

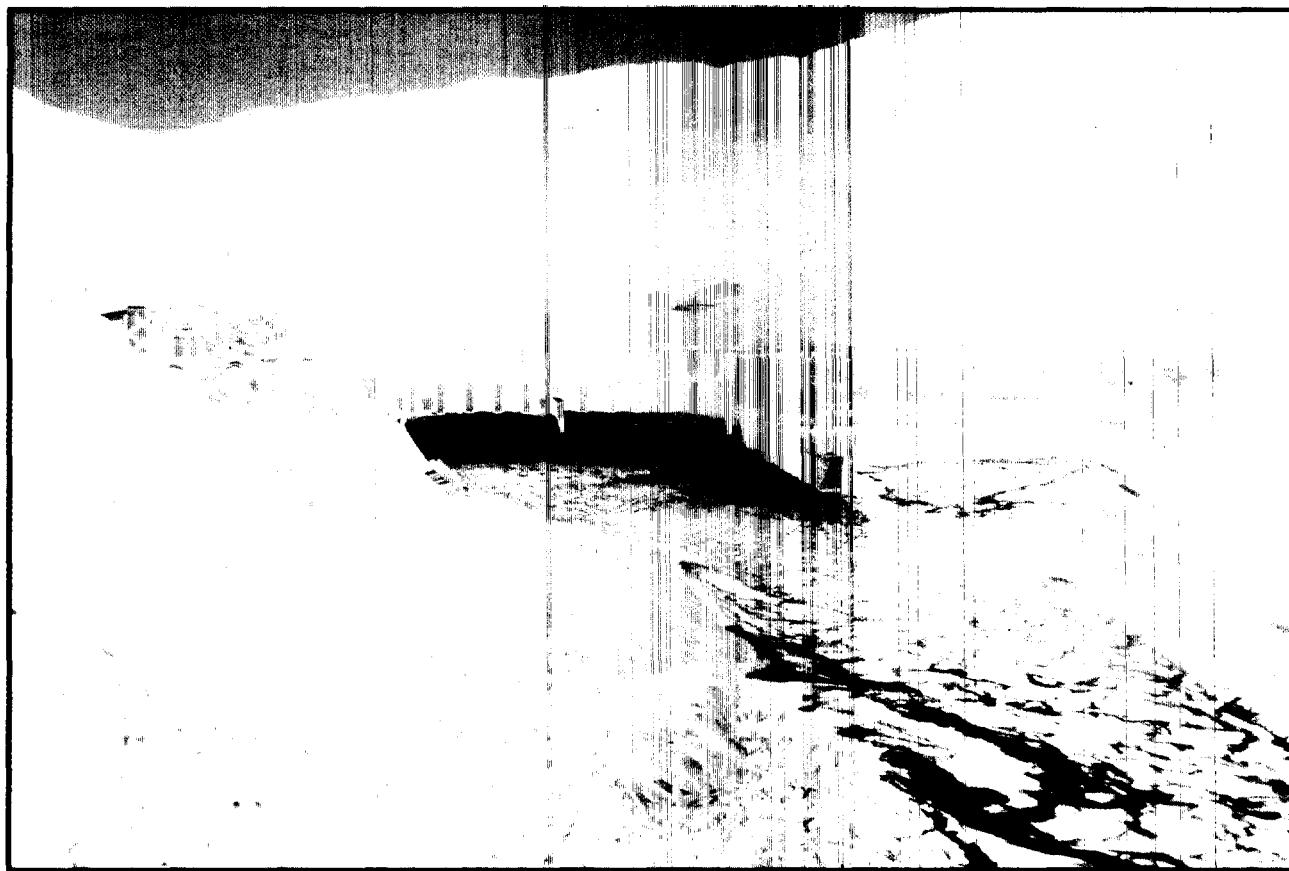


Work in progress  
for public discussion

WORLD BANK DISCUSSION PAPER NO. 361

WDP 361  
March 1997

China  
*Power Sector Regulation in a  
Socialist Market Economy*



*Edited by*  
Shao Shiwei  
Lu Zhengyong  
Noureddine Berrah  
Bernard Tenenbaum  
Zhao Jianping

## Recent World Bank Discussion Papers

- No. 292 *Regulated Deregulation of the Financial System in Korea*. Ismail Dalla and Deena Khatkhate
- No. 293 *Design Issues in Rural Finance*. Orlando J. Sacay and Bikki K. Randhawa
- No. 294 *Financing Health Services Through User Fees and Insurance. Case Studies from Sub-Saharan Africa*. R. Paul Shaw and Martha Ainsworth
- No. 295 *The Participation of Nongovernmental Organizations in Poverty Alleviation The Case Study of the Honduras Social Investment Fund Project* Anna Kathryn Vandever Webb, Kye Woo Lee, and Anna Maria Sant'Anna
- No. 296 *Reforming the Energy Sector in Transition Economies: Selected Experience and Lessons* Dale Gray
- No. 297 *Assessing Sector Institutions: Lessons of Experience from Zambia's Education Sector* Rogerio F. Pinto and Angelous J. Mrope
- No. 298 *Uganda's AIDS Crisis Its Implications for Development*. Jill Armstrong
- No. 299 *Towards a Payments System Law for Developing and Transition Economies*. Raj Bhala
- No. 300 *Africa Can Compete! Export Opportunities and Challenges for Garments and Home Products in the European Market* Tyler Biggs, Margaret Miller, Caroline Otto, and Gerald Tyler
- No. 301 *Review and Outlook for the World Oil Market* Shane S. Streifel
- No. 302 *The Broad Sector Approach to Investment Lending. Sector Investment Programs*. Peter Harrold and Associates
- No. 303 *Institutional Adjustment and Adjusting to Institutions* Robert Klitgaard
- No. 304 *Putting Institutional Economics to Work. From Participation to Governance* Robert Picciotto
- No. 305 *Pakistan's Public Agricultural Enterprises: Inefficiencies, Market Distortions, and Proposals for Reform* Rashid Faruque, Ridwan Ali, and Yusuf Choudhry
- No. 306 *Grameen Bank: Performance and Stability*. Shahidur R. Khandker, Baqui Khalily, and Zahed Khan
- No. 307 *The Uruguay Round and the Developing Economies*. Edited by Will Martin and L. Alan Winters
- No. 308 *Bank Governance Contracts: Establishing Goals and Accountability in Bank Restructuring*. Richard P. Roulier
- No. 309 *Public and Private Secondary Education in Developing Countries: A Comparative Study*. Emmanuel Jimenez and Marlaine E. Lockheed with contributions by Donald Cox, Eduardo Luna, Vicente Paquo, M. L. de Vera, and Nongnuch Wattanawaha
- No. 310 *Practical Lessons for Africa from East Asia in Industrial and Trade Policies*. Peter Harrold, Malathi Jayawickrama, and Deepak Bhattacharjee
- No. 311 *The Impact of the Uruguay Round on Africa*. Peter Harrold
- No. 312 *Procurement and Disbursement Manual for Projects with Community Participation* Gita Gopal
- No. 313 *Harnessing Information for Development. A Proposal for a World Bank Group Strategy*. Eduardo Talero and Philip Gaudette
- No. 314 *Colombia's Pension Reform. Fiscal and Macroeconomic Effects*. Klaus Schmidt-Hebbel
- No. 315 *Land Quality Indicators*. Christian Pieri, Julian Dumanski, Ann Hamblin, and Anthony Young
- No. 316 *Sustainability of a Government Targeted Credit Program: Evidence from Bangladesh*. Shahidur R. Khandker, Zahed Khan, and Baqui Khalily
- No. 317 *Selected Social Safety Net Programs in the Philippines: Targeting, Cost-Effectiveness, and Options for Reform*. Kalanidhi Subbarao, Akhter U. Ahmed, and Tesfaye Teklu
- No. 318 *Private Sector Development During Transition. The Visegrad Countries*. Michael S. Borish and Michel Noel
- No. 319 *Education Achievements and School Efficiency in Rural Bangladesh*. Shahidur R. Khandker
- No. 320 *Household and Intrahousehold Impacts of the Grameen Bank and Similar Targeted Credit Programs in Bangladesh*. Mark M. Pitt and Shahidur R. Khandker
- No. 321 *Clearance and Settlement Systems for Securities: Critical Design Choices in Emerging Market Economies* Jeff Stehm
- No. 322 *Selecting Development Projects for the World Bank*. Jean Baneth
- No. 323 *Evaluating Public Spending: A Framework for Public Expenditure Reviews*. Sanjay Pradhan
- No. 324 *The Bangladesh Rural Advancement Committee's Credit Programs. Performance and Sustainability*. Shahidur R. Khandker and Baqui Khalily
- No. 325 *Institutional and Entrepreneurial Leadership in the Brazilian Science and Technology Sector: Setting a New Agenda*. Edited by Lauritz Holm-Nielsen, Michael Crawford, and Alcyone Saliba
- No. 326 *The East Asian Miracle and Information Technology: Strategic Management of Technological Learning*. Nagy Hanna, Sandor Boyson, and Shakuntala Gunaratne

