

---

---

**Establishment of a  
State Electricity Regulatory Commission in China  
A Suggested 'Roadmap'  
Working Paper**

---

---

**October 2002  
The World Bank**

This working paper was prepared by Nouredine Berrah (Lead Energy Specialist, EASEG) and Joseph Wright (Young Professional, EW DEN). It is based on position papers prepared by Jon Stern (Regulation Specialist, NERA, UK) and Roberto D'Addario (Regulation Specialist, Mercados Energeticos, Argentina) following discussions held during two missions to China: the first being in April, 2002 including N. Berrah, J. Zhao (EASEG) and J. Stern, and the second in June, 2002 including N. Berrah, J. Zhao and R. D'Addario. The paper has also benefitted from review by Philip Gray (Senior Private Sector Development Specialist, PSAPP), Jianping Zhao (Senior Energy Specialist, EASEG) and Ranjit Lamech (Senior Energy Specialist, ECSIE).

# Table of Contents

<b>EXECUTIVE SUMMARY.....</b>	<b>1</b>
<b>A. INTRODUCTION.....</b>	<b>3</b>
<b>B. PRIORITIES AND TASKS OF STAGE 1.....</b>	<b>3</b>
WORKING METHODS.....	4
INSTITUTION BUILDING ACTIVITIES.....	5
HIGH PRIORITY REGULATORY ACTIVITIES.....	7
TABLE 1. PROPOSED STAGE I ACTIVITIES.....	8
<b>C. PRIORITIES AND TASKS OF STAGE 2.....</b>	<b>9</b>
INSTITUTION BUILDING ACTIVITIES.....	9
HIGH PRIORITY REGULATORY ACTIVITIES.....	12
TABLE 2: STAGE 2 ACTIVITIES.....	14
<b>D. INDICATIVE STAGE 3 TASKS.....</b>	<b>17</b>
INSTITUTION BUILDING ACTIVITIES.....	17
REGULATORY ACTIVITIES.....	17
<b>APPENDIX 1: STUDY VISITS, TWINNING AND TRAINING.....</b>	<b>20</b>
<b>APPENDIX 2: WHAT NEEDS TO BE REGULATED?.....</b>	<b>23</b>
<b>APPENDIX 3: SERC INSTITUTIONAL DESIGN CONCEPTUAL ISSUES.....</b>	<b>25</b>
TARIFF SETTING.....	25
RULES BASED REGULATORY METHODOLOGY.....	26
BENCHMARKING.....	26
LICENSES.....	27
STRUCTURE: LEVELS.....	27
BUDGETING FOR THE SERC.....	28
BEST PRACTICE FOR EXPANSION PLANNING AND INVESTMENT APPROVAL.....	28
<b>APPENDIX 4: ORGANIZATIONAL STRUCTURES OF REGULATORY AGENCIES.....</b>	<b>30</b>

## List of Charts:

- Chart 1. Organization Chart for Ofgem, United Kingdom
- Chart 2. Organization Chart for ENRE, Energy Regulator in Argentina
- Chart 3. Organization Chart for EMA, The Singapore Energy Regulatory Agency

# Establishment of a State Electricity Regulatory Commission in China

## A Suggested 'Roadmap'

### EXECUTIVE SUMMARY

This paper presents an indicative 'roadmap' for establishment of an effective and functioning State Electricity Regulatory Commission (SERC) for China by the end of 2003. The roadmap has been prepared based on preliminary discussions with the concerned Government agencies in China.

During these discussions two scenarios were considered: the first would aim for the establishment of an 'achievable' regulatory agency (limiting the functions of the SERC to those currently assigned to the State Economic and Trade Commission) and the second would aim to establish of an agency based on the needs of the industry and international 'best practice'. This Paper argues that: (a) the goal of the project should be to establish a 'best practice' 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*; and (b) 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 avoid regulatory gaps as the sector reform proceed; 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.

The recommended sequence (roadmap) of institution building actions is to (a) establish an SERC Core Team with the capability and necessary funds to perform the planned activities; (b) determine the functions and authority of the SERC in detail; and (c) prepare an SERC organizational structure and implementation plan.

The roadmap also presents for consideration several regulatory tasks that are deemed a high priority given the reform plan detailed in State Council Document No. 5. First amongst these is preparation of transitional generation and transmission tariffs. Thereafter the recommended priorities are (a) the design of decentralized regulatory arrangements (b) licensing of new generation entrants (c) preparation of power market rules (d) design of a regulatory reporting system. However, it should be noted that the

proposed actions, especially for the later stages of the project will, inevitably, need to be reviewed and revised as the project progresses.

With regard to working methods, the project should be lead by a team of Chinese experts (an inter agency working group and an SERC Core Team) with input from international experts as appropriate. For most regulatory matters discussion papers will be required as a basis for wide-ranging stakeholder consultation. Training, study tours and twinning arrangements will be required to build and enhance the capability and experience of the SERC Core Team. However, these must be carefully focused on specific regulatory tasks if they are to make their fullest contribution to the project objective.

# **Establishment of a State Electricity Regulatory Commission in China**

## **A Suggested ‘Roadmap’**

### **A. INTRODUCTION**

1. The Electric Power Sector Reform Plan (Document No. 5) issued by the State Council in April 2002 includes the establishment of a State Electricity Regulatory Commission (SERC) as one of its major objectives. The State Council’s groundbreaking decision to establish a Commission to regulate the power sector is the beginning of the long and intensive work process to establish a well functioning SERC. This paper builds on discussions held during World Bank missions to China in April and June 2002 and proposes for consideration a “roadmap” for establishment of the SERC, focusing on: (a) initial institution building tasks and (b) high priority regulatory tasks to establish an effective and functioning SERC by the end of 2003, as envisaged by the Chinese authorities.

2. The paper is structured as follows: (a) Section B discusses the first stage of the project and suggests ways to build a strong foundation for the SERC; (b) Section C focuses on institution building and priority regulatory tasks for Stage 2, and discusses priorities to achieve the objectives of the State Council’s Document No. 5 based on international experience; and (c) Section D suggests actions for Stage 3, but these are indicative only because the work-plan for this period will be contingent upon policy decisions made in earlier stages, progress with sector restructuring, and the development of initial rules and regulations.

3. Appendix 1 elaborates on the proposed arrangements for training, study tours and twinning arrangements. Appendix 2 provides a provisional list of the main electricity functions that need to be regulated. Appendix 3 presents a discussion of conceptual issues relevant to the design of the SERC. Appendix 4 provides a discussion of the key organizational choices affecting electricity regulatory agencies and reproduces the organization charts of electricity regulatory agencies in four countries.

### **B. PRIORITIES AND TASKS OF STAGE 1**

4. The main objective of Stage 1 is to: (a) establish the SERC Core Team; (b) finalize the road map for establishing a functioning Commission by the end of the project; and (c) provide the Core Team with the managerial capacity and skill required to successfully undertake the important tasks planned for later stages. It is anticipated that a Steering Group will take lead responsibility for this stage, with the participation of the staff of the Core Regulatory Team (see below) when they are recruited.

5. *This preparatory stage should focus on developing a regulatory commission according to the needs of the industry and international best-practice.* An approach based on a so called ‘achievable’ regulator, with limited functions reflecting the current status quo could undermine the credibility of the regulatory process even before it starts. *This project 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 to a new agency would be a seriously wasted opportunity.* It is clearly understood that establishing a State Electricity Regulatory Commission is a major undertaking that will require time, commitment and hard work. However, it is important at the outset to determine: (a) the regulatory tasks, mechanisms and structures necessary for an adequate supervision of the power sector based on the State Council Document No. 5 and international best practice; and (b) a realistic and explicit transition path with key milestones, a timetable and necessary processes to attain the target. It is therefore recommended that the goal of the project should be to establish a ‘best practice’ regulator, and that the prioritization of tasks to this end should be based on progress with (a) the government reform program; (b) electricity market reform; and (c) the development of awareness of policy makers and regulatory capacity of the Commission.

