules for Dispute Resolution

Rules regarding consumer rights, resolution of disputes between customers and utilities, and resolution of disputes among market participants are important to assure regulatory efficiency and predictability. There is a broad range of informal dispute resolution techniques,

including mediation and arbitration.[47] These procedures are usually quicker, less expensive, and may provide greater confidence to the affected parties than more formal processes. SERC will need to have personnel trained in the use of these procedures.

When disputes cannot be resolved informally, SERC will need to employ processes that distinguish between matters of interest only to the parties involved and matters of broader importance. With matters of broad importance, SERC may want to involve relevant parts of its own staff or take other measures to be sure that all interests are properly represented and evaluated. For matters of interest to a limited number of parties, the rules may provide an arbitration option.

3.3.3. Periodic Reporting

Accurate information, provided by the regulated entities on a regular and timely basis, is the lifeblood of the regulatory process. From its earliest days, the regulatory agency will need a uniform system of accounts, with variations applicable to the different types of entities that it regulates. Such records should be kept in accordance with internationally accepted accounting standards (or equivalent or higher Chinese standards if these exist). The filing of this information should be under the signature of the highest financial officer of the regulated entity, accompanied by a statement attesting to its accuracy and acknowledging the penalties for a knowingly incorrect filing.

3.3.4. Service Standards

SERC will need to adopt rules setting service standards to be observed with regard to utility customers. Separate rules may address technical and non-technical service standards. Technical standards will address matters such as voltage level, outage frequency, and metering requirements. Non-technical service standards will address matters such as payment responsibility, billing frequency, and dispute resolution. Service standard rules may also specify enforcement and penalties for failure to meet service standards.

3.3.5. License Applications

SERC will be responsible for issuing licenses for competitive generators. Later, SERC may also issue licenses for retailers. These rules will establish the financial and technical

[47] For some types of disputes, especially commercial disputes between market participants, SERC may want to encourage the use of third-party arbitration.

requirements for new market entrants.[48] Because ease of entry is one of the essential ingredients of any competitive market, it will be especially important that these rules be clear.

Some countries fulfill many of their regulatory functions through licenses. Granting licenses may involve a mix of formal and less formal procedures. Standard terms for all licenses may be decided using less formal procedures. Terms that are specific to a particular licensee may involve a more formal process. This process may give more assurance to investors, because the license may be tailored to the needs of individual companies, and the terms may be hard to change without the consent of the license holder.

In a country as large as China, regulating by license will require the regulators to spend a great deal of time drawing up licenses and then adopting modifications as circumstances change. Of course, the license holders may object to the changes or engage in practices designed to overcome such changes. These difficulties caused the US to abandon license-based regulation many years ago in favor of a more flexible system of generic rules applicable to many utilities. In such a system, the rights of the license holders are protected not by their contracts but by the regulatory law, associated regulations, and applicable constitutional principles.

3.3.6. Ethical Rules

In order to assure high confidence in the regulatory agency and to assure that employees have clear guidance as to acceptable behavior, ethics rules should be adopted. The purpose of these rules is to avoid any conflicts that could bias the fairness of regulatory decision-making or undermine public confidence in the regulators or the regulatory process. The critical components of such a rule include:

- Prohibition against any financial ownership or interest in any entity with an interest in regulatory agency decisions;
- Prohibition of any outside employment by regulators;
- Prohibition against accepting gifts of any sort from anyone with an interest in regulatory decisions;
- Prohibition against political influence or interference; and,
- Avoidance of all types of bias or prejudgment.

[48] To see the standard terms and conditions of generation licenses in the UK see http://www.dti.gov.uk/energy/gas_and_electricity/regulation_policy/licences/sc1_elecgen.pdf.

3.3.7. *Ex Parte* Rules

Ex parte rules establish the limits and conditions on permissible communication between those who are affected by SERC decisions and the decision makers. *Ex parte* communication is considered to be any written or oral communication between a person affected by a SERC decision and SERC members without the presence or knowledge of other participants. As a general matter, *ex parte* rules prohibit this type of secret communication. The entire concept of an open and transparent regulatory process is undermined if *ex parte* contacts are allowed.

3.4. Settlements

In some proceedings, groups of participants – sometimes all of the participants – will reach a negotiated settlement of the outcome before the SERC reaches a decision. Such settlements then have the status of a recommendation to the Commission. Participants opposed to the settlement should still have an opportunity to present their positions, and a Commission decision approving a settlement should have the characteristics of other decisions discussed earlier.

The consensus involved in such settlements deserves some deference from regulators, but regulators still must exercise their own judgment. Settlements are by their nature treaties, *i.e.*, compromise documents satisfactory to all of the signatories. These compromises among particular parties do not necessarily yield the best result for society as whole. The Commission should be sure to consider this possibility before approving a settlement.

3.5. Legal Effect and Enforcement

Regulatory decisions are binding and must be followed unless a higher authority reverses the decision. Chinese law should provide that failure to comply with Commission orders could result in any of several actions: fines, other penalties (such as a reduction in rates of monopoly providers), or even revocation of a firm's permit to operate.

A regulatory agency needs clear powers of enforcement. These include an ability to get all necessary information, to inspect as necessary, to audit the records as well as the management and the operations of regulated entities, and to compel compliance through the courts or other means.

3.6. Enforcement and Remedial Powers

No regulatory process can succeed without adequate powers and resources for effective enforcement. The financial stakes in electricity regulation are so large that violations are inevitable. Unless violators are caught and punished, such conduct will soon undermine regulation. Countries – especially those in the former Soviet Union – that have denied meaningful enforcement powers to the regulatory agencies have found that the Commission is often ignored and is unable to act meaningfully even in the face of outright corruption.[49]

The enforcement authority must be set out in the documents or the laws establishing SERC. The necessary powers include prompt and complete access to all necessary information, the power to impose substantial fines, the power to penalize through tariff reductions, and the power to suspend and revoke licenses.