*(Continued on the inside back cover)*

# China

*Power Sector Regulation in a  
Socialist Market Economy*

---

*Edited by*  
Shao Shiwei  
Lu Zhengyong  
Nourreddine Berrah  
Bernard Tenenbaum  
Zhao Jianping

*The World Bank  
Washington, D.C.*

Copyright © 1997

The International Bank for Reconstruction  
and Development/THE WORLD BANK  
1818 H Street, N.W.  
Washington, D.C. 20433, U.S.A.

All rights reserved

Manufactured in the United States of America  
First printing March 1997

Discussion Papers present results of country analysis or research that are circulated to encourage discussion and comment within the development community. To present these results with the least possible delay, the typescript of this paper has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. Some sources cited in this paper may be informal documents that are not readily available.

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatsoever for any consequence of their use. The boundaries, colors, denominations, and other information shown on any map in this volume do not imply on the part of the World Bank Group any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Office of the Publisher at the address shown in the copyright notice above. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee. Permission to copy portions for classroom use is granted through the Copyright Clearance Center, Inc., Suite 910, 222 Rosewood Drive, Danvers, Massachusetts 01923, U.S.A.

Cover photograph is of Shuikou Hydroelectric Power Plant, Fujian Province, People's Republic of China.

ISSN: 0259-210X

Shao Shiwei is director and Lu Zhengyong is deputy director of the Policy and Legislation Department, Ministry of Electric Power, Beijing, China. Noureddine Berrah is a senior economist in the Infrastructure Operation Division of the World Bank's China and Mongolia Department. Bernard Tenenbaum is a former power sector regulation specialist in the Bank's Industry and Energy Department. Zhao Jianping is operations officer in the World Bank's Field Office, Beijing, China.

**Library of Congress Cataloging-in-Publication Data**

China : power sector regulation in a socialist market economy / edited  
by Shao Shiwei . . . [et al.]

p. cm. — (World Bank discussion papers ; 361)

ISBN 0-8213-3913-3

1. Electric utilities—Government policy—China. 2. Electric  
utilities—China—Management. 3. Electric utilities—China  
—Finance. 4. Electric power systems—China. 5. World Bank.  
I. Shao, Shiwei. II. World Bank. III. Series.

HD9685.C62C434 1997

333.793'2'0951—dc21

97-7350

CIP

## CONTENTS

Foreword .....	v
Abstract .....	vii
Preface .....	ix
Acknowledgments .....	xi
Abbreviations And Acronyms Used .....	xii
Executive Summary .....	xiii
<b>CHAPTER 1. INTRODUCTION .....</b>	<b>1</b>
Achievements .....	1
Challenges Facing the Power Sector .....	2
Impediments to Sector Reform .....	3
Reform Objectives .....	7
Two Reform Measures to Enhance Efficiency .....	9
Regulation of the Power Sector in a Socialist Market Economy .....	10
<b>CHAPTER 2. SECTOR STRUCTURE AND REGULATION .....</b>	<b>15</b>
Meaning of Sector Structure .....	15
The New Regulatory System Must Accommodate Different Structures .....	16
Regulation Will Fail if the Structure Is Flawed .....	17
The Current Structure of the Power Sector .....	18
Expected Changes in Structure .....	18
The Purchasing Agency Model: A Useful Target .....	20
Creating Wholesale Markets: The Role of Power Pools .....	25
The Role of Industry Associations .....	27
A Potential Structural and Regulatory Problem of the Purchasing Agency Structure .....	28
What Needs to Be Regulated in this Structure? .....	29
<b>CHAPTER 3. PROPOSED REGULATORY SYSTEM .....</b>	<b>33</b>
Regulatory Tasks .....	34
Allocation of Regulatory Tasks .....	44
Creation of the Regulatory Institutions .....	46
Internal Structure and Procedures of Power Regulatory Commissions .....	49
<b>CHAPTER 4. PROPOSED LEGAL FRAMEWORK .....</b>	<b>53</b>
Objectives .....	53
New Electric Power Law .....	54
Proposed Use of Legal Instruments .....	55
Enforcement of Regulatory Decisions .....	66
Regulatory Process .....	68

<b>CHAPTER 5. TARIFF REFORMS .....</b>	<b>73</b>
Current Tariff System .....	74
Critique of Existing Tariffs .....	77
The Need for a Comprehensive Reform of the Pricing System.....	81
<b>CHAPTER 6. IMPLEMENTATION OF REGULATORY SYSTEM.....</b>	<b>91</b>
Staged Implementation of Reforms .....	91
Immediate Reforms.....	95
Appendix 1: Design Questions for the Purchasing Agency Model .....	97
Appendix 2: Design Issues for New Power Pools .....	99
Appendix 3: Expected Power Sector Regulations .....	101
Appendix 4: International Case Studies in Power Sector Regulation.....	103

## TABLES

Table 1: Summary of Recommended Reforms.....	.xxv
Table 2: Recommended Implementation Steps .....	xxvi
Table 2.1: Regulatory Tasks Under the Purchasing Agency Model.....	29
Table 3.1: The Vertical Allocation of Regulatory Tasks .....	47
Table 4.1: Recommended Use of Legal Instruments.....	57
Table 5.1: Summary of Tariff Recommendations .....	74
Table 5.2: Tariff Review Process.....	90
Table 6.1: Immediate Legal Actions Necessary to Establish Regulatory Framework ....	96
Table A4.1: Key Characteristics of Regulatory Entities.....	105

## BOXES

Box 3.1: Responsibilities Not Assigned to Regulatory Institutions .....	45
Box 5.1: Five Basic Power Services .....	76

## FIGURES

Figure 2.1: Purchasing Agency Model .....	21
Figure 4.1: Tradeoff Between Stability and Flexibility .....	57
Figure 5.1: Current Tariff Structure.....	75
Figure 5.2: The Current Producer Tariffs Result in Uneconomic Dispatch .....	79
Figure 5.3: Cost Structure of Electricity Delivery .....	81
Figure 5.4: Principles for Determining Bulk Sales Tariffs .....	86
Figure 5.5: Capacity Costs.....	88
Figure 6.1: Implementation Stages .....	92

## FOREWORD

Since the early 1990s, the World Bank has supported the Chinese Government's efforts to assess power sector reform progress and provide guidance on the direction and implementation of further reforms.