### **Working Methods**

6. ***Organization and Supervision.*** It is strongly recommended that a Steering Group<sup>1</sup>, meeting on a regular basis (e.g. twice a month or at least monthly), be established before the start of Stage 2. Similarly, it is also recommended that reporting lines and consultation obligations are established and made clear before the start of Stage 2. Putting clear arrangements of this type in place has been crucial for the smooth progress and success of the establishment of an electricity and gas regulatory agency in Singapore, Argentina and other countries.

7. One possible arrangement for reporting and project supervision is presented here for further discussion: Initially an SERC Core Team should be established under the leadership of the Chief Regulator. The Chief Regulator would also act as the chairperson of the Steering Group, reporting to the State Council. The Steering Group then would be responsible for supervising and advising The Core Team as it takes the required steps to create a fully-fledged regulatory agency. Both the Steering Group and the Core Team should be staffed with individuals with experience of regulatory and power sector matters (the idea of an SERC Core Team is discussed further in Section C).

8. It should also be noted that the establishment of a new regulatory framework is an iterative process. Decisions related to the responsibilities and structure of the SERC should not be approved by the State Council and/or included in new electricity legislation until (i) there has been a detailed allocation of regulatory functions that elaborates the

---

<sup>1</sup> The Steering Group could, for instance, include the Core Regulatory Group recommended later and representatives from concerned government agencies and representatives of the power industry.

policy in State Council Document No. 5 (ii) there is a detailed strategy in place for the restructuring of the electricity industry. - It is important for this sequencing to be correct if State Council decisions and new legislation are to be supportive of the reform process. *Therefore, while this may be a departure from the usual decision making process in China, it should be considered for the establishment of SERC.* It may be necessary for the Chief Regulator to have access to decision makers on a regular basis until an operational SERC is in place. Interim regulations will be required, in this case, to give the SERC Core Team the authority to begin establishment of the agency and commence the process that will culminate in the production of final regulations.

9. ***Working Methods and Expert Advice.*** It is expected that there will be a large number of issues that can readily be handled by Chinese experts. Papers on such issues might only be sent to appropriate international experts for comment. There will, however, be several critical issues – in particular the high priority regulatory tasks discussed in Sections C and D – for which the input of experts with extensive international experience will be required to ensure that the Project achieves its objectives in the most efficient way. International experts would be hired on ad hoc basis to carry out assignments that would help, for instance, in producing papers on key issues, providing lessons learned from international experience, and preparing options and making recommendation to facilitate decision making on important policy issues. The SERC Core Team should consider retaining a limited number of high-level international experts – both consultants and practitioners – *throughout the duration of the project.*

10. For many of the important policy decisions, it will be appropriate for a draft paper to be discussed at a *Workshop* (or a closed meeting involving all parties concerned) in China before the options and recommendations are finalized. These Workshops/meetings are important not only for consultation and consensus building; they can be important for knowledge transfer and training.

11. While it is clearly important that Chinese experts should be able to survey relevant international experience, it is advised that general study tours are not effective at providing the necessary information for a regulatory *implementation* project. They can be important and useful for development of initial regulatory design and institutional principles, but China has moved on beyond this stage. An alternative approach is therefore proposed whereby a combination of specialized training courses (both applied and academic), study tours and twinning arrangements with foreign regulators are employed in order to provide Chinese officials with the necessary depth of exposure to international experience. The suggested approach is set out in detail in Appendix 1.

### **Institution Building Activities**

12. ***Prepare a Current Status Report.*** This paper should be prepared by the SETC Power Department upon handing over regulatory responsibilities to the SERC. It should summarize all the main relevant regulatory functions for electricity and list (a) which agency is responsible for each function in China (b) any changes in function or change in

responsibility currently taking place or being planned; and, (c) regulatory functions not currently covered. A provisional list of regulatory functions is attached as Appendix 2. This provisional mapping of regulatory functions is intended to provide a starting point for the recommended Stage 2 activity to determine the SERC's functions in detail (see paragraph 24).

13. ***Establish a Core Regulator.*** Now that the high level managers of the SERC have been appointed, two main actions are required: (a) an SERC Core Team should be recruited to supervise and coordinate all subsequent working group(s) involved in the project, and to progressively take on regulatory functions starting with those currently exercised by SETC and/or not covered by existing agencies and; (b) a budget should be allocated to enable the Core Team to perform the tasks included in the project.

14. The SERC Core Team outlined in this paper should be progressively expanded during Stages 2 and 3 of the project to become a fully established agency with sufficient staff to perform its functions and responsibilities by the conclusion of the project. It should be noted that a decision on the final organizational structure of the SERC should not be made until the SERC's regulatory functions have been defined in detail. Reaching agreement on the SERC's structure is therefore an important activity following the detailed definition of SERC functions in Stages 2 and 3 of the project. Appendix 4 presents some of the main choices and options for the organizational structure of regulatory agencies, including examples from a few developed and developing countries.

15. The SERC Core Team will be headed by the Chief Regulator. It is recommended that the Chief Regulator should report directly to the State Council and that he or she should also act as the chairperson of the project Steering Group. The Chief Regulator should focus initially on finalizing the Roadmap and setting up the SERC Core Team to assist with the crucial initial stages of the project.

16. In terms of senior experts, it is anticipated that about 15 – 20 people will be required in two groups: (a) specialists on particular segments of the electricity industry e.g. experts on generation, on transmission, on dispatch, on distribution and supply, and experts on the structure and operation of the Chinese electricity industry at State, Regional and Provincial levels; and (b) experts on particular subject areas e.g. one or two economists, lawyers, accountants, engineers. Preference should be given to people who have experience in the regulatory aspects of these subjects. It may be possible to find people who can combine some functions e.g. people with both economic and engineering qualifications and experience. It would be reasonable for leading members of the Core Team to expect to be Department Heads or Deputy Department Heads within the later fully established SERC. A particular priority is to find a senior person who could lead work on developing pricing policies to ensure that (a) generation tariffs are reviewed and transitional rules are in place to manage transactions between the generation companies and transmission/network companies and (b) transmission tariffs (even if transitional) are



in place to ensure financial viability of regional transmission companies prior to the separation of generation mandated by the State Council before end of March 2003.<sup>2</sup>

17. Another way to ensure the quality and adequate skill mix of the Core Team is to secure 'secondment' of high caliber experts from the different government agencies and industry players. However, this approach requires a clear understanding that their task is to establish an effective regulatory commission rather than act as representatives of their agencies.<sup>3</sup>

18. It must be noted that only a decision about the staffing of the Core Team is needed and should be made early in Stage 1. Further decisions about the structure of SERC should not be made until power sector regulatory functions have been mapped in detail and allocated amongst the various agencies with authority relating to the sector (including those at State, Regional and Provincial levels). This activity is the first to be undertaken in Stage 2 of the project (see paragraph 24).

19. ***Finalizing the Action Plan for Stage 2.*** Following appointment of the Core Team and completion of the Current Status Report, the Action Plan for Stage 2 discussed below should be reviewed and confirmed by the Core Team in association with sector stakeholders.

20. *The Action Plan should indicate the relative priority of issues within the project and ensure that they are synchronized with the restructuring of the industry.* Establishing a regulatory agency and a regulatory framework in a country of the size and diversity of China at a time the industry is being actively restructured is a momentous challenge. Cooperation with the Group overseeing the restructuring of the industry is critical because: (a) the single most important determinant of what should be regulated is the structure of the industry; and (b) development of the Commission's capacity to regulate should be synchronized with the restructuring to avoid regulatory gaps and timing problems that could derail the reform process.