In some instances the tasks of enforcement are more difficult when the government owns the regulated entities. The tasks are more difficult because the incentives – in the form of enhanced or diminished profitability – that can be brought to bear on privately owned firms are much less effective against government entities, which are often not expected to turn a profit.

In other instances, government ownership may provide some very strong enforcement power in the form of the government's power to penalize or replace senior individuals who perform poorly or violate regulatory decisions. As discussed in Section 1.6.2, this is the situation in China. Periodic reports by SERC to the State Council on the management of government owned utilities could make the use of this power more effective and transparent.

It is especially important that enforcement proceedings be transparent. No penalties should be imposed without giving the accused violator a chance to review the evidence and to make a thorough defense. In the event that the markets are not functioning well because of the exercise of market power, the penalties might also include orders to pay damages to injured

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[49] "Report on the Regulatory Enforcement Procedures of the Georgia National Energy Regulatory Commission," Hagler Bailly for USAID, August 1999; "Enforcement of License Provisions in the Armenian Energy Sector," Hagler Bailly for USAID, October 1999; "License Enforcement, Report of the Licensing Committee, Central and Eastern European & Newly Independent States Regulatory Conference," 1998, http://www.narucintl.org/CEE-NIS/Meetings/Annual_Conference/2ndAnnual/licensing_issue-papers.html; "What We Have Learned in Our Licensing/Monitoring Practices," Licensing/Competition Committee, 4th Annual Regional Energy Regulatory Conference for Central/Eastern Europe & Eurasia, 2000, http://www.erranet.org/library/issuepapers/IP_LC_Lessons_%20learnt_Dec00.pdf; and, "Mechanism of Monitoring and Enforcement of the Conditions of Licensed Activities," Licensing/Competition Committee Monitoring Group Working Paper, 5th Annual Regional Energy Regulatory Conference for Central/Eastern Europe & Eurasia, 2001, http://www.erranet.org/library/issuepapers/IP_LC_Monitoring_WG_Dec01.pdf.

parties. Other remedial actions might include divestiture, revision of market rules, imposition of price caps, and orders prohibiting specific acts and practices.

3.7. Reconsideration and Appellate Review

3.7.1. Reconsideration

If a participant in a case believes a SERC decision to be unjust or unlawful it may ask SERC for reconsideration. The person will explain in writing the factual and legal basis for its request. Such requests must be filed within a certain number of days after the Commission's decision is issued (usually 15 or 30).

3.7.2. Appellate Review

In order to assure transparency and accountability at SERC, parties who feel that they have been treated unfairly must have an avenue of appeal to a body that, like SERC, must be independent and make use of procedures that are transparent and fair. SERC's responsibility is to administer and implement laws adopted by the PRC. If a participating person believes SERC has erred, he may, after SERC has dealt with a request to reconsider, appeal the decision to a higher court or tribunal.

There are two options for appellate review, the court system and a special tribunal.

As discussed in section 1.6.1, China's judicial system may not currently be able to provide institutional support for appellate review of SERC decisions. However, the judicial system is being reformed as a condition of China's entry into the WTO.[50] The reforms may soon progress to the point that the judicial system will have the needed independence and transparency to be a useful means of assuring that SERC actions and decisions are reasonable and lawful. If the court system is selected as the best appellate body, the high level and quasi-judicial nature of SERC actions suggest that appeals should go directly to one of the highest levels of the court system, preferably the highest court. Ordinary trial courts and lower appellate courts are likely to lack the expertise and perhaps the status to inspire confidence that they can handle complex regulatory appeals.

[50] See http://www.china-laws-online.com/china-WTO/WTO-chinese-legal-system.htm for a discussion of needed reforms of the legal and judicial system.

A second option, which may serve as either a permanent or transition mechanism until further legal system reforms have been implemented, is to create a special tribunal.[51] This might be a special panel consisting of three or five highly respected individuals, perhaps former members of the National Peoples Congress or State Council who have legal experience.

The tribunal members would be subject to the same ethical (Section 3.3.6) and decision rules (Section 3.1.5) as SERC.

Whether appeals are taken to the court or a special appellate tribunal, the scope of appeals should be limited. Considerations of efficiency as well as respect for the expertise of the regulatory agency suggest that the appellate review should be limited to determining whether the Commission committed any errors of law or procedure. The appellate body should not, generally, substitute its own findings of fact or sense of wise policy for the conclusions of the Commission. The appellate decisions, like those of the Commission, should be written, and the basis for the decision should be clearly explained.

Finally, if the aggrieved person believes, or the appellate tribunal has determined, that the disputed decision is in accordance with the law, there remains the option of seeking a change in the law.[52]

[51] In Australia, the Administrative Appeals Tribunal is a body that provides independent review of a wide range of administrative decisions made by the Australian utility regulator. http://www.aat.gov.au.

[52] Seeking a change in the law is not an appeal because even if the law is revised, the revision will probably only apply to future decisions.

Chapter 4. Organizational Structure and Funding

The organizational structure of a regulatory commission should follow from a clear understanding of the agency's mission and functions. In the structure recommended, the Commission's mission is the implementation of national regulatory and competition policies and the resolution of specific cases. The Commission is best made up of multiple commissioners who function in the mode of a decision-making board of directors – detached from the day-to-day management of the agency and with limited responsibility for personnel matters. The Commissioners, however, should have full access to the agency staff and be kept fully and currently informed of all matters within the commission's responsibility.