As part of that process, the Ministry of Electric Power (MOEP) requested Bank assistance to review the progress of the structural reforms and explore options to adapt the regulatory system to the emerging socialist market economy. The timing of the study was opportune: it took place in 1996 in the wake of the enacting of the "Electricity Law" that provided a solid foundation to deepen reform of the power sector.

MOEP took a leading role in conducting the study and preparing this report. It organized one seminar and two one-week working sessions attended by Bank staff and international consultants to discuss issues and options related to the establishment of a regulatory system, discuss working papers and interim reports prepared by Chinese experts and learn from international best practice. MOEP is currently disseminating the recommendations of the study to build consensus among concerned Chinese agencies on transitional steps to accelerate the move from the "heavy-handed" rules of the centrally planned economy to a new regulation of the power sector consistent with the new role and autonomy of diversified power enterprises in a socialist market economy.

In publishing this volume we very much hope it proves to be useful to the international community that is interested in recent and future development of the power sector in China.

Nicholas C. Hope  
Director  
China and Mongolia Department  
East Asia and Pacific Region



## ABSTRACT

This paper discusses issues and explores options related to the reform of the power sector regulatory system in China. It stresses that for the power sector reforms to succeed, regulation must be transformed from old-style command and control to that of "light-handed" supervision of diversified, autonomous, commercially oriented enterprises. Chapter 1 reviews the power sector's current situation and impediments to reform. Chapter 2 examines the relationship between power sector structure and regulation and suggests several structural changes to improve the economic performance of the power sector. Chapter 3 recommends a regulatory system and legal and economic techniques to improve commercial autonomy of power enterprises. Chapter 4 proposes a legal framework for implementing the recommended regulatory system. Chapter 5 presents a brief summary and critique of the current pricing system and recommends acceleration of ongoing reforms to increase the market orientation and economic performance of the sector. Chapter 6 presents a four-stage implementation plan for developing the proposed regulatory system and legal framework over a period of 10 years. Finally, the report presents in Appendix 4, case studies on power sector regulation in India (the state of Orissa), the United Kingdom (England and Wales), Colombia and the United States and highlights the relevance of different aspects of the foreign regulatory and reform experience to the Chinese context.



## 前言

1993年，中华人民共和国电力工业部、财政部与世界银行合作，成功地进行了“中国电力部门改革战略选择”课题研究。中国电力工业部及时把这一研究成果转化成决策，提出了“公司制改组、商业化运营、法制化管理”的改革战略。基于这次合作的成功，1994年，世界银行与中国电力工业部决定再次合作，研究中国电力工业法规与管制框架建设问题。中国电力工业部有关领导对这一课题十分重视并积极支持。

中国电力部专门成立了课题组。课题组由24位中外专家组成，并分为法规、管制、电价三个子课题组。在中方提供背景报告的基础上，国际咨询专家协助起草了研究报告草案。

中外专家先后在北京、西安和黄山召开了三次研讨会，进行了深入细致的交流、探讨，取得了广泛的共识。期间，中国电力工业部和世界银行在中国北京还共同召开了一次较大规模和较高层次的国际研讨会。会上，来自美国、英国、西班牙、波兰、法国、泰国、香港等国家和地区的政府官员、专家、学者介绍了各自电力工业法规建设与管制体系方面的经验；中国有关方面的政府官员、专家、学者介绍了相关的现行政策、实践经验和改革的初步建议。通过这些卓有成效的合作和课题组成员辛勤的工作，出色地完成了该课题的最终报告。

## PREFACE

In 1993, the Ministry of Electric Power (MOEP) and the Ministry of Finance of the People's Republic of China and the World Bank successfully undertook a study of the "Strategic Options for Power Sector Reform in China." MOEP made good use of the study recommendations when formulating the reform strategy for "corporatized restructuring, commercialized operation and legalized regulation." In 1994, based on the success of the cooperation efforts, the World Bank and MOEP decided to jointly explore options for the development of a legal and regulatory framework for the power sector in China. The senior management of MOEP strongly supported this initiative.

MOEP created a task force consisting of 24 experts to undertake the study. The task force was divided into three groups, with each focusing on one thematic area. Based on background information provided by Chinese experts, international consultants helped prepare a preliminary report that outlined the principal issues and options.

Three seminars were held in Beijing, Xian and Huangshan to discuss these issues and options and build consensus among the participants. The Beijing seminar, sponsored by the World Bank and MOEP, was a large-scale and high-level international seminar attended by government officials, experts and scholars from the United States, the United Kingdom, Spain, Poland, France, Thailand and Hong Kong. During the seminar, experts presented the experiences of their home country in the development of a legal and regulatory framework for the power sector. Chinese officials and experts introduced the current sector policies, the existing issues and the proposed changes. Finally, through these cooperative efforts and the hard work of the Chinese task force and the international consultants, the final report was successfully completed.

中国政府有关综合经济管理部门对本课题的研究表现出浓厚的兴趣并给予热情的关注，在具体研究思路上提出了许多有益的建议。

1997年1月16日，中国国家电力公司宣布成立了。这是中国电力工业发展史上的一件大事，它标志着中国电力工业管理体制改革创新已经进入实施阶段，开始走出关键性的一步。但是，改革是一个不断发展的过程，今后，任务还相当艰巨、相当繁重。我相信，本课题的研究成果将对中国电力工业深化改革起到积极的推动和借鉴作用。

借此技术报告出版的机会，我真诚地感谢各位朋友对中国电力事业的关心和对本课题的帮助，感谢世界银行所给予的支持。中国电力工业管理体制改革创新是中国经济体制改革的一部分。中国的经济发展和社会进步是人类历史进程的一部分。在这一基础上，我对中国电力工业的美好前景和更为广泛的国际交往与合作充满了信心和期望。

中华人民共和国电力工业部  
政策法规体制司

司长：  
(邵世伟)

1997年1月18日

Several government agencies and departments showed great interest in the topic and made many valuable suggestions about how to carry out the study and implement the report recommendations.

On January 16, 1997, the State Power Corporation of China was officially established. This is an important event in the history of China's power sector development. It marks a critical step in the implementation phase of reform of China's power sector. However, reform is a continuing process and the tasks ahead are still complex and difficult. I believe that the findings and recommendations of the study will provide positive guidance for continuing power sector reforms in China.

On the occasion of the publication of this technical report, I would like to express my sincere thanks to all friends who provided assistance during the course of the study and who continue to be concerned about the reform of China's power sector; and to the World Bank for its continued support. This process is part of China's overall economic reform program. China's economic development and social progress are part of mankind's evolving history. I have full confidence and high expectation for the fate of China's power industry and hope for continued international exchange and cooperation.