### **High Priority Regulatory Activities**

21. ***Commence preparation of transitional generation and transmission tariffs.*** This activity is a priority so that: (a) generation tariffs are adjusted to an economic level prior to the establishment of competitive markets; and (b) explicit transmission tariffs can be in place when State Power's transmission functions are separated from its generation functions. It is suggested that one of the initial tasks following the appointment of the Chief Regulator should be to review the analysis and recommendations of previous

---

<sup>2</sup> Developing and implementing adequate transmission tariffs would require more time than allowed by the reform schedule. It is therefore important to develop target tariffs with clear transitional steps before the unbundling of generation.

<sup>3</sup> Concerns of different stakeholders would be presented by their representatives during the consultation workshops or through their representatives in the Steering Committee discussed in para.

pricing studies in China. These include: (a) previous World Bank study of transmission in Zhejiang, issues identified in Chapter 4 of the 2001 World Bank Discussion Paper No. 416,<sup>4</sup> and (b) other pricing studies (generation and transmission) carried out by government agencies or provincial utilities in association with multilateral, bilateral and non government agencies. In addition, after its establishment, the SERC Core Team should be involved in all pricing studies (with high priority to transmission pricing) that will be undertaken within projects under preparation (e.g. the World Bank Yixing Pumped Storage Project as well as any other studies on transmission pricing that may be in progress under other projects.)

**Table 1. Proposed Stage I Activities**

<i>Objectives</i>			
<ul style="list-style-type: none"> <li>• Establish 'Core Regulatory Team' capable of performing anticipated functions and contributing to future reform policy decisions.</li> <li>• Finalize roadmap to establish operational regulatory agency.</li> <li>• Commence high priority regulatory tasks (preparation of transmission tariffs)</li> </ul>			
<i>Activity</i>	<i>Critical Inputs</i>	<i>Output(s)</i>	<i>Target Date</i>
<b>1. Establish Core Regulatory Team</b> <ul style="list-style-type: none"> <li>• Recruitment of core staff</li> <li>• Training for core staff</li> </ul>		<ul style="list-style-type: none"> <li>• Core staff commence work</li> <li>• Training provided for core staff</li> <li>• Twinning agreement in place</li> </ul>	<i>a.s.a.p.</i>
<b>2. Prepare Current Status Report</b> <ul style="list-style-type: none"> <li>• Define industrial, corporate and business-function structure of power companies at State, Regional and Provincial level.</li> <li>• List and define regulatory functions</li> <li>• Map regulatory functions to</li> </ul>	<ul style="list-style-type: none"> <li>• State Council Electric Power Sector Reform Plan (Document No. 5)</li> </ul>	Production of Current Status Report	<i>a.s.a.p.</i>

<sup>4</sup> "Fostering Competition in China's Power Markets" jointly published by the World Bank, the joint World Bank/UNDP Energy Sector Management Assistance Programme and State Power Corporation of China in March 2001.

responsible agencies (at State, Regional and Provincial levels), noting anticipated changes.			
<b>3. Finalize Stage 2 Action Plan</b> <ul style="list-style-type: none"> <li>Finalize definition of Stage 2 activities, outputs, delivery dates.</li> </ul>	<ul style="list-style-type: none"> <li>Current Status Report (activity 2)</li> <li>Preliminary Stage 2 Action Plan (below)</li> </ul>	<ul style="list-style-type: none"> <li>Production and approval of Stage Action Plan</li> </ul>	<i>To be determined by SERC (preferably before end 2002)</i>
<b>4. High Priority Regulatory Task: Preparation of Transmission Tariffs</b> <ul style="list-style-type: none"> <li>Review existing analysis and recommendation regarding transmission pricing in China.</li> <li>Participate in pilot transmission pricing studies.</li> </ul>	<ul style="list-style-type: none"> <li>Existing analysis of transmission pricing</li> </ul>	<ul style="list-style-type: none"> <li>Production of transmission tariff methodology and regulations for approval by necessary authority (to be determined)</li> </ul>	<i>To be determined by SERC (preferably before end 2002)</i>

## C. PRIORITIES AND TASKS OF STAGE 2

22. The objectives of Stage 2 are to: (a) determine the specific regulatory functions and organization of SERC; (b) develop a conceptual framework of power sector regulation in China; and (c) develop, obtain approval for and implement priority regulations to ensure adequate supervision of the power sector as it evolves. This work will depend crucially on having in place the recommended mapping of regulatory functions that was recommended as a key output of Stage 1. It is highly likely that the Steering Group will need to amplify the initial mapping as the main regulatory functions are broken down into sub-categories and further elaborated at State, Regional and Provincial levels.

23. It is anticipated that the SERC Core Team will take the lead responsibility for implementation of this stage with over-sight from the Steering Group.

### **Institution Building Activities**

24. *Determine the functions and authority of the SERC in detail.* As discussed in Section B, State Council Document No. 5, as a policy statement, provides a broad description of the functions of SERC. Based on these guiding principles, the Core Team

should establish a more exhaustive list of responsibilities and functions to ensure that SERC will be able to adequately regulate the sector. For example: SERC has, according to Document No. 5, the principal role in establishing tariffs and supervising quality of service. However, the SERC will not be able to perform these functions properly unless it has responsibility for: (a) regulation of capacity expansion projections and (generation, transmission and distribution) investment plans and project approval; and (b) financial and accounting regulation of power enterprises.

25. Point 4 in the State Council list of functions – ‘recommending price adjustment to the Government’ – requires clarification and further discussion. For instance, what is meant by “recommendation” and who will ultimately make the decision about tariff levels? With regard to price regulation, the priorities are likely to be: (a) agreeing the role of SERC and other agencies (e.g. SDPC) for *establishing methodologies* for the regulation of transmission, distribution and retail supply prices; (b) agreeing the role of the SERC (at State, Regional and Provincial level) relative to other agencies (e.g. SDPC, Provincial Pricing Bureau) for *making decisions* on the levels of regulated prices.

26. Setting methodologies for regulation of these prices is clearly a key task for SERC. It will be a major task of Stage 2 to develop, in collaboration with concerned government agencies, and agree on pricing principles and methodologies and submit a comprehensive policy (including decision-making responsibilities at the various government levels) for approval. Making decisions on transmission prices is likely to be a State-level (including regional regulatory branches) task whereas making decisions on distribution and regulated retail prices is likely to be a Provincial task. Procedures for industry participants to appeal regulatory decisions should also be considered at this point.

27. Equally important is the prioritization of the functions identified in the State Council List. Some, in particular (a) defining license arrangements, and (b) establishing a price regulation framework are clear priorities. Others may be considered later in the process of establishing an effective regulator. For example, the function relating to social obligations - who decides what they should be and the role of SERC in monitoring and enforcing them - is certainly important, but probably best considered *after* decisions have been taken on defining license arrangements and the nature of the price regulation framework.

28. It is therefore necessary, at the outset of (or early in) Stage 2 to: (a) clearly and exhaustively define SERC’s role, scope of authority and relationships with other governmental institutions and other stakeholders; and (b) define transitional steps to effect the agreed allocation of roles (which may require changes to existing electricity sector legislation - see paragraph 37). This work should be based on the principles of the State Council’s Document No. 5, previous work carried out on power sector regulation by various government agencies and international best practice. As mentioned above, a critical issue is the SERC’s role in price regulation and project approval.