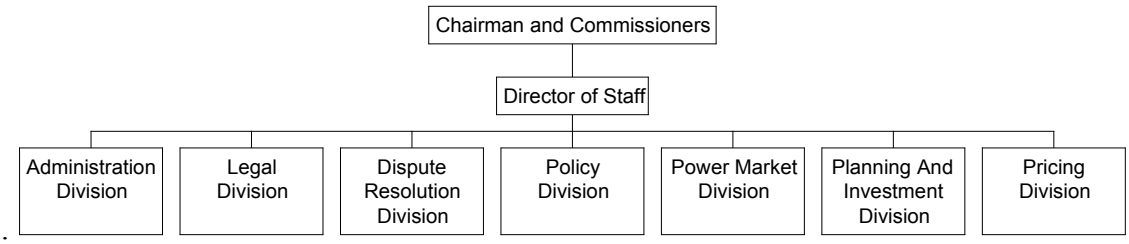
Of course, the best organizational structure cannot compensate for the appointment of unqualified commissioners. Commissioners must be chosen who can work competently and professionally together to further the interests of the Chinese people. Regulatory history contains many examples in which commissioners who were poorly chosen and who put personal interests ahead of wise and collegial regulation have nullified viable organizational structures.

4.1. Summary of Organizational Structure

This section describes the suggested organizational structure in more detail. The number or exact titles of positions are less important than the overall structure and the organizational principles.

The Commission may have three basic levels: the Commissioners, the Chief of Staff (or Executive Director), and various divisions. The high priority functions described in Section 2.4.1 correspond to the division structure.

A summary organizational chart is shown below.



4.1.1. Commissioners

Multi-member regulatory commissions are generally preferred to a regulatory agency headed by a single individual for several reasons:

- A diversity of viewpoints leads to wiser decisions on complex issues;
- There will be greater stability because the replacement of a single commissioner will not bring about a complete change in regulatory policy; and
- There is less likelihood of corruption or other improper influences affecting commission decisions.

Most national regulatory commissions in the US consist of five commissioners, but many of the state commissions have only three members. International experience is mixed. A review of several OECD countries shows the number of commissioners to range from one (UK, Finland, and Sweden) to nine (Spain and Canada).[53] In our experience, more than five results in inefficiencies and complexities that outweigh any gains in perspective. Almost everywhere, the head of government chooses the commissioners, often with confirmation by the legislative body. A few jurisdictions (including Great Britain and some US states) use some form of nominating or screening panels to assure that the candidates are well qualified and not nominated for political reasons. The characteristics are summarized in Table 3 below.[54]

Table 3 Commission Characteristics Examples

	Australia	Canada	Finland	Ireland	Italy	Portugal	Spain	Sweden	United Kingdom	United States
Board Members	7	9	1	1 (could increase to 3)	3	3	9	1	11[55]	
Length of appointment (Years)	Up to 5 years	7	Indefinite	Up to 7	7	5	6	Indefinite	5	5
Possibility of renewal	Yes	Yes	—	Yes (only once)	No	Yes	Yes, one time	—	Yes, one time	Yes

Under the recommended structure, the Commission could have three or five well-qualified voting commissioners, including a Chairman, who will serve as the agency's chief

[53] "Regulatory Institutions In Liberalized Electricity Markets," International Energy Agency, 2001.

[54] *Id*. Also see Section 2, " Power and Gas Regulation – Issues and International Experience," World Bank Draft Working Paper, April 2001, for a summary of the organizational structures of regulatory bodies in six additional countries.

[55] Until recently there was a single regulator in the UK. Under the new arrangement there is an eleven-member board that address major policy issues. A subset of five members comprises the OFGEM management committee.

executive officer and preside at commission meetings. Together, the commissioners should have demonstrated some familiarity with the economic, technical, and legal backgrounds involved in energy regulation. In addition, they should have a demonstrated commitment to resolving complex energy and environmental matters.

Each would have one vote to decide all matters coming before the Commission. The Commission would have the power to hire and remove the Director of Staff. The Commission should be consulted on all major administrative and personnel matters.

4.1.1.1. Chairman

The Chairman should be a person with significant experience in government and the energy sector and should be the official representative and spokesperson of the commission.

4.1.1.2. Commissioners

In addition to the Chairman, there could be two or four voting commissioners. The Chairman is ordinarily the presiding commissioner at all meetings, hearings or other official occasions. The Chairman may choose a deputy chairman from among the other commissioners to preside when the Chairman is unavailable.

Each Commissioner should devote full-time to the Commission's responsibilities and should hold no other position or employment.

For a period of two years after the end of his or her term of office, no commissioner should be employed directly or indirectly by any utility or other person or entity regulated by or interested in the regulation of the Commission.

4.1.1.3. Term of Office

Except for the first persons to serve as commissioners, each commissioner might serve for a fixed term of five or six years and eligible for only one reappointment. During the fixed term a commissioner may be removed only for serious violations of laws or incapacity. Having a fixed term with limited means of removal is one way regulatory agencies gain independence.

The terms of each of the first commissioners should be staggered so that no more than one commissioner's term ends in any year. This helps provide the agency with continuity and stability. In the event of a premature vacancy in a commission position, a qualified replacement

should be appointed to serve the remainder of the unexpired term. At the end of the unexpired term, the commissioner may be reappointed or a new commissioner may be appointed.

4.1.2. Director of Staff

The Director of Staff is responsible to the Chairman (and ultimately to the Commission) for the administration of the Commission. This responsibility can also include the management of documents and information so that all staff analyses and recommendations to the Commission flow through the Director of Staff's office, thus assuring the input from all necessary officials as well as timely completion and efficient distribution of the agency workload.

4.1.3. Administration Division

This division will be responsible for a wide range of activities including the following:

- Internal budget and auditing;
- Human resources including recruitment of qualified employees;
- Information Technology, including document management;
- Public information, including responding to requests for information; and
- Central liaison contact for relations with regional or provincial regulatory branches and other government agencies and officials.