Department of Policy and Regulatory System  
Ministry of Electric Power  
People's Republic of China

Director: Shao Shiwei

January 18, 1997

## ACKNOWLEDGMENTS

This report was prepared under the general supervision of Mr. Shao Shiwei (Director, Policy and Legislation Department, Ministry of Electric Power). The project team was led by Mr. Lu Zhengyong (Deputy Director, Policy and Legislation Department, Ministry of Electric Power), and was organized into three groups: the legal framework group, the regulatory framework group, and the tariff group. The legal framework group members included Ren Hua (Group Leader), M. Shuquan, Hu Yaoguo, and Sun Jiayu. The regulatory framework group members included Gong Jianzu (Group Leader), Chen Qingda, Wang Fuxing, Liu Changjie, and Chi Yi. The tariff group members included Gao Guangfu (Group Leader), Zheng Houqing, and Fang Bin. The project consulting panel was made up of Tang Zhongnan (Senior Consultant), Hu Koming (Deputy Director, Industry and Transportation Department, Legislative Bureau of the State Council), and Huang Yongda (Deputy Director, Economic Coordination and State Asset Management Department, Ministry of Electric Power). Contributions were also received from Chen Yufeng, Liu Jiayu, Li Yong, Xiang Haiping, Zhao Jianqi, Zhao Shehong, Chen Lifeng, Li Jianguo, and Zhang Hong. The World Bank Department of the Ministry of Finance (MOF), the Northwest China Power Administration, and Anhui Provincial Power Company also provided substantial support to the project.

Financing for this project was provided by the World Bank's Institutional Development Fund. The Ministry of Electric Power (MOEP) wishes to gratefully acknowledge the support and substantive assistance of the two World Bank task managers: Mr. Noureddine Berrah (Infrastructure Division, China and Mongolia Department) and Dr. Zhao Jianping (Operations Unit, World Bank Resident Mission in China).

In preparing this report, MOEP also wishes to acknowledge the substantial assistance and cooperation that it received from a team of international experts that included Dr. Bernard Tenenbaum (World Bank), Mr. Robert Fitzgibbons and Ms. Laura Wilson (Hunton and Williams Law Firm), Professor Athar Husain (London School of Economics), Mr. Noureddine Berrah (World Bank), and Ms. Sally Hunt (National Economic Research Associates).

Finally, acknowledgments are owed to Rebecca Kary and Joy Dougherty (consultants) and Norma Leon and Meredith Dearborn of the World Bank's China and Mongolia Department for the editorial and secretarial assistance.

## ABBREVIATIONS AND ACRONYMS USED

APP	-	affiliated power producer
BOT	-	build-own-transfer
CEA	-	Central Electricity Agency (Orissa)
CEGB	-	Central Electricity Generating Board
DOE	-	US Department of Energy
EGAT	-	the national electricity company of Thailand
FCG	-	Florida Coordinating Group
FERC	-	US Federal Energy Regulatory Commission
GRIDCO	-	The Grid Corporation (Orissa)
GW	-	gigawatt
HV	-	high voltage
IPP	-	independent power producer
kW	-	kilowatt
kWh	-	kilowatt-hour
MAPP	-	Mid-America Power Pool
MMC	-	Monopolies and Mergers Commission
MOF	-	Ministry of Finance
MOEP	-	Ministry of Electric Power
MW	-	megawatt
NPC	-	National Power Company
NPGC	-	National Power Grid Company
OFFER	-	Office of Electricity Regulation
OSEB	-	Orissa State Electricity Board
PPC	-	provincial power company
REC	-	regional electricity company
RG	-	regional group
SEB	-	state electricity board
UNIPEDE	-	Union Internationale des Producteurs et Distributeurs d'Electricité (International Union of Producers and Distributors of Electrical Energy)

## **EXECUTIVE SUMMARY**

### **THE POWER SECTOR'S CURRENT SITUATION**

The Chinese power sector has achieved notable successes since 1980. Installed capacity has grown 8 percent per year, with new generation capacity being added at an annual rate of 15 GW to 16 GW. Technical capabilities have steadily improved. Rural electrification and the supply of power to national minorities has steadily advanced. The power pricing system has been reformed to increase the funding sources available to the power sector and to establish tariffs that allow power enterprises to recover the costs of providing power.

Notwithstanding these achievements, the power sector still faces significant challenges. The power sector has not been able to satisfy the growth in demand for power. Industry must curtail production at great cost to the economy, and households, which account for less than 10 percent of power consumption, regularly suffer curtailments. Power enterprises are not efficient, and the quality of electricity is low. One hundred million rural people still have no access to electricity. Unless basic reforms are implemented, the power sector could impede the growth of China's overall economy.

The underlying weaknesses of the power sector are well understood. They arise from a combination of factors that are the legacy of the old-style command-and-control approach to central management of the economy. The four basic problems are the following:

- Centralized organization of the power sector.
- Direct management of power sector enterprises by the government.
- Lack of a transparent legal and regulatory system.
- Absence of incentives for efficiency.

### **PLANNED REFORMS AND THE REGULATORY PROBLEM**

Recognizing these underlying problems, the government has initiated an ambitious set of structural and institutional reforms to transform the power sector from a centrally planned to a socialist market economy. These reforms include the separation of government from power enterprises, the corporatization and commercialization of power enterprises, and the introduction of competition in generation. These are important and

needed reforms. However, there is concern within the sector that these reforms will fail unless they are accompanied by reforms in how the government regulates the sector.

Regulation designed for a centrally planned economy will *not* work in a socialist market economy. Reform of the regulatory system for the power sector is therefore a critical component of power sector reform, and is the focus of this report.

Regulation is not a new or mysterious concept. It simply means government control of an enterprise's activities. However, there is much confusion in discussions of regulation. The confusion arises from the fact that one word is being given two meanings. There is an old-style regulation and a new-style regulation. The old-style regulation has been the prevailing mode in China. It has involved extensive, slow, and nontransparent direct management of the power enterprises by multiple ministries and other institutions at virtually every level of government. **A socialist market economy in China's power sector requires a new-style regulation that is limited and transparent, and that "allows power enterprise managers to manage."**

The reform goal of removing government from power enterprise management is necessary, but not sufficient. Once government is out of the enterprise, government needs to reform the way it controls power enterprises. It must transform the regulatory system from old-style command-and-control to light-handed supervision of autonomous, commercially oriented enterprises. Table 1 summarizes the principal recommendations of this report for creating a new light-handed regulatory system. It is recognized that these recommendations cannot be implemented overnight. Therefore, the report also presents a phased, multiyear strategy for implementing the recommendations. The key elements of the implementation strategy are summarized in Table 2. Detailed discussions of the recommendations and the implementation strategy are presented in the main body of the report.

## **DESIGNING A NEW REGULATORY SYSTEM FOR THE POWER SECTOR**

If the recommendation to create a new regulatory system is accepted, the following basic questions must be answered:

- What enterprise activities should be regulated?
- What are the economic and legal control mechanisms required to regulate these activities?
- How should responsibilities be divided among new central and provincial regulatory entities and other central and provincial government authorities?
- Who "regulates the regulators?"

- How are regulatory rules created and enforced?
- What legal changes are required to implement the new system?
- What are possible steps in an action plan to implement the new regulatory system over a period of several years?

The report provides preliminary answers to each of these questions.