29. **Prepare SERC Organization Structure and Implementation Plan.** Once the detailed functions of the SERC and the scope of its authority have been confirmed, it is recommended that an implementation plan should be prepared, including but not limited to:

- *Organizational structure:* The organizational structure should define the internal departments of the SERC, their relationship, decision-making authority, and reporting procedures.
- *Human Resources Plan:* The confirmation of the SERC's functions and the organizational design will be key inputs into this activity. The Human Resources Plan should include an assessment of required skills and experience, job descriptions, terms of service, a recruitment plan, and a plan for training and skills enhancement. The Human Resources Plan should provide for SERC staffing to increase in pace with the Commission's assumption of new regulatory tasks.
- *Information Technology Plan:* In addition to the normal IT systems required for office and financial management, the SERC' should develop IT systems capable of managing operational and financial data submitted by industry participants (see paragraph 38). An SERC website will also be an important means of disclosing information to sector participants.
- *Capital Investment Plan:* This plan should provide for the non-recurrent start-up costs of the SERC, such as office accommodation, equipment, information technology systems etc. Given initial capital costs are likely to be large relative to the recurrent costs of the agency, it may not be reasonable to expect them to be financed from charges imposed on the sector. Therefore special financing arrangements may be required.
- *Budget and Financing Plan:* The budget should reflect both capital investments and recurrent expenditures for the coming year. The major part of recurrent costs are likely to be staff salaries, so the Human Resources Plan will be a key input. While the SERC may expect to be funded initially by budget allocations, it should ideally and as soon as possible, be funded by levies charged upon industry participants. The financing plan should therefore propose arrangements for the collection of fees from industry participants. (See Appendix 3 for a more detailed discussion of budgeting).
- *Internal Procedures Manual:* The Internal Procedures Manual is a handbook to guide SERC staff with regard to procedures for such things as decision-making authority, financial management, information management, internal reporting, professional conduct, conflicts of interest, and so on. Ideally it would be based on ISO 9000 methodology. The internal procedures manual should be considered a living document that may be adapted as the agency grows to fulfill its functions.
- *Develop financial management and internal / external auditing procedure:* Regulatory agencies are constantly scrutinized and need to be held to the highest standards of financial probity in order to gain credibility and the confidence of

industry participants and consumers. Regulatory agencies are essentially service providers funded by fees and/or budget allocations levied on sector stakeholders and/or taxpayers. They are required to demonstrate that the service is provided efficiently and at a reasonable cost. The development of financial management and audit systems should therefore be considered as a high priority. Relatively cheap and standardized financial management systems are available ‘off the shelf’ or could be easily developed. While SERC’s expenditures will be relatively small at the early stages of implementation, the financial management system should be designed to scale-up as the activities of SERC increase.

30. ***Liaise with Other Agencies to Avoid Regulatory Gaps during the Transition Period.*** Even at these early stages of implementation, particular attention needs to be given to the coherence between the regulatory framework to be implemented, the industry restructuring process and the development of generation and subsequently wholesale markets. The reform process will need to be coordinated with the establishment of separate tariffs for generation, transmission and distribution in the restructured sector to ensure the financial sustainability of all the companies in the supply chain. Coordination is required not only at State level but also with Regional and Provincial entities so that the development of the framework is synchronized with the restructuring process mandated by the State Council’s Document No. 5.

31. ***Launch a Public Awareness Program.*** The initial objective of the public awareness program should be to inform stakeholders about the functions and authority of the SERC. Other agencies with authority in the power sector should be targeted in particular to build relationships that foster cooperation and coordinated actions with these agencies’ activities. An additional component for consideration would be public education with regard to power sector reform and regulation.

### **High Priority Regulatory Activities**

32. This section describes rules and regulations considered priorities in the context of the State Council Electric Power Sector Reform Plan (Document No. 5). It is recommended that initially the SERC should concentrate its efforts on the regulatory actions required by the separation and divestiture of generation assets.

33. ***Design Decentralized Regulatory Arrangements.*** The detailed definition of SERC functions and its relationship with other agencies is a necessary input to this activity. Planning the extent of the decentralization of regulation, and the allocation of regulatory functions between State, Regional and Provincial levels will be a complex task. The amount and timing of such decentralization should take cognizance of the pace of the restructuring process, institutional capability of different parties involved, any clauses of the constitution related to responsibilities of lower government levels, interests of industry participants and consumers, etc. (For a more detailed discussion of this topic see the section in Appendix 3 on ‘Structure and Levels’).

34. ***Begin Licensing New Entrants in the Generation Segment.*** Licensing of generation companies is a priority regulatory action because of the (Document No. 5) requirement that generation and transmission functions be separated by end- March 2003. It is desirable that during this transition, the SERC begins issuing licenses to the new generation companies or fully restructured entities. For non- or partially restructured companies, licenses would be issued only once their restructuring is completed. The licensing of new or fully restructured generation companies will need immediate attention and would require at least decisions on: (a) standard forms for licenses; (b) a standard format for appendixes through which licenses would be customized and adapted to each licensee; and (c) issuance of licenses by power plant or by generation company.

35. ***Prepare Power Market Rules, Initial Phase.*** This Initial Phase is intended to cover a period of time starting at the moment when independent generation companies are put in place and ending when wholesale power markets are implemented. It is important to recognize that wholesale power markets are likely to vary in form and complexity as well as in date of introduction across the various Regions of China. The key purpose of the necessary work in Stage 2 is for SERC to develop, discuss and agree a framework for appropriate regulatory oversight. *The initial output in Stage 2 could be a Discussion Paper covering such issues as (a) definition of initial vesting contracts (b) dispatch methodology (probably self dispatch) (c) clearing mechanisms, if any (d) metering, settlement and payments systems (e) definition of the roles of the System Operator / Market Administrator and other issues.*

36. Following discussions and agreement with relevant Government bodies, companies and other concerned parties, SERC should prepare a Framework Document detailing the regulatory framework for wholesale market development in all the various circumstances and options in China. The Framework Document should ensure that chosen options are consistent with the overall State policy perspective on the development of competitive wholesale power markets. Thereafter, this can be developed into an SERC regulation to support independent generation companies as they start operating in the new Regional and/or provincial power markets.

37. ***Prepare Amendments to the Electricity Law or New Regulations to Reflect Policy Changes.*** Changes to existing legislation are likely to be required to give legal authority to the detailed allocation of regulatory functions (discussed above), and to give the SERC adequate power to perform the functions assigned to it. New legislation may also be required to formalize policy changes introduced from 1996 to date. SERC and other concerned agencies should therefore discuss and commence drafting amendments to the Electricity Law and/or State Council Regulations during Stage 2.

38. ***Regulatory Reporting System.*** This regulation will specify the information that power companies should report to the SERC. The task will include: (a) design of standardized reporting forms (b) development of SERC information management systems (c) implementation schedule / transition plan. The reporting system should be discussed with other government agencies and industry participants to avoid duplication or

reporting requirements that are onerous for regulated entities. The collection and dissemination of this data will be especially important if forms of ‘yardstick’ regulation or ‘bench-marking’ are to be employed (see Appendix 3).

39. **Conceptual design of the rules/regulations:** At this stage it will be necessary to prepare principles that will guide the development of detailed rules/regulations in Stage 3. These guidelines and principles should be based on the conclusions of studies carried out earlier in the process, international best practice, and reform policy recently adopted by the State Council. In this way, drafting of further rules will be carried out more efficiently and coherently.