4.1.4. Legal Division

This division will provide legal services to the agency and all of its divisions. It will be responsible for assuring that the agency follows the necessary legal processes to bring about transparency and for assuring that the agency follows legal requirements and bases its decisions on law, regulation, and its own precedents.

4.1.5. Policy Division

This division will have the responsibility of drawing together the expertise from across the agency and integrating that expertise into a comprehensive policy program. This division should be the most forward-looking in the organization. Examples of the type of work that this department will perform include:

- Development of transition strategies for implementing competitive power acquisition;
- Development of permitting standards;
- Inter-provincial "cross-border" transaction analysis;

- Development of rate design policies;
- Identification of and proposed resolutions for conflicts in existing government laws and regulations; and
- Identification of and proposed resolutions for competitive market issues.

4.1.6. Planning Division

This division will provide technical support to all other divisions for a variety of functions including the following:

- System planning assessments, including demand and supply forecasting, energy efficiency and supply resource assessments,
- Development and monitoring of plant and system performance,
- Transmission planning review,
- Distribution system review, and
- Environmental impact analyses.

This department will perform in-depth analysis of the operating electrical system, with an emphasis on reliability, safety, and environmental impact. It will also provide supporting analyses for cost allocation studies used by the Pricing Division in tariff design cases.

4.1.7. Power Market Division

This division will focus on the special needs and requirements of regulation in a competitive market environment. The division will focus on the identification of regulatory rules and regulations necessary to assure that the wholesale competitive markets are fair to all participants and are free from the exercise of market power. It will also be responsible for monitoring market performance and the behavior of market participants for signs of market power.

4.1.8. Pricing Division

The Pricing Division will be the principal department involved in rate design analysis, designing and assessing incentive programs, and cost-of-service determinations.

4.1.9. Dispute Resolution Division

Dispute resolution involves disputes between market participants and disputes between consumers and suppliers. This division's functions include:

- Preparing regulations governing the processing of consumers' problems;
- Ensuring the protection of the consumers' interests;

- Resolving disputes that could arise between different parties;
- Setting terms and conditions of service;
- Developing and implementing line extension policies;
- Customer education; and
- Setting electric service termination policies.

Because customers today have no effective means for protecting their interests or for voicing their concerns, the Division will have a key role to play in developing public confidence in the evolving electric market and in the role of regulation in the electric sector. This division will play a unique role in facilitating resolution of these problems.

4.2. Funding

The funding of regulatory commissions in most countries is based on an assessment (set by the government) on the regulated industries calculated to raise the necessary amount for the Commission. A summary of some nations' approaches to funding is shown in Table 4 below.[56]

Table 4 Funding Source Examples

	Australia	Canada	Finland	Ireland	Italy	Portugal	Spain	United Kingdom	United States
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	SERCharge on transmission tariffs	SERCharge 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

The industries' payments are mandatory and the industries have no control or influence over the use of the funds. The fee is a small percentage of their total revenues. It can be collected in a variety of ways (*e.g.*, in proportion to a company's share of the market or as fixed license charges) and frequencies (*e.g.*, monthly, quarterly, etc.). Among the most administratively simple and fair methods of funding the regulatory agency is to collect the monies on a per-kilowatt-hour basis. The more electricity a company produces or transports, the greater will be its share of the Commission's funding. Since it is typically the larger companies that demand more of the regulators' attention, this approach more fairly aligns the sources and uses of the regulators funds. It also imposes the least distortions on the market, since all

[56] "Regulatory Institutions In Liberalized Electricity Markets," International Energy Agency, 2001.

participants will be passing through to customers the same unit cost for regulation. China has had experience with this kind of funding mechanism (*e.g.*, levies for new plant construction).

The government often approves the overall budget and salary scales, but this approval does not depend on the decisions made by the Commission. The salary levels are set high enough to attract capable people with the necessary skills and good judgment.

Funding and support should be adequate to cover hiring expenses, including advertisements placed internationally; salaries; office space; training; the ability to hire consulting and auditing assistance as needed; travel in China and abroad; clerical and office support; and the purchase of office supplies and equipment.[57]

[57] Appendix 1 has a fuller discussion of regulatory agency funding. For details on how other countries organize and fund their regulatory agencies, and for additional recommendations in this regard for China, see "Funding of Independent Regulatory Agencies for Electricity: Options and Recommendations for China," National Economics Research Associates, 2002, and "Funding the Regulatory Commission," Mercados Energeticos, November 2002.

Chapter 5. Conclusion

The success of restructuring the electricity sector is highly dependent on the creation of a strong and independent regulatory body. SERC must be created and granted clear and adequate authority to answer the challenges of restructuring and to provide on-going regulation of the sector.

Here are the key steps to move the process forward:

Step1 – Give SERC necessary legal status

- Consolidate as many of the regulatory functions as possible in SERC. If all necessary regulatory functions cannot be transferred to SERC at the outset, a schedule should be set for the completion of a transition.
- SERC should have a clear mandate for furthering all public interests related to the electric sector.
- The extent of central and provincial authority should be defined.
- A mechanism for appeals from agency decisions and for accountability should be specified.
- SERC should be adequately funded and staffed to fulfill its mission.

Step 2 - Identify and select Commissioners and key staff

SERC Commissioners have been selected. The next step is to select key staff.

Step 3 - Identify and prioritize first year tasks

The first year of SERC's work is a critical time for two reasons. First, the credibility of the agency will be established in the first year of operation. If the agency fails in the first year to earn the trust and confidence of the public and the industry, its future and the future of reform will be set back substantially. Second, many key features of the reformed power sector will be established in the first year. The stakes are very high. Any significant error that leads to dysfunctional markets, degraded reliability, or adverse consumer effects will put reforms at risk. The "roadmap" to SERC's success needs to include three areas:

- Substantive regulatory actions. Major power sector reform issues will be made in the first year. These decisions will create strong vested interests that will greatly influence the direction and pace of all future reforms. Section 2 below discusses some of the most important and long lasting decisions.
- Procedural rules and SERC "process". In the first year, SERC will establish the process it will use to reach decisions. Investors, consumers, and others will judge the effectiveness and transparency of SERC by the process SERC uses to reach its decisions. These first impressions will be long lasting. Section 3 below describes some of the most important processes related issues.