### **The Purchasing Agency Structure: A Useful Target**

**The single most important determinant of what should be regulated is the structure of the power sector.** Given China's size and diversity, no single structural model is appropriate for all parts of the country. This, in turn, implies that any new regulatory system must be designed to accommodate regional and provincial diversity in structure. Nevertheless, the purchasing agency model should be a useful intermediate structural model for many parts of China. Its key features are the following:

- A single buyer or purchasing agent who is the only buyer of power from generators in a specific geographic area.
- Independent and affiliated generators located inside or outside the geographic area compete for the right to make power sales to the single buyer.
- The single buyer usually owns the transmission facilities within this area and also performs the dispatch function.
- The single buyer is also the only seller of power in the specified geographic area to affiliated and independent lower-level power supply (distribution) enterprises, such as county, prefectural, and municipal power enterprises.

The purchasing agency structure has four main advantages:

- Steps have already been taken to create this structure in many parts of China.
- It can easily accommodate competitive bidding for the purchase of power with or without joint ventures.
- It will encourage more investment in transmission and distribution.
- It can serve as a transition to a more fully competitive market.

A listing of design issues for the purchasing agency model can be found in Appendix 1.

Recommendations call for the purchasing agency structure to be combined with power pools. Power pools are agreements among separate power enterprises to formalize wholesale power trading arrangements. They are an important technique, now used in many countries, for creating more active and competitive power markets. A detailed list of design issues for creating power pools in China is given in Appendix 2.

### **Potential Roles for the Regional Groups**

If China's power sector moves to some combination of purchasing agencies and power pools, it will be important to decide how the five existing regional groups will fit into this structure. Five possible roles are considered. While recognizing that "one size does not fit all," it is concluded that the most promising role for several of the groups would include the following functions:

- Serve as a passive holding company for state ownership interests in provincial power enterprises.
- Act as the operator of the regional high-voltage network.
- Act as the operator of a "loose" or "tight" power pool among provincial and lower-level power enterprises.

In performing these three functions, the regional group could act as a subsidiary of either the National Power Company or the National Power Grid Company. The purchasing agency functions would be performed by provincial power enterprises or large municipal power enterprises. However, this would not prevent the regional power group from facilitating joint purchases by several power enterprises within the region if there were beneficial opportunities to merge the buying power of several enterprises.

### **A Potential Structural and Regulatory Problem for Purchasing Agencies**

The single biggest problem in implementing the purchasing agency model is to avoid both the perception and reality that the purchasing agency may unfairly and inefficiently favor its own power generators over others. (The same problem exists for the operator of a power pool.) In theory, this problem could be solved if the purchasing agency signs contracts with its affiliated power producers (APPs) that are the same as the contracts that it signs with independent power producers (IPPs).

In reality, much depends on how a contract is implemented and enforced. The worldwide regulatory experience suggests that it is not easy for regulatory authorities to detect and stop subtle forms of favoritism toward APPs. Several overseas electricity regulators have tried unsuccessfully to stop this anticompetitive behavior and have finally concluded that the only viable long-term solution is to require that purchasers and power pool operators be completely unaffiliated—that is, no direct or indirect ownership

connection—with wholesale sellers of power. This would also be a sensible and necessary policy for China.

## **THE RECOMMENDED REGULATORY SYSTEM**

### **The Potential Tasks of a New Regulatory System**

There are eight potential tasks for China's new regulatory system:

- To define regulated power enterprises' specific service obligations and establish quality of service standards.
- To determine and supervise tariff levels for power enterprises, consistent with general principles laid down by the Electric Power Law and State Council regulations.
- To approve regulated power enterprises' investment plans, to the extent that those plans are consistent with national and provincial plans.
- To establish an accounting system for power enterprises within guidelines established by the Ministry of Finance.
- To oversee regulated power enterprises' financial planning.
- To oversee industry structure, including coordination and power pooling agreement among power enterprises.
- To make and enforce regulatory requirements and decisions.
- To resolve disputes involving power enterprises.

Since these are *potential* tasks, they do not need to be performed for all power enterprises in all sector structures. Chapters 2 and 3 describe the regulatory tasks that would apply to different types of power enterprises in a purchasing agency structure. This is meant to be illustrative only. Other sector structures would lead to different regulatory outcomes.

### **Creation of National and Provincial Regulatory Institutions**

It is recommended that a national regulatory authority called the National Power Regulatory Commission be created that is separate from other government institutions. The Commission should be under the supervision of the State Council. It would be created through a State Council decree at Stage 4 of a four-stage, multiyear implementation process.

In Stages 3 and 4, the Commission would be given substantial operational autonomy.<sup>1</sup> Similarly, provincial power regulatory commissions should be created in each province. To ensure coordination between the national and provincial regulatory authorities, it is important to establish the principle that provincial power regulatory commissions would be supervised by and report to the National Power Regulatory Commission. No benefits in creating regional regulatory authorities are foreseen.

### **Horizontal and Vertical Division of Regulated Responsibilities**

Some government officials may oppose the creation of a power regulatory institution because they are concerned that the regulators will assume policymaking functions. Since this is a reasonable concern, it is recommended that the State Council decree that establishes the new regulatory system state clearly that **the regulator implements policy, but does not make policy**. Following this principle, Box 3.1 provides specific examples of responsibilities that should *not* be assigned to power sector regulators.

It is also necessary to decide on the allocation of responsibilities between the central and provincial regulatory entities. The general principles that govern this allocation are the following:

- Rules that are intended to be applied to the entire power sector should be determined at the central government level to ensure uniformity and consistent application.
- Power enterprises whose facilities are located in more than one province should be regulated at the central government level.
- Power sector activities that have an extraprovincial impact and transactions that are interprovincial should be regulated at the central government level.
- Power enterprises and activities located entirely within one province should be regulated at the provincial government level so as to ensure that regulatory decisions conform with local conditions.

Table 3.1 provides a recommended allocation of regulatory tasks based on these principles for China.

---

<sup>1</sup> This is similar to the operational autonomy given to the People's Bank of China by the Central Banking Law of March 1995.

## **Internal Structure of Power Regulatory Commissions**

It is recommended that the national and provincial power regulatory commissions should consist of five member panels. Most countries that have established power regulatory entities in the last several years have opted for multimember commissions. Multimember panels offer the advantages of greater depth and continuity of expertise and improved transparency of the regulatory process.

### **Consultative Process**

**It is recommended that the national and provincial power regulatory commissions be required, before taking a major regulatory action, to notify interested parties (including other government institutions) of the proposed regulatory action and to consider the comments of parties whose interests may be directly affected by that action.** This would improve the effectiveness of the regulatory process by the following:

- Improving the information available to the power regulatory commissions.
- Enabling the power regulatory commissions to explore the implications of potential decisions with all parties, thus improving the quality of decisions.
- Improving power enterprises' understanding of the regulatory process and their ability to predict regulatory decisions.
- Reducing the potential for arbitrary decisions.

### **Accountability**

Recommendations call for the National Power Regulatory Commission and provincial power regulatory commissions to be accountable to the State Council for their actions in the following respects:

- **Procedural accountability:** The procedures adopted by the commissions must be fair and transparent.
- **Substantive accountability:** The regulatory decisions must be consistent with relevant laws, State Council regulations, and other legal requirements.
- **Financial accountability:** The power regulatory commission must make proper and economical use of allocated funds.

## Funding

The power regulatory commissions will need a secure source of funding to operate effectively. Funds for both the national and provincial power regulatory commissions should be allocated from the central government budget. The central government could also raise funds through a small levy on the prices paid by customers and an annual license fee paid by regulated power enterprises. This is a regulatory funding technique used in many other countries.