**Table 2: Stage 2 Activities**

<i>Stage 2 Objectives</i>			
<ul style="list-style-type: none"> <li>• Complete Organizational Design of SERC</li> <li>• Develop Conceptual Framework of power sector regulation in China</li> <li>• Implement priority regulations to ensure adequate supervision of the sector as it is restructured</li> </ul>			
<i>Activity</i>	<i>Critical Inputs</i>	<i>Output(s)</i>	<i>Target Date</i>
<b>1. Confirm Detailed SERC Functions and Authority</b> <ul style="list-style-type: none"> <li>• Document should define SERC regulatory functions in detail; identify the roles and authority of SERC with regard to other agencies.</li> </ul>	<ul style="list-style-type: none"> <li>• State Council Document No. 5</li> <li>• Current Status Report (Stage 1, activity 2)</li> <li>• Previous work on power regulation by government agencies</li> </ul>	<ul style="list-style-type: none"> <li>• Document specifying SERC roles and authority in detail approved by relevant authority (to be determined).</li> </ul>	<i>SERC to advise</i>
<b>2. SERC Organization Structure and Implementation Plan, including:</b> <ul style="list-style-type: none"> <li>• Definition of internal departmental responsibilities, reporting procedures, and decision-making authority.</li> <li>• Design of financial management and audit systems:</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Approval of organizational structure</li> <li>• Auditing procedures operational</li> </ul>	<i>SERC to advise</i>  <i>SERC to advise</i>



<p>and audit systems:</p> <ul style="list-style-type: none"> <li>• Prepare Internal Procedures Manual, including information management; decision making and budget authority; confidentiality; conflict of interest; internal reporting</li> <li>• Prepare human resources plan including personnel requirements, skills mix, recruitment procedures, training plan etc.</li> <li>• Prepare Capital Investment Plan</li> <li>• Prepare Budget and Financing Plan</li> </ul>		<ul style="list-style-type: none"> <li>• Draft Internal Procedures prepared and under trial</li> <li>• HR plan approved and under implementation.</li> <li>• Capital Investment Plan approved.</li> <li>• Budget and Financing Plan approved</li> </ul>	<p><i>SERC to advise</i></p> <p><i>SERC to advise</i></p> <p><i>SERC to advise</i></p> <p><i>SERC to advise</i></p>
<p><b>3. Liaison with Other Agencies Involved in Power Sector Restructuring</b></p> <ul style="list-style-type: none"> <li>• Ensure regulatory frameworks coherence with other market restructuring initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Forum for Consultation with other stakeholder agencies</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>4. Public Awareness Program</b></p> <ul style="list-style-type: none"> <li>• Design public awareness program to promote stakeholder understanding of the functions and authority of SERC, and educate stakeholders on the objectives and content of the power sector reform exercise</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Commencement of Public Awareness Program</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>5. Design of Decentralized Regulatory Arrangements</b></p>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Proposal on decentralized regulatory arrangements for approval by relevant authority (to be determined)</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>6. Licensing Generation</b></p>			

<p><b>Companies</b></p> <ul style="list-style-type: none"> <li>• Prepare draft licenses</li> <li>• Consult with Generation Companies and other stakeholders</li> <li>• Administer license application process</li> <li>• Award licenses</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Licenses granted to Generation Companies</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>7. Conceptual Design of Rules and Regulations to be Developed During Stage 3</b></p>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> <li>• Design of Decentralized Regulatory Arrangements (Stage 2, activity 6)</li> <li>• Current Status Report (Stage 1, activity 2)</li> </ul>	<ul style="list-style-type: none"> <li>• Production of Concept Paper on Design of Rules and Regulations</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>8. Prepare Power Market Rules, Initial Phase</b></p>		<ul style="list-style-type: none"> <li>• Publication of initial power market rules.</li> </ul>	<p><i>SERC to advise</i></p>
<p><b>9. Prepare New Amendments to Electricity Law or New Regulations to reflect policy changes / clarification</b></p>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> <li>• Design of Decentralized Regulatory Arrangements (Stage 2, activity 6)</li> </ul>	<ul style="list-style-type: none"> <li>• Submission of draft laws or regulations to appropriate body for approval.</li> </ul>	<p><i>SERC to advise</i></p>

<b>10. Prepare Stage 3 Action Plan</b>	<ul style="list-style-type: none"> <li>• Confirmation of SERC functions and authority (Stage 2, activity 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Stage 3 Action Plan approved</li> </ul>	<i>SERC to advise</i>
--	--	--	-----------------------

## D. INDICATIVE STAGE 3 TASKS

40. The work-plan for this period will be heavily contingent upon policy decisions made in earlier stages, progress of sector restructuring and the development of initial rules and regulations. This section therefore presents only an indicative list of institution building activities. With regard to regulatory activities, this section presents a discussion of the process required to complete regulations for wholesale power markets, transmission and distribution.

### **Institution Building Activities**

- Complete the staffing of the central office.
- Commence establishment of the decentralized structure.
- Implement system for collection license fees and other regulatory charges.
- Draft proposed amendments to introduce to the Electricity Law or eventually propose a new Electricity Law
- Develop computational tools (IT and application software for different studies to be carried out within SERC's responsibilities)
- Adopt regulatory procedures and SERC office procedures and document management protocols to enable regulation to be carried out on a proper legal basis.

### **Regulatory Activities**

41. ***Finalize Regulatory Arrangements for Wholesale Power Markets.*** The timing of this activity will depend upon the pace at which regional and/or provincial markets are developed. Extensive consultation with industry participants will be necessary, prior to finalizing wholesale market regulatory oversight arrangements. A SERC Discussion Paper on (a) wholesale market rules and (b) how Regional markets will be created, evolve and develop should be proposed, disseminated and discussed prior to issuing the regulatory arrangements. This paper should be based on State Council Document No. 5 and be coordinated with, and contain the input of, the Industry Restructuring Group.

42. The objective of effective regulatory arrangements is to establish the conditions necessary for competition in a market place of multiple buyers and sellers. This can be done by a market code (as in Zhejiang), by wholesale market rules issued by the market operator and approved by the Regulator, or in other ways. These arrangements should take into consideration the policy to organize existing or future markets around regional and/or provincial structures. The wholesale market regulatory framework should cover, but not limited to, the following topics: (a) full competition multiple seller - multiple buyer system (b) spot pricing (c) contracts market (d) dispatch rules (e) information management (f) guidelines for system and market operator(s) i.e. organization, functions and (g) design of transition period for implementation. Most importantly, the rules need to ensure effective (and fair) competition in wholesale power markets. During Stage 3, SERC will need to prepare discussion papers on frameworks, methodologies and options to address these issues so that regulations and regional models can be approved and issued to support the development of regional markets.

43. **Prepare Distribution Regulations.** During Stage 3, SERC will need to issue discussion papers on methodologies and regulatory frameworks for distribution and retail supply. Ideally these regulations would be established by the SERC at a national level with application to distribution and retail supply companies across China, but they would be administered at Provincial level. Regulatory matters specific to a particular company, such as tariffs levels, quality of service indexes, should be specified in that company's license. The main topics to be covered by distribution regulations will be:

- **Rights and obligations of supply** (particularly related to demands for new connection)
- **Tariff setting.** The core methodology will be decided during the conceptual design of the regulation planned for Stage 2. In selecting the tariff methodology consideration should be given to the various approaches to tariff regulation, including efficiency-oriented methodologies, such as price caps, and/or 'yardstick' (reference company) regulation. The design of regulations should take into account the availability of information and the role of incentives in improving operational and commercial efficiency. (See Annex 3 for a more detailed discussion of tariff setting approaches).
- **Bulk power purchasing rules,** including arrangements for the approval of power purchase contracts in instances when these costs are 'passed through' to retail tariffs.
- **Quality of service.** Ideally, principles and indicators of quality of service should be same nationwide but with values and benchmarks adapted to the conditions of local systems.
- **Introduction of Retail Competition:** Third party access' to distribution networks is an implicit aim of the reform policy as it permits the introduction of competition to the retail segment of the market. Retail competition is usually introduced gradually with increasing number of consumer classes permitted to

choose their electricity suppliers. However, this process requires a set of rules for third party access to the distribution network to be defined at the start of the transition. The extent to which retail markets are opened to competition may be impacted by decisions to be made about the extent of decentralization of SERC functions. These arrangements must be developed in close consultation with stakeholders to ensure that both effective consumer choice and financial sustainability of incumbent operators is ensured during the transition period. The process for preparing these distribution regulations should take these factors into account.