- Institutional organization. In the first year, SERC will build an institution including the selection and training of its staff. The quality of the staff and the training they receive in the first year of operation will have a strong influence on SERC's effectiveness. Section 4 below discusses some of these issues.

These points were made by the World Bank in an October 2002 Working Paper entitled "Establishment of a State Power Regulatory Commission in China: A Suggested Roadmap".

5.1. Substantive Regulatory Actions

The following is our view of the ten most important substantive issues that SERC will address in the first year. Some of these issues may not be fully decided during the first year, but the first year will produce important initial decisions and guidance on how the issues will be decided.

5.1.1. Market structure and market rules

SERC will need to decide the basic market structure and market rules. These decisions will affect the value of existing plants and the type and location of plants built in the future. Special attention will need to be given to market power issues, incorporating the opportunity for load response and other demand-side initiatives to participate in the market, accommodating the unique benefits and characteristics of some renewable resources, and designing markets so environmental standards apply equally to all entities.

5.1.2. Market power

Identifying and preventing market power abuse is a key function of SERC and work in this area should begin as soon as possible. Market power has been a serious problem in most countries and our observations in Zhejiang suggest the serious potential for market power problems in China. In our view, markets with only four or five equal size competitors will not be good enough to assure competitive outcomes.

First year rules should establish guidelines to measure and monitor market performance and should inform the market participants of the measures that will be used to maintain competitive markets.

5.1.3. Separation issues

Separation of generation interests from control of the grid is one of the first steps in creating a competitive generation market. SERC's responsibility will be to oversee and implement separation in a way that is fair and efficient, addresses stranded expectation issues, and does not raise consumer prices.

Separation issues are especially important because they will have a long lasting influence on the economic and competitive interests of the newly formed generating companies. In addition, as in section 2.4.1.1.3, how the separation is accomplished will effect whether reforms yield higher or lower prices and whether environmental goals are easier or harder to meet.

5.1.4. Reform Existing Generation Contracts

A very early step in power sector reform will be the reform of existing generation contracts. The reformed price level will affect whether electricity prices increase or decrease. The reformed price structure will affect the extent to which existing generation can be dispatched more efficiently. The reformed contracts may also set conditions rights, duties, and responsibilities of existing generating companies including the obligation to meet more stringent environmental requirements.

5.1.5. Distribution utility obligations

Spot markets will only provide a small portion of the electricity sold by distribution companies for two reasons. First, excessive reliance on spot markets increase price volatility and exposure to market power. Second, the financial strength and certainty of spot markets will not support the new investment needed to meet China's rapidly growing demand.

SERC will need to address the obligation of the distribution company to meet demand with a reasonable mix, or portfolio, of short-term, long-term resources, demand-side, and supply-side resources.

5.1.6. Revenue setting methods

SERC should adopt rules or license terms setting forth its revenue and pricing methods and principles. There are several different approaches for achieving this goal. They can be broadly categorized as cost-of-service regulation and performance-based regulation. All revenue-setting methods contain incentives for performance of some sort. Regulators must decide what

kinds of behavior should be encouraged and what kinds discouraged. Adopting methods that encourage investment in end use energy efficiency should be a high priority.

5.1.7. Transmission access, pricing, and planning

Transmission pricing and access rules are critical parts of competitive generation markets. Providing for transmission planning and expansion is, in part, a matter of establishing economically sound tariffs. When such tariffs are in place, they will indicate which parts of the system are facing congestion and how that congestion can best be relieved. However, SERC rules must make clear who is responsible for undertaking the necessary planning and construction and also set out the regulatory principles that will assure that transmission is paid for. These guidelines should include full participation of demand-side and distributed generation options to insure that least-cost solutions to transmission problems are implemented.

5.1.8. Environment

Many of SERC's substantive decisions will have environmental implications. Market rules, planning obligations, and pricing decisions will affect what types of plants are built and operated and what level of investment is made in pollution control equipment. China's goals for increased use of natural gas and renewable energy need to be incorporated in SERC decisions.

SERC should also be involved in reforming power sector environmental standards to assure that generators do not gain any competitive advantage through an ability to emit pollutants to a disproportionate degree. SERC bidding guidelines and guidelines covering system dispatch should also reflect China's environmental goals and standards.

5.1.9. Licensing competitive generation

China's rapidly growing demand means SERC will have immediate and ongoing reason to begin licensing competitive generators. Reducing barriers to entry while protecting consumers and the environment are important licensing considerations.

The existing licensing process in China is complex and involves many different government agencies.[58] Consolidating the licensing of competitive generators in SERC will simplify the process. A more predictable licensing process will reduce market power and make generation markets more efficient.

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[58] See "The Power Sector and Power Generation in China," World Bank Discussion Paper 406.

5.1.10. Planning

The recent California experience shows the need to assess the energy situation and plan for needed generation, transmission, and distribution. This is especially true for large systems that are experiencing significant growth.

SERC should set guidelines for comprehensive system reliability assessments and expansion plans. The results of the planning should be publicly available and should be submitted to relevant government agencies engaged in other planning and investment decisions. The planning function of SERC needs to consider the full range of resources in addition to conventional power plants including end-use energy efficiency, renewable energy, and distributed resources.