## LEGAL FRAMEWORK TO IMPLEMENT PROPOSED REGULATORY SYSTEM

For the proposed power sector reforms to succeed, a legal framework is required which is compatible with the features of a socialist market economy and which will establish and reinforce the proposed regulatory system. **A well-designed legal framework will ensure that the government is afforded adequate supervision over the power sector to protect the national interest, limit the government's ability to directly manage the power sector, and protect the commercial autonomy of power enterprises.**

### The New Electric Power Law

**The Electric Power Law, by establishing general principles that will govern regulatory decisions, provides a solid foundation upon which to establish the recommended regulatory system.** The law does not include specific provisions relating to the creation and precise authority of the national and provincial regulatory institutions, the allocation of regulatory responsibilities among different government institutions, and the standards and procedures for appeals of regulatory decisions. However, many of these matters could be adequately addressed through State Council regulations.

In two instances, the Electric Power Law could be interpreted to be inconsistent with reforms recommended in this report because of the following:

- The Electric Power Law includes very specific requirements for tariffs that may make it difficult to implement certain types of desirable tariff reforms.
- The Electric Power Law includes language that may make it difficult to implement the recommended allocation of regulatory responsibilities between the central and provincial power regulatory authorities.

However, in both instances, the wording of the law could accommodate alternate interpretations that would be consistent with the recommendations in this report. If the State Council agrees with these recommendations, it is then recommended to issue rules that are consistent with the recommended policies. **In the future, additional legal reforms will be needed to establish the recommended regulatory system and to further deepen reform of the power sector. The Electric Power Law may need to be amended or**

**supplemented by additional laws as the need for further legal reforms becomes evident.**

### **Proposed Use of Legal Instruments**

**State Council Regulations.** State Council regulations should be relatively general, leaving the development of specific standards to regulations issued by the central and provincial power regulatory authorities, and leaving the application of those standards to case-by-case determinations by the regulatory authorities.

**State Council regulations are recommended to establish the central and provincial power regulatory authorities,** and should address the following:

- The central and provincial power institutions' authorities and responsibilities.
- The power regulatory institutions' institutional structure.
- The allocation of the regulatory functions and tasks among government institutions.
- Regulatory procedures.
- Funding for the power regulatory institutions.

**Administrative Regulations.** Regulations issued by the National Power Regulatory Commission would perform a function similar to laws and State Council decrees, in the sense that each of these legal instruments would apply uniformly to all affected power enterprises.

The National Power Regulatory Commission should issue regulations on all regulatory tasks to be performed by the provincial power regulatory commissions, including tariff methodologies, procedures, and detailed criteria for issuance of licenses for network and power supply enterprises, safety and quality of service standards, and specific standards and procedures for approving investment plans and individual power projects.

**Licenses.** Licenses should be required for all power enterprises other than independent power generation companies. They are particularly important for the network and power supply enterprises because they would be used to control market entry to ensure that the desired sector structure is achieved, and would carry out the following:

- Impose legally mandated service obligations.
- Identify the rights that the power enterprise receives as a result of incurring those obligations.

**Contracts.** In a socialist market economy, contracts negotiated between power enterprises responding to commercial incentives largely replace government directives as instruments for directing power enterprise operations. To enable power enterprises to operate in a commercially autonomous fashion and to engage in effective planning, the legal framework must fulfill the following requirements:

- Minimize the requirements for government approval of power enterprise contracts.
- Eliminate the opportunity for subsequent government or regulatory interference with rights and obligations that have been defined by contract.
- Provide a means of enforcing those rights and obligations.

**Case-by-Case Decisions.** One of the key functions of regulation is to apply, to specific factual circumstances, guidelines that have been previously established through laws, State Council decrees, and regulations issued by the power regulatory institutions. The power regulatory institutions therefore must be authorized to engage in such case-by-case determinations on matters such as tariff determinations, approval of investment plans and specific projects, enforcement actions, and dispute resolution.

### **Legal Requirements Regarding Regulatory Process**

A well-designed regulatory process is essential for an effective regulatory system. A well-designed regulatory process is one that reduces the appearance and reality of arbitrary action.

**Regulatory decisions are least likely to be arbitrary when the affected parties can identify the standards that the power regulatory institutions are required to apply and can understand how the power regulatory institutions have applied those standards in reaching particular decisions.** In other words, the acceptability and certainty associated with regulatory decisions is enhanced by the transparency of the regulatory process.

The report recommends the following four mechanisms for enhancing the transparency of the regulatory process:

- Pre-established and publicly available standards.
- Written decisions.
- Appeals and monitoring.
- Annual reports available to the general public.

---

## Tariff Recommendations

Of all possible regulatory actions, tariff regulation is the most important. The two major dimensions of tariff regulation are level and structure of tariffs. Table 5.1 summarizes 14 recommendations for tariff reform. These recommendations cover the five major types of electric service (producer or generator sales, interenterprise sales, transmission service, bulk sales, and consumer sales) that are likely to dominate during the next 10 years.

Probably the most important recommendations are those dealing with producer or generator sales, since such sales usually account for 50 to 75 percent of the total cost of electricity. The report stresses four major recommendations that would increase the efficiency of the sector:

- Switch from a one-part to a two-part tariff structure.
- Acquire new generation supplies through (international and/or local) competitive procurement whenever possible.
- Focus on minimizing consumer prices, not on operators' profits.
- Do *not* establish uniform producer prices based on administratively determined estimates of long-run marginal cost.

The details and other recommendations are elaborated in Chapter 5 and summarized in Table 5.1.

## STAGED PLAN FOR IMPLEMENTING RECOMMENDED REGULATORY SYSTEM AND LEGAL FRAMEWORK

The report recommends implementing the proposed regulatory system and legal framework in stages (see Table 2). The staged implementation program would require organizational reform of the government institutions responsible for regulation of the power sector and adoption of new legal instruments necessary to create the proposed regulatory framework.

### Immediate Reforms

As shown in this four-stage process, gradual regulatory and legal reforms are recommended. However, there are pressing problems in the sector that cannot wait until the reform process is completed. Therefore, it is recommended that the regulations listed below be issued immediately and then revised as necessary in later stages of the reform process.

- Investment and planning approval process regulations.
- Financial planning regulations for regulated enterprises.
- Power enterprise accounting standards.
- Internal procedures requiring (a) written regulatory decisions, (b) notice and an opportunity for comment on proposed regulatory decisions, and (c) publication of all regulatory decisions.
- Filing requirements (for example, licenses, tariff changes, and investment approvals).
- Safety and quality of service standards.
- Technical standards for operation of power enterprises, including network grid codes.
- Power enterprise reporting requirements.
- Service complaint and enforcement procedures.
- Dispute resolution procedures.