44. **Transmission regulation.** This detailed regulation is a key element in promoting the integration of different isolated areas into regional markets. This will promote fair competition at the generation level, which takes into account real costs associated with location, and facilitate the development of a multiple buyer system. As with other regulations, the SERC should issue a methodological Discussion Paper outlining the guiding principles to be discussed before finalizing the regulation.

45. Transmission regulations should include: (a) pricing, reflecting locations (b) quality of service (c) open access and rights of use (d) right and obligations of companies and (e) users' rights of way. (Note that SERC will probably be responsible for issuing transmission licenses and carrying out most regulation of transmission companies. During Stage 3, they will therefore need to develop procedures and staff to carry out these regulatory tasks.)

46. **Other Regulatory Tasks:** Mechanisms will also need to be developed for (a) power market surveillance to prevent abuse of market power (b) license dispute resolution (c) expansion planning and the approval of investments (d) integration of environmental issues into the regulatory framework (e) procedures for public disclosure and public hearings (f) procedures for modifying regulations (g) procedures for license application. Again these actions will be contingent upon the detailed confirmation of SERC's functions and the pace of industry restructuring. The production of discussion papers and stakeholder consultation is preferable in all cases. The amount of work and scheduling of tasks related to these matters during Stage 3 should be detailed as the project develops.

## APPENDIX 1: STUDY VISITS, TWINNING AND TRAINING

It is important that the Chinese experts should be able to survey relevant international experience. However, experience indicates that such visits (e.g. by a group of 10 or more people) are not very effective at providing the necessary information for a regulatory *implementation* project. They can be important and useful for development of initial regulatory design and institutional principles but China has moved on beyond this stage.

An approach to training and international visits that combine different elements, well tailored to the issues at hand are more effective. The proposal outlined here draws on the Bank's general experience as well as experiences in developing energy and telecom regulatory agencies in Central and East European countries that are expecting to join the European Union.

The suggested approach, based on the assumptions discussed in Section IV, is set below. It requires that:

- (a) the implementation process is headed by a senior figure reporting directly to the State Council; and
- (b) the appointment of the senior person is followed by the selection of a core regulation team who would be responsible for developing work in some specialist areas and carry out some of the regulations tasks during the transition period. This Core Team might usefully include a senior electricity regulatory economist, a lawyer, an accountant – the people needed to be the nucleus of an effective SERC and potential Department heads who would be largely responsible for subsequent rollout of the SERC and training of later recruits.

The suggested international visit and training approach based on these assumptions is as follows:

- (a) An initial intensive training course on economic regulation as applied to electricity is held during Stage 1 or early in Stage 2 might be held outside China (Washington is an option for the senior staff of the Core Regulatory Team). The attendees should probably be the Chief Regulator, Senior Steering Group members, and senior Core Team Members.

The course might be held over 1-2 weeks.

The content of the course might include the following:

- Basic principles of regulation (economic, legal, etc);
- Key issues in electricity regulation;

- Establishing effective regulatory agencies;
- Regulatory reviews and procedures;
- Price and investment regulatory issues
- Regulation and competition policy in electricity;
- Monitoring and enforcement issues;
- Effective regulatory design in large and complex systems.

This list is intended to be illustrative and other items might well be added and some might be dropped or amalgamated with others.

- (b) One or two high-level representatives (e.g. the SERC chairperson and a deputy) should join one of the main international groupings of international energy regulators and attend their meetings.
- (c) It may also be appropriate, in due course, for a few of the most senior members of the Core Regulatory Team to go on a high-level course on economic regulation of the kind that is held for senior regulatory people in middle income and developing countries. The Bank could, if requested, readily provide some suggestions.
- (d) An early visit by a few senior Chinese individuals to one or two countries in which electricity reform and the establishment of an electricity (or energy regulator) has recently been successfully implemented. This would provide a useful practical perspective on how it is best done, the practical problems that arise and how they can be anticipated and tackled.

Singapore is a candidate country for such a visit. Argentina would also be a good choice since it is a larger, middle-income developing country with multiple government levels.

- (e) “Twinning” of the SERC nucleus with one or two other electricity (or energy) regulatory agencies to help develop practical knowledge and understanding of the requirements of an effective regulatory agency and of standard regulatory techniques. Singapore might be a good possible candidate for such a “twinning” arrangement; Argentina and Australia could also be considered. (“Twinning” arrangements between new regulatory institutions in Central and East Europe and European Union counterparts have proved to be very helpful in their development).
- (f) Training courses for the senior experts, the Steering Group and SERC Core Team and others are held in China and in Mandarin drawing on the best international regulatory training courses.

International experience suggests that this multi-pronged approach is likely to provide a better and more cost-effective way of developing regulatory capacity and providing training than the short study tours that have been suggested previously. The near term training program discussed above should be complemented by a longer term program for investment in human capital, which should constitute part of the Human Resources Plan (which is a recommended activity in Stage 2). In particular consideration should be given to sending junior staff on longer term courses, for example MSc programs in regulatory economics, and exchanges with other regulatory agencies, in order to ensure a future stream of high caliber regulators.



## **APPENDIX 2: WHAT NEEDS TO BE REGULATED?**

There follows a tentative list of the main electricity functions that need to be regulated in China, based on international experience in market oriented power sectors and previous studies carried out jointly by the World Bank and Chinese governmental institutions.

### **1. State Transmission Company**

Transmission (very high voltage and interconnection)

- Transmission prices
- Investment plans
- Service obligations and quality
- Financial activities

### **2. Regional Transmission Companies**

(a) Transmission (at high voltage level within region)

- Transmission prices
- Investment plans
- Service obligations and quality
- Financial activities

(b) System operation and dispatch

- SO prices (including ancillary services)
- Investment plans
- Service obligations and quality
- Financial activities

(c) Power purchase

- Tender rules and procedures
- Power demand projections (including reserve)

(d) Market Operation and Settlement

### **3. Distribution Companies**

(a) Distribution (low voltage lines e.g. < 110kV)

- Distribution price (distribution margin)
  - Investment plans
  - Service obligations and quality
  - Financial activities
- (b) Retail sales
- Retail prices – at least for household and other franchise customers (supply margin not final retail price)
  - Investment plans
  - Service obligations and quality
  - Financial activities

#### **4. Generation Markets**

- Competition and mergers
- Market rules
- Pool design, settlement systems, etc

#### **5. Generating Companies**

It is likely that generating companies may need to have licenses, but it is unlikely that these licenses need to cover any specific *economic* aspects of regulation e.g. on prices or investment.

A key issue for decision is the role, if any, of ex ante regulation of investment, particularly on generation e.g. whether regulatory approval is needed for PPA prices in winners of tender competitions for them to be granted generation licenses.

## **APPENDIX 3: SERC INSTITUTIONAL DESIGN CONCEPTUAL ISSUES**

The objective of this appendix is to present a discussion (not recommendation) of key issues that have a bearing on the institutional design of the SERC. The issues are particularly relevant to the Stage 2 activity ‘Determining the functions and authority of the SERC in detail.’

The discussion presented here is based on the findings of previous studies on power reform and regulation in China, and international experiences relevant to China.

### **Tariff Setting**

According to the principles established by the Policy Paper, with the exception of social electrification, tariffs should reflect economic costs, as a result of competition, where that is possible, and/or regulation, in case of natural monopolies.

The tariff setting process requires two steps: the establishment of the methodology used to determine tariffs (which would be set out in a Distribution Regulation) and the implementation of the provisions as set out in the Distribution Regulation.

Under this approach – which has been adopted by most countries that have implemented reforms of the kind defined in the Policy Paper – the relevant authority approves the methodology, as part of the whole Distribution Regulation, and the regulatory agency applies it on a strictly professional basis.