5.2. Procedural Rules and the SERC "Process"

It is widely accepted that SERC regulation should be transparent. In the first year SERC will adopt procedural rules that will define its transparency. This means "how" SERC reaches decisions on the substantive issues discussed above is as important as the actual decision. The process SERC uses in its first year will form a lasting impression on stakeholders about the transparency of the agency. Does it offer an open and fair forum for resolving important regulatory issues? Are the parties encouraged to participate? Are the parties allowed adequate access to information? Is it apparent that decisions are made based upon the input of the participating parties? Are the decisions of the agency rational and easily understood from the facts presented in the public process? Independent regulation is a new concept in China. SERC's first year presents it with the opportunity to establish its transparency and distinguish itself from historical agency processes under the planned economy.

SERC needs to decide what process it will use to decide each of the substantive issues listed above. The process selected must inform stakeholders of the issues to be decided, the policies that will guide the decision, the initial proposed decision (if one exists), the process stakeholders may use to provide input and obtain information.

In addition, SERC's rules of procedure must address the following:

- The manner in which specific proceedings are initiated by both SERC and interested stakeholders;
- The form and content for filing documents and requests with the agency, including data necessary to support specific requests made by parties;

- The manner in which critical information useful for making regulatory decisions can be obtained by SERC and by participating parties;
- The manner in which stakeholders are allowed to make their positions known to SERC and other parties;
- The manner in which stakeholders are allowed to respond to the positions of other parties;
- The amount of time allowed for parties to take actions required or allowed under the rules of procedure;
- The form and manner in which the public is made aware of pending matters and of decisions of SERC; and,
- All other rules regarding the process of initiating, considering and resolving matters that come before the agency.

5.3. Organizational Tasks

5.3.1. First Year Organization Work Plan

First among SERC's tasks is its institutional organization. Expansion from the initial appointment of senior personnel to a fully functioning agency with both regulators and staff should be undertaken as quickly as possible. Closely associated with staffing requirements is the development of a working budget and implementation of a funding mechanism for the budget. Finally, significant training and skill development will be required. Based on these needs, the initial core senior personnel of SERC should formulate and adopt a First Year Organizational Work Plan that provides for each of these necessary organizational tasks.

5.3.2. Staffing

Staffing of SERC should be commenced as quickly as possible. There has already been significant work done by various NGOs, including The Energy Foundation and the World Bank, outlining the staffing needs of an electric sector regulator at both the State and provincial levels.[59] The experiences and recommendations contained in these documents are excellent starting places for SERC in assessing its staffing needs.

Working with international experts, SERC should develop a staffing plan based on international best practices. This should include staffing on a technical and expertise basis to include attorneys, economists, accountants and engineers. Recruitment for these positions

[59] See *Establishment of a State Power Regulatory Commission in China: A Suggested 'Roadmap' (Working Paper)*, The World Bank (October 2002); and *Draft Study On The Establishment Of ZERA: The Zhejiang Electric Regulatory Authority*, The Regulatory Assistance Project on behalf of The Energy Foundation China Sustainable Energy Project (October 2002).

should be conducted both within the existing electric sector and outside of the electric sector. This will assure that the new agency has a sound grasp of the industry based on the experience of personnel drawn from the industry, as well as an appropriate mixture of personnel with experiences beyond the electric sector, especially in the areas of market economies and capital markets.

5.3.3. Budget

Once the initial staffing requirements are identified, SERC will be in a position to develop its first year working budget. Budget requirements will include all of the regular expenses of any organization: office space, equipment, supplies, personnel, consultants, and training. In developing this budget, it is important to keep in mind the highly technical nature of the agency and the need for highly qualified personnel. This need will translate directly into the requirement of competitive pay scales for the technical staff of the agency.

5.3.4. Funding

Once the overall budget is determined (which should include funds to hire consultants and train staff), SERC must obtain the necessary funding to support its budget. International best practices indicate that this should be done through assessments on the regulated entities – on either a fee for service basis or on an ability to pay basis, such as a kWh charge.[60]

5.3.5. Training

As SERC builds its staff, it will face significant training and support requirements. While many of the individuals will have technical skills in their respective disciplines (such as economics or engineering), they will have little or no experience applying those skills as regulators. In the beginning, SERC may have to rely more heavily on outside, international experts, to assist it in analyzing its options and developing sound policies. Over the long run, however, it is critical that SERC build the necessary reserve of expertise within the agency to understand the issues it faces and develop sound regulatory solutions. Training during the first year should focus on the top 10 issue areas discussed above.

[60] See Appendix 1.

Appendix 1 – Funding Issues and Options

Experience And Options For Funding SERC
Regulatory Assistance Project
December 5, 2002

As a government agency charged with the regulation of a network industry and staffed with qualified professionals, SERC's activities need to be properly financed and employees need to be highly motivated. There are two general mechanisms by which the regulatory body can be financed: (1) through the government's general budget and (2) by collecting fees (a surcharge) from regulated companies. Below, we answer eight questions that we have been asked about US experience with these issues.

1. With respect to collecting fees from regulated companies to finance the Regulators' activities, why are fees preferred over a general budget approach?

We have reviewed the funding mechanisms in place for regulatory bodies in the US and selected countries. The comments and suggestions below are based on this review, as well as our personal experience with these issues.

Collecting fees (through kWh charges, a gross receipts tax on utility revenues, or filing fees) is superior to general budget financing because it assures a greater level of regulatory independence from the political process. Financing through the general budget means that the regulatory agency's budget will be subject to on-going political pressure. If, for example, the legislature is unhappy with the agency's decisions, it could threaten to cut the agency's funding, thus rendering it incapable of doing its job. We acknowledge that it is important that the agency's budget be reviewed and audited – under the US systems, kWh fee, a gross receipts tax, or other set of fees would need legislative approval – but separate budget and funding mechanisms will inhibit the legislature from appropriating the agency's cash and putting it to other uses.