**TABLE 1: SUMMARY OF RECOMMENDED REFORMS**

Enterprise reform	Sector reform	Regulatory reform			Legal reform
		Structure	Process	Policies	
<ul style="list-style-type: none"> <li>Define property rights.</li> <li>Continue separation of government from enterprise.</li> <li>Commercialize and corporatize enterprises.</li> <li>Continue multitrack financing policy.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage “purchasing agency” model as a transition step.</li> <li>Promote generators that are unaffiliated with buyers.</li> <li>Foster development of markets through “loose” and “tight” pools.</li> <li>Assist regional groups to be operators of the transmission grid and power pools.</li> <li>Encourage educational and technical standard-setting roles for one or more industry associations.</li> </ul>	<ul style="list-style-type: none"> <li>Consolidate regulatory functions that are currently dispersed.</li> <li>Establish multimember, national, and provincial regulatory commissions that are ultimately separate from other government entities.</li> <li>Delineate clearly the responsibilities of the national and provincial commissions.</li> <li>Do <i>not</i> establish regional regulatory commissions.</li> <li>Do <i>not</i> give policy-making functions to the regulatory commission</li> <li>Fund the commissions through small levies on kWh sales and annual license fees.</li> </ul>	<ul style="list-style-type: none"> <li>Adopt the principle of “once is enough.”</li> <li>Establish procedures for procedural, substantive, and financial accountability.</li> <li>Pursue transparency through public consultations clearly specified rules, written explanation of decisions, and public annual reports.</li> <li>Create procedures and standards for appeals of regulatory decisions.</li> <li>Require regulatory commissions to make public all licenses, regulations and decisions, along with indices and summaries.</li> </ul>	<ul style="list-style-type: none"> <li>Pursue a new-style regulation that is limited, transparent, and “allows managers to manage.”</li> <li>Regulate price or profits <i>only</i> when an enterprise has monopoly power.</li> <li>Set tariff levels to enable enterprises to cover their costs of supply (if they operate efficiently).</li> <li>Set tariff structures to achieve the efficient production and use of electricity.</li> <li>Review investment plans before the fact.</li> <li>Do <i>not</i> require additional approvals of projects that are consistent with approved investment plans.</li> <li>Promote competitive markets in generation and elsewhere if feasible.</li> <li>Require approvals of mergers, acquisitions and other structural changes that could affect competition.</li> <li>Treat state and nonstate power enterprises equally.</li> </ul>	<ul style="list-style-type: none"> <li>Issue a State Council regulation that establishes national and provincial regulatory commissions.</li> <li>Allow commissions to issue licenses, regulations, and case-by-case decisions.</li> <li>Develop model licenses for network and distribution entities.</li> <li>Create monitoring and sanction mechanisms for violations of regulatory rules.</li> <li>Give enterprises the right to respond in writing to alleged violations.</li> <li>Establish clear standards for appeals of regulatory decisions.</li> <li>Restrict the ability of commissions to make unilateral changes to existing licenses.</li> </ul>

**TABLE 2: RECOMMENDED IMPLEMENTATION STEPS**

Stages	Intended achievements
<i>Stage 1 (1996–1997) will focus on the separation of government function from power enterprise management.</i>	Elimination of the Ministry of Electric Power (MOEP). Allocation of government functions previously performed by MOEP among other central government institutions. Adoption of legal instruments that are a precondition to further reform of the power sector.
<i>Stage 2 (1997–2000) will focus on concentrating regulation at both the central and provincial government levels and beginning to formulate the basis for the recommended regulatory system and legal framework for the power sector.</i>	Concentration of power regulatory functions at the central and provincial levels within one central and one provincial government institution. Training of national and provincial regulators in regulatory techniques appropriate for a socialist market economy. Adoption of the legal instruments necessary to define the regulatory relationship between power enterprises and the government.
<i>Stage 3 (2000–2005) will focus on rationalizing the regulatory functions within the government organizations that had been entrusted with such regulatory responsibilities in the preceding stage.</i>	Power regulation will be set up within a separate division or department within the central and provincial government organizations responsible for power sector regulation. The legal framework will be perfected.
<i>Stage 4 (2005–2007) will complete implementation of the recommended reforms by establishing an independent regulatory system and regulatory framework.</i>	The power sector regulatory authorities will be established as power regulatory commissions under the supervision of the State Council, but separate from other government institutions. The power regulatory commissions will exercise their regulatory responsibilities consistent with the procedures recommended in this report.

## CHAPTER 1. INTRODUCTION

### ACHIEVEMENTS

Since 1980, the Chinese power sector has had a number of impressive achievements to its credit and compares favorably with the power sectors in many developing economies. Installed capacity has grown at 8 percent per year from 66 GW in 1980 to 213 GW in 1995. The Chinese power sector is now the second largest in the world, and additional generation capacity is being added at a rate of 15 GW to 16 GW per year.

There have been steady technical improvements. The power sector has successfully absorbed and mastered advanced foreign technology and upgraded the technical capabilities of its staff.

Since the issuance of the State Council's "Provisional Regulation on Encouraging Fund-Raising for Power Construction" in 1985, investment in power generation both from domestic and foreign sources has expanded. As a result, a large number of new sources of generation capacity have augmented generation resources, and have enhanced the opportunities for competition. A pilot project is under way to use competitive bidding for the Laibin B generating unit.

There has been a steady advance in rural electrification and the supply of electricity to areas inhabited by national minorities. The increase in electricity supply in rural areas has helped in the development of agriculture and rural industry.

The power sector has seen important organizational changes in line with the development of a socialist market economy. The older power enterprises have begun to achieve greater commercial autonomy, and power generation companies have started to operate as commercial organizations responsible for their profits and losses. Initial steps have been taken to separate the government from enterprises.

There have been some improvements in the power pricing system. New plants are allowed to charge prices that cover operating costs, debt service payments, and a reasonable profit. Tariffs for the old plants are allowed to be adjusted annually to recover increases in fuel and other costs.

In December 1995 the National People's Congress passed the Electric Power Law, which came into force on April 1, 1996. The Electric Power Law provides a comprehensive framework for the reform and development of the power sector in line with the socialist market economy.

---

## CHALLENGES FACING THE POWER SECTOR

Notwithstanding these major achievements, the Chinese power sector suffers from major problems that impede social and economic development throughout the rest of the economy. The requirement of the Electric Power Law—that users shall be supplied with electricity without interruption (Article 29 of the Electric Power Law)—is a hope for the future rather than the current reality.

There is a critical shortage of power. The power sector is not able to satisfy energy demand, let alone peak power demand. As a result, many enterprises must curtail their production, and households suffer power cuts and restrictions on the use of electrical appliances. The proportion of power consumed by households is less than 10 percent, which is not only low by international standards, but low in comparison with many developing economies.

The quality of the power supply is low and variable. Both predictable and unpredictable outages are common, and departures from targeted voltage levels can be great and frequent. They impose a cost on all branches of industry and households. This includes the additional cost of restarting equipment, damage to machinery, and the cost of voltage stabilizers that are needed to protect electrical appliances from damage due to voltage variation. These costs are actually much greater than they seem because they are dispersed.

Rural areas suffer heavily. Compared with urban areas, they pay a higher price for power. This reflects in part higher generation and distribution costs. Moreover, electricity shortages are more severe, and voltage variations from targeted levels are higher. Faced with problems of electricity supply, many rural counties and townships build dedicated (or own-use) generation plants, which are generally small in size and inefficient. There are still 100 million rural people without access to electricity.

Overall, the efficiency of many generating plants is low. A significant percentage of generated electricity is used by power plants themselves—in some cases as much as 25 percent. The efficiency of energy use remains low. Despite massive investment in new generation capacity, there has been only a modest increase in fuel efficiency. Up to a third of generating plants are too small to be technically efficient. A cause of serious concern is that these include not only old plants, but also many new plants. Thus, new investment, rather than reducing inefficiency, seems to be perpetuating it.