For the particular case of China one possible way to implement this process would be to let all parties concerned with tariff issues, including a qualified task force belonging to the SERC, work on a common basis to put together a methodology responding to the principles defined in the Policy Paper. Once consensus is achieved, and approvals granted, the SERC should be in charge of its application and enforcement. It should perform this function autonomously but be required to report results in a standard and transparent manner.

An important step in this process is to complete pilot tariff studies to test methodologies. Pilot tariff studies are recommended in Stage 2 of the work-plan. For these first pilot studies, it is recommended that the working groups should be supported by international experts, to take advantage of recent experiences of tariff setting for unbundled electricity sectors, with competitive segments. Skills transfer during this stage would enhance the SERC’s ability to conduct such exercises independently for future tariff reviews.

## **Rules based regulatory methodology**

Among possible regulatory approaches, the regulatory methodology termed Rules Based, seems to be best adapted to China's situation. The main characteristics of this type of approach are:

- a) for every activity requiring regulation, specific rules are developed (therefore ensuring uniformity at the country-level)
- b) these rules contain clear instructions about how to customize them for particular cases (therefore ensuring adaptability to particular circumstances)

This ensures that the regulatory framework is predictable and uniform at the country-level, but also adaptable to particular circumstances. The regulatory activity carried out by the SERC would rely on pre-established procedures known for all parties, and the sector will evolve toward a more predictable and transparent industry, which gives participants sufficient confidence to invest and take risks, even in a competitive environment.

The detailed regulations should be developed to cover all areas where the SERC may intervene. Therefore it will be necessary to develop a complete set of regulations, as indicated below, which should also be made public.

It is also important to take into consideration that regulation of competitive markets (multiple buyers and sellers) will require monitoring on a permanent basis by the SERC, to detect possible malpractices and market power abuse. The way to address detected failures under a rules based regulatory approach is done either through correction of existing rules or issuance of new ones.

It is therefore extremely important to clearly establish in the regulatory rules specific provisions about the attributions of the SERC in such cases. Modern regulations of this type are usually complemented by specific procedures to be followed when the regulation/rules must be modified, eliminated or complemented. These procedures increase the transparency of the regulation process. The market arrangements and regulations are therefore sufficiently flexible to adapt to changing circumstances without creating the perception that the Regulator is able to act arbitrarily. The arrangements outlined above will need to be developed for all regulatory offices operating at State, Regional and Provincial levels.

## **Benchmarking**

In a large power sector such as China's, with multiple generation plants and distribution businesses, the collection and publication of comparative data on the operational and financial performance of these entities can be a powerful regulatory tool.

This information provides a large data-set against which the regulator (and consumers and power companies themselves) may evaluate technical and financial performance. Even without further regulatory intervention, the public disclosure of such data can be a powerful incentive for companies to improve their performance.

While the regulator should have adequate powers to collect and disseminate such data, it is important that the reporting requirement placed upon power companies should not be excessively intrusive or onerous. Consideration should therefore be given to the design of (i) reporting requirements, (ii) powers to enforce compliance, and (iii) methods for disseminating benchmarking data.

## **Licenses**

In a market characterized by an increasing number of participants, licenses are important and sophisticated tools for establishing the regulatory conditions under which firms operate. Therefore every company acting in the Electricity Market should have a license. A license is a contract between the Company and the SERC establishing the rights and duties of the licenses and the conditions under which it operates.

International best practice shows the convenience of having a specific regulation setting out everything related to licensing: how a license is issued, its contents, and other legal clauses. Standard forms are also prepared for each type of license with clauses applicable in all cases, and appendices are attached to detail conditions specific to each case.

A combination of rules-based regulatory approach and licensing mechanisms, described herein, would reinforce the simplicity, flexibility and security of the regulatory regime.

## **Structure: levels**

The power sector in China is characterized by a very large territory and different sizes of systems to be regulated. International experience suggests that the SERC would have a decentralized structure, with a central office in Beijing, and branches in other parts of the country. The number and location of branches are still to be decided, as well as roles and responsibilities assigned to each level. Particular attention needs to be given to this final structure design during Stage 2. This paper concentrates principally on the state level regulator

It is likely that under the head office one or two organizational levels will be required: one responsible for regional regulatory matters (typically regional generation, measured in terms of size, and transmission) and another covering matters related to distribution and retail supply, including quality of service monitoring. It is advisable to create regional or local advisory committees, with formal representation of stakeholders concerned with the matters treated by the local offices. These committees are only consultative but their deliberations should be made public by SERC to increase the transparency of the regulatory process.

## **Budgeting for the SERC**

The SERC is as a matter of fact a supplier of regulatory services to end consumers and industry participants, and the guiding principal should be that those benefiting from the service should pay for it.

In practical terms, the process of budgeting should consist of the following steps (for example):

- (a) The SERC prepares a budget covering the financial needs for the next year
- (b) The budget is submitted to the corresponding authority (to be determined) for approval.
- (c) Once approved, the total budget is split proportionally among all companies and agents buying power in the wholesale market, in proportion to the forecasted demand for the next year. Payments by companies and agents are made on a monthly basis.
- (d) Distributions companies are allowed to include these costs in the end users tariffs.
- (e) Deviations between forecasted and actual demand could eventually be compensated.
- (f) An alternative is to determine a regulatory fee (budgeted amount divided by forecasted demand) to be added to the tariffs.

As this mechanism requires some time to be implemented, it is advisable to start using it at the beginning of the Stage 3. For Stage 2 financial needs should be covered by budget allocations.

## **Best Practice for Expansion Planning and Investment Approval**

In a market of the size and complexity of the Chinese power sector, there are different types of needs regarding planning and approval of investments.

It is advisable to clarify institutional responsibility for the following tasks as soon as possible:

- (a) Expansions relating to the national economic policies, such as large inter-regional generation and transmission projects
- (b) Expansions related to intra-regional transmission projects: based on proposals prepared by the regional transmission companies
- (c) Expansions related to generation capacity required by distribution companies to be able to supply the demand growth

- (d) Expansions related to distribution networks required by the distribution companies to comply their supply and quality of service obligations

If necessary, these practices could be gradually transferred from existing agencies to the selected organization as its capability increases. One first step in this process should be the creation of an inter-agencies commission in charge of the development of the detailed rules that would apply in each case. This would allow all parties to build consensus around the proposed schedule, eventually minimizing resistance to change probably rooted in traditions and existing practices.

## APPENDIX 4: ORGANIZATIONAL STRUCTURES OF REGULATORY AGENCIES

Electricity and energy (electricity and natural gas) regulators tend to be organized in a few particular ways:

- (a) by function (generation, transmission, etc) or by market (wholesale markets, retail markets);
- (b) by a division into (a) internal functions and (b) external functions; and
- (c) by grouping regulation specialists (lawyers, economists, accountants) in central divisions *or* by allocating specialists to the operational divisions.

Established regulatory agencies (like FERC in the US and OFGEM in the UK) typically have only a few departments/divisions. They tend:

- (a) to organize their departments/divisions by market rather than by regulatory function; and
- (b) to allocate most regulation specialists to these departments/divisions rather than in central divisions.

This pattern is shown in the organization chart for OFGEM, shown in Chart 1. Ofgem has around 300 staff of whom about one-half are senior professionals.

Conversely, developing countries, where specialist regulatory skills are scarce, tend to have sizeable number of departments. They also tend:

- (a) to organize their departments/divisions by regulatory function rather than by market; and
- (b) to allocate most regulation specialists to central divisions rather than to the functional departments/divisions.

This pattern is shown in Chart 2 for Argentina. In 2000, ENRE the Argentine energy regulator, had about 140 staff with 25 lawyers and about 40 engineers/economists (probably mainly engineers).

Recently established regulatory agencies, like the Energy Markets Authority (the EMA) in Singapore, tend to have very few departments but to group their specialists in specialist divisions. See Chart 3 for an organization chart for the EMA.