In considering the method of funding for a regulatory agency, it is useful to distinguish between the sources of funds, on the one hand, and the method for budgeting expenditures, on the other hand. The fee-based approach is intended to directly recover the cost of regulation from the regulated entities. This assures that the cost of regulation is borne by the industry that is being regulated and not by others who do not cause the regulation to occur in the first place and do not benefit from the regulation. While it is possible to assess the cost of regulation through general taxes, the overall effect of such a method is to subsidize the regulated industry by forcing others to bear part of the expenses of the regulated industry.

There is a mixed experience in the US with regard to how the fees are accounted for after collection. In some states, the fees collected from industry are actually placed into the

government's general fund and the agency's expenses are paid out of the general fund (as approved in the agency's budget).

In other states, the fees collected are placed into a special fund for the regulatory agency. In most of these situations, any excess or shortfall in the fund will affect the fees assessed in the following year, in order to assure that the agency remains fully, but not over-, funded. Annual excesses are used to reduce the next year's fees while annual shortfalls increase the next year's fees. In some cases, the excess balance at the end of the year is placed into the government's general fund.

- In all cases in the US, the regulatory agency's budget is approved by the legislature (usually on an annual basis), in the same manner that all other government agencies are handled. This budget usually designates the number and types of employees that the agency can hire, as well as all other operating budget items, such as equipment, paper, office space, etc. The regulatory agency may only expend money as approved in its budget. The agency is also subject to audit procedures that apply to all other government agencies.

As shown in the following table collecting fees from the regulated sector is the dominant approach taken internationally

RAP Recommendation: We recommend that SERC use a simple per-kWh fee system to fund its operations.

2. What are the general principles of collecting fees from regulated companies? How is the level of the rate decided?

The regulatory agency's budget should be determined first. Once the total annual budget is known, the level of fees necessary to raise the money can be easily calculated. As a general rule, the fees are collected from the utilities either on an energy basis ($/kWh) or on a revenue or earnings basis. For example, if the regulatory budget is to be collected by a fee per kilowatt-hour, it is simple enough to divide the budget by the number of kWh expected to be produced by all the companies under the agency's jurisdiction. Electric rates should be set to include the fee, and the electric companies should be responsible for collecting the monies and remitting them to the regulatory body on a periodic basis (for instance, monthly).

The cost of regulation at the state level in the US ranges from approximately 0.2% to 0.5% (0.002 to 0.005) of utility company revenues. FERC, by contrast, collects much of its revenue from particular types of filing fees shown in the table below. The average cost of FERC regulation is less than $0.000019 per kWh.

FERC Filing Fees	
Petitions for Rate Approval	$9,090.00
Petitions for issuance of declaratory orders	$18,260.00
Requests for Written Legal Interpretations by the Office of General Counsel	$5,240.00
Application for Pipeline Certificate Authorization	$1,000.00
Application of Qualifying Status as a Small Power Production Facility	$15,700.00
Application of Qualifying Status as a Cogeneration Facility	$17,770.00
Application for Exempt Wholesale Generator Status	$990.00
Review of Department of Energy Remedial Order	$26,660.00
Review of Department of Energy Denial of Adjustment	$13,980.00

As shown in the following table, the effective costs for other countries are also very small.

Selected Country Funding Information[61]

	Australia*	Canada*	Finland	Italy
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	Tax on utilities' revenue
Effective Cost/kWh	$ 0.000179	$ 0.000034	$ 0.000013	$ 0.000036

	Portugal	Spain	United Kingdom	United States
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	Charge on the income of the regulated parties	Fees for services (filing fees) and annual charges on utilities
Effective Cost/kWh	$0.00009712	$0.00003824	$ 0.000070	$ 0.000019

Whether fees are collected from the utilities on an energy basis or on a revenue or earnings basis, the actual cost of the fees will be reflected in the utilities' cost of service and will implicitly be included in the tariffs charged by the utility. In many states, the fees are actually stated on customers' bills as a separate line item. In other words, customers usually end up actually paying for the fees, even though they are assessed against the utilities.

Most states make an annual determination of the fees required to pay for the agency's annual budget and then make an assessment on the utilities sufficient to pay for that budget (sometimes with an additional cushion amount). In some states, the fee rate is simply set by law and is only adjusted every few years, if at all. This latter approach will tend to over-collect the required fees over time, because total utility sales will tend to grow faster than the regulatory agency's budget.

[61] From "Regulatory Institutions In Liberalized Electricity Markets," International Energy Agency, 2001.

It is better to adjust the rate annually to match the regulatory agency's actual budget requirements.

RAP recommendation: We recommend that SERC make an annual calculation of the fee per kWh necessary to fully fund its budget for the ensuing year, with some small margin for unexpected expenses. Annual excesses or deficiencies in the fees collected should be used to adjust the fees for the following year.

3. What is the legislative procedure that approves the fee collection and rate of the fees?

The method of determining, assessing, collecting and accounting for fees is set forth in laws passed by the legislature. The specific process may differ from place to place, but in general it is a legislative process, since the fee is in effect a tax to support a governmental program. The legislature can either fix the fee in advance or delineate a method for the regulatory agency to calculate the necessary fees from year to year.

The legislature is responsible for approving the overall agency budget as well as assessing its performance. FERC, for example, files an annual report with Congress describing its goals, workload, activities, and performance. This document provides Congress with the opportunity to review agency costs and performance. See http://www.ferc.fed.us/about/mission/Fy03Budg.pdf.

RAP recommendation: We recommend that the decrees or laws that empower SERC to perform its functions also provide a method for the authority to fund its operations through fees.

4. How are fees collected? Through licenses? Fines? From whom? List all the items covered by fee collection.

A gross receipts tax on electric sales is probably the best and simplest method of collecting the money. It has the virtues of being fair, proportional (larger companies pay a larger share), easy to calculate, and easy to administer. Moreover, it does not need to be recalculated every year. It becomes a regular feature of doing business.