The problem of “too small for efficiency” also applies to distribution enterprises, especially in rural areas. Moreover, electricity losses in distribution are high by international standards.

Power enterprises suffer from a problem of surplus labor. Despite a large improvement in the technical capabilities of the power sector personnel, the average skill level still remains low.

### **IMPEDIMENTS TO SECTOR REFORM**

The above problems arise from a combination of factors:

- The organization of the power sector.
- The relationship between the government and power enterprises and the current system of direct government management of the power sector.
- Lack of appropriate incentives for efficiency.
- The absence of a comprehensive and transparent legal and regulatory framework for the power sector.

These problems can be solved through a comprehensive reform of the sector.

### **Nonseparation of Government from Enterprise Management**

Many power enterprises are both government organizations and enterprises with their own budget and with responsibility for profits and losses, in principle if not always in fact. This applies to all levels of the power sector from the central level down to the county level. This structure developed as a result of the past system of a centrally planned economy.

The present situation of “one organization with two roles” is a major impediment in a transition to a socialist market economy. In a socialist market economy, the role of government is to serve the wider social interest through indirect supervision of the economy rather than direct control. The role of enterprises is to respond to socialist market signals and to earn profits through efficient operation. One organization cannot serve both roles without conflict.

This conflict is presently kept in check by limiting managerial autonomy and commercial independence of power enterprises. This stops the abuse of monopoly power by power enterprises, but at the high cost of an adverse effect on the incentive of enterprises to raise efficiency.

### **Multitrack Power Sector**

Significant financing has been obtained from new sources with the opening of power generation to investment from multiple domestic and foreign sources. These expanded avenues for financing construction of power plants have helped to partially

relieve the power shortage. It also represents a significant institutional change in the power sector.

This development, however, has also created a “multitrack” power sector. One track consists of older enterprises, which received their investment from the central government budget, and the other track consists of new sources of financing.

Compared to plants financed from sources other than the central government budget, the older enterprises are only partially commercialized and are under tighter government control. The generated electricity from these plants is administratively allocated and sold at lower prices than electricity from new power plants. This difference is contrary to the basic principle of uniform treatment of customers with the same load patterns and in the same locality, which is required by the Electric Power Law (Article 41).

### **Proliferation of Units**

The power sector currently consists of the following:

- 10,000 independent legal entities.
- 80,000 independent power plants.
- 1,600 distribution companies.

This vast multiplicity of entities aggravates problems associated with insufficient coordination among power sector enterprises. Many of the power enterprises, especially in rural areas, operate as autonomous subsystems. This gives rise to inefficiency both in the utilization of existing capacity and in investment.

An example of the first type of inefficiency is localities using small, high-cost plants to satisfy demand that could be met by a larger, lower-cost plants. The large number of units also impedes change in the style of management inherited from the planned economy to one suited to a socialist market economy. Recognizing the problems created by the multiplicity of enterprises, the 1996 Electric Power Law encourages mergers in the power sector (Article 22).

### **Divided Decisionmaking and Diffuse Responsibility**

At all levels, a wide range of government institutions participates in management decisions affecting the power sector. There is comparatively little delegation of decisionmaking. When there is delegation, decisions are still subject to review by a number of government institutions. The result is a decisionmaking process that is slow, diffuse, inefficient, and nontransparent. It also leads to bargaining between government institutions,

with each institution pursuing its own particular interests. These problems are particularly apparent with regard to tariff determinations and the investment project approval process.

### **Defective Power Pricing System**

Some of the major problems in the power sector can be traced to the defective tariff structure. For example, maintaining low prices for electricity generated by older plants, while helping to keep industrial costs down and to protect living standards, reduces the self-financing capability of the power enterprises, thus undermining the development of the power sector. The one-part producer tariff that puts both capital and operating expenses in a single kilowatt-hour charge results in uneconomic dispatch of generating plants. The customer tariff structure blunts incentives for customers to economize on the use of electricity and creates the paradoxical situation where electricity is both in short supply and wastefully used.

### **Cumbersome Investment Approval Process**

The need for new investment in generation is widely recognized. However, the slow, unclear, nontransparent, and complex investment approval process delays investment that is urgently needed to relieve power shortages.

The difficulties associated with the investment approval process is evident from the amount of investment in small generation plants. The approval process for small generation plants (up to 50 MW) is much simpler than the process for large plants. This bifurcated process has accelerated investment in generation plants in rural areas, but at a cost of building inefficient small-scale generation plants rather than more efficient large plants. A major reason for small plants accounting for up to one-third of new generation capacity is the deficient process for approving investments in larger generation plants.

### **Absence of a Transparent and Comprehensive Legal Framework**

Prior to the enactment of the Electric Power Law, there was no comprehensive legal framework for the power sector. Instead, the power sector was governed by administrative directives issued by multiple institutions at every level of government. This resulted in the power sector being subjected to more than 500 laws, regulations, and administrative directives. There was little coordination regarding the development of such legal requirements, and the legal rules governing the power sector were at best confusing and at worst contradictory.

The absence of a systematic development of a comprehensive legal framework also resulted in great difficulty in identifying and obtaining documents containing regulations applicable to the power sector. An understanding of the legal requirements is more often obtained from discussions with and speeches made by government officials than from

written rules and regulations. This lack of transparency has only reinforced government's managerial control over power enterprises.

### **Partial Reform Process**

The reforms since 1985 have helped to raise investment and encourage preliminary steps toward the commercialization of the power sector. But the reforms thus far have mostly been responses to pressing problems rather than elements of a comprehensive, long-term strategy of reform of the power sector.

Partial reforms have diminished immediate problems, but they have also created some new problems and caused neglect of issues that are of crucial importance for the long-term efficiency of the power sector. The new problems include the emergence of a multietier tariff system and diversion of sector revenues to provincial and county governments. The neglected issues include investment in distribution and transmission.

The overall efficiency of the power sector depends critically on a close coordination in operation and investment between generation, transmission, and distribution. Up to now, reforms to encourage investment and a partial rationalization of prices have largely focused on generation, given the pressing problem of electricity shortages. They have tended to neglect complementary investment in upgrading and extending distribution and transmission networks. Also, insufficient attention has been paid to encouraging different components of a single enterprise to charge commercial prices for the provision of internal goods and services.

### **Unclear Property Rights**

As in other industries in China, a major problem with the power sector is the lack of clearly defined property rights. The power sector is largely state-owned. However, control of state-owned assets has been vested with each government tier from the central government down to the township and urban district. Further, within the same tier of government, control has been exercised by a number of different organizations.

A clear specification of which organization owns what and how it exercises its ownership interests is essential for the full commercialization and corporatization of power enterprises. The problem of unclear property rights of state assets is especially acute in the power sector because of changes in its sources of investment. Initially all investment came from the central government budget. Since 1985, however, the sources of investment funds have multiplied and now include the central and territorial governments (including counties and townships) and other state-owned organizations.

## **REFORM OBJECTIVES**

There are solutions to the problems discussed above that could lead to dramatic improvements in the performance of the sector. What is needed is a reform package that takes a comprehensive rather than a partial view of the power sector.

Bold reforms of the power sector are already under way. Indeed, many of the essential components of such a reform package are provided by the Electric Power Law and reform measures, which have either been announced or in preparation. Additional power sector reform measures should focus on the following actions.

### **Separation of the Government from Enterprises**

Power