For the SERC in China, the Singapore structure might be appropriate for the Core Regulator but even by the end of the project, one would expect to see a more disaggregated structure at State level – China is many times larger than Singapore and has a massively larger ESI. However, the Singapore structure might be an appropriate starting point for Regional branches of the SERC.

For a fully established State-level SERC (e.g. in 2-3 years time), the Argentine structure may be a useful starting point. In particular, the grouping by main ESI function (generation, transmission, distribution and supply) may be more appropriate than the Ofgem structure based on wholesale and retail markets.

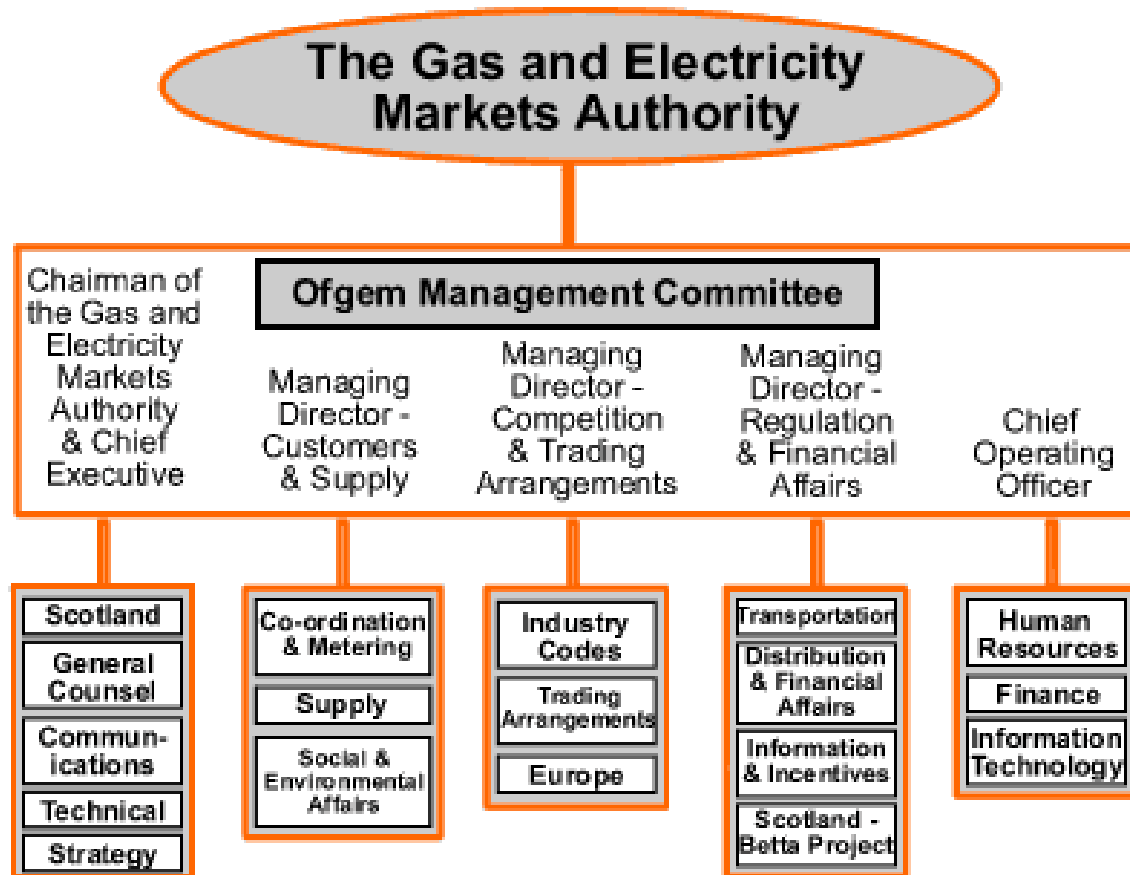
Note that Ofgem evolved to its current structure after initially starting out with a more ESI function-based approach with specialists in central departments/divisions. This was not least because people who started out as economists, accountants or lawyers, increasingly wanted to become regulatory professionals and were both willing and able to take on more general regulatory jobs in operational divisions rather than remaining as specialist advisers. This pattern of evolution is common with telecommunications regulatory agencies as well as electricity and energy regulators.

One final point worth mentioning here is that regulatory agencies tend to change their organizational structures relatively frequently in response to changes in industry and market structure, changes in regulatory priorities, changes in emphasis regarding markets and competition issues relative to ex ante regulation, availability of professional regulatory specialists, etc. It is important to build-in such design flexibility and not impose a rigid structure as usually the case in China.

A preliminary investigation of the assignment of (c), the assignment of regulatory functions between State and lower level regulatory agencies, is set out in Table 6.2 of the 2001 ESMAP/SPC Discussion Paper. These issues are further discussed in the context of regionally based power markets in the 2001 World Bank-submitted paper “Electricity Industry Structure and Regulation in China.” This latter paper also provides some initial discussion of the relationship between (a) - industry and company structural issues; and, (b) - the classification of regulatory functions as well as some implications for licensing arrangements.

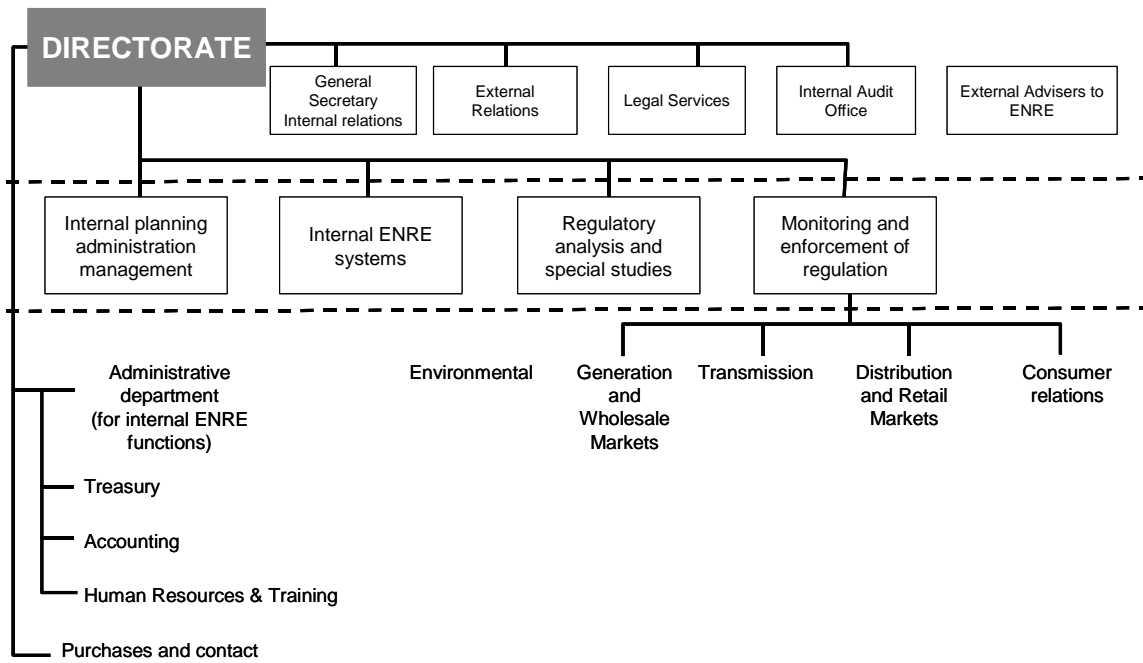
CHART 1

ORGANISATION CHART FOR OFGEM  
United Kingdom



## CHART 2

### ORGANISATION CHART FOR ENRE Energy Regulator in Argentina



### CHART 3

## ORGANISATION CHART FOR EMA The Singapore Regulatory Agency