Fees are usually collected by the regulatory agency on an annual or other periodic basis (*e.g.*, quarterly). In some states, the fees are collected by the general tax collection agency of the government. As shown in the table above, FERC collects most of its fees through individual filing fees.

As a general rule there is a specific fee to cover the on-going regulatory costs of the agency. Where the agency also collects other types of charges, such as licensing fees, filing fees, fines, etc., the monies usually also go into the agency's revenue calculation. These funds may help to reduce the regulatory fee, although in some states these other fees are paid into the general fund.

The fees are assessed against the regulated entities. Historically, these were the vertically integrated utilities. Where the industry has been unbundled, the fee collection is slightly more complex. Because transmission companies generally remain regulated monopolies, they may be assessed a fee in the same manner as a vertically integrated utility would be. The same may be

said for the distribution utilities. Generators may be assessed a fee directly or may pay indirectly through the transmission company as part of a transmission access fee. The degree to which generators should be required to pay fees depends in part on the degree to which they remain regulated (even though they may be selling into an unregulated market). Because electric markets require continuing regulation, it is appropriate to assess generators for the cost of that regulation. This may be accomplished in a simplified manner by simply allocating some share of the cost to each of the components of the industry (generation, transmission, distribution) using some common factor for allocation (such as total revenues, total assets, earnings or some other factor).

Alternatively, the regulatory agency can attempt to determine the relative cost of regulation for each of the components of the industry (generation, transmission, distribution) and allocate to each its share of the total cost of regulation. That is, if the regulator finds that it is spending 60% of its budget on tasks associated with regulating the transmission functions, then 60% of its revenues would be collected from transmission companies. Each share would then be collected from each of the companies based on sales, revenues, earnings, or particular filing fees.

RAP recommendation: SERC should assess its fees through a mechanism that fairly allocates the cost of regulation to the electric sector. Because transmission is the common gateway through which virtually all transactions must be conducted, it would be simplest to assess the fees as part of the cost of access to the grid. This could be accomplished through a kWh charge assessed against generators who supply energy to the grid.

5. Who is responsible for collecting fees? Using the existing tax collection system or creating a new body?

As mentioned before, no new body is needed to collect the monies. SERC charges the fee to the grid company. The grid companies collect the fees and forward them directly to the regulatory body on a regular basis.

In most cases in the US, the regulatory agency is responsible for collecting the fees. In some states, the general tax-collecting agency will perform this function. We know of no cases in which a new, separate body was created solely for the purpose of collecting regulatory fees.

RAP recommendation: SERC should compute the fees annually and collect them on a periodic basis (annual, monthly, or quarterly).

6. How are the fees collected, kept and audited?

This is usually done through an assessment procedure or a filing procedure in which each utility files a statement reflecting its calculated responsibility for the fees and tendering payment to the agency. In all cases, four critical steps are involved. First a determination of the total amount required to pay for the agency's budget (total money to be collected, *e.g.*, $10 million) is determined. Second a determination of the base used to compute the fees is made. If the fee were based on a kWh charge, then the total energy for all companies who are required to pay the fee would be computed (*e.g.*, 10 billion kWh for the entire set of companies). Third a

computation of the fee rate is done (*e.g.*, $10 million divided by 100 billion kWh = 0.001/kWh). Fourth, a filing or disclosure from the utility verifies the amount owed by that utility [*e.g.*, Utility A has 765 million kWh in sales and so owes $765,000 (765,000,000 x 0.001 = $765,000)]. Payment is usually made at the same time or shortly after the utility's individual responsibility is determined.

The companies and regulatory agency should be required to keep accurate records of the amounts collected and used, and they should be required to file regular reports with the government department that is responsible for auditing other government departments and agencies. Audits of those who owe fees can be performed by outside auditors or SERC personnel whenever appropriate. Audits of the agency can be performed either by a government auditor or a contracted outside auditor.

When paid by the utilities, the funds are usually kept in a special account for the regulatory agency (although in some US states the funds are paid directly into the state's general fund). Once in the agency's account, the agency may then disburse the funds to cover its expenses, as approved in its budget.

RAP recommendation: SERC should deposit fees into its own operating account and manage the funds itself. The management and accounting of these funds should be subject to annual audit by a qualified auditor.

7. What is the level of compensation rate for staff of the regulatory agencies, compared with government officials? With industry average?

Generally, the specialized technical nature of the regulatory agency means that its employees are paid more than the staff of most other governmental agencies. In many states, regulatory employees are not part of the ordinary government personnel or hiring process. The regulatory agency is allowed to hire directly without using the state government personnel department. In order to attract and retain talented, skilled workers, it will be necessary to pay them wages that are comparable to the wages they could earn working for the regulated companies. We understand, however, that it is not always possible to do this. Nevertheless, every effort should be made to pay agency employees wages that are competitive with the marketplace.

RAP recommendation: If personnel are subject to governmental pay scale rules, then special categories may be needed for SERC, and the pay for SERC employees should be in the higher grades of governmental service. If personnel pay is not constrained to governmental pay rules, then SERC should assess necessary pay scales based on market conditions.

8. The scope of the activities that can be financed.

All of SERC's operational costs (salaries, equipment, supplies, office space, etc.) should be financed through the fee system.

In addition, to the extent SERC is empowered to pursue system benefits on behalf of the public (*e.g.*, energy efficiency or renewable energy programs, etc.), then SERC should consider the use

of an additional system benefits fee levied in much the same way as the fees used to pay for its operations.

RAP recommendation: All of SERC's costs should be financed through a fee-based system. In addition, SERC should be authorized to establish fees necessary to fund authorized system benefit expenditures such as renewable energy, energy efficiency and other programs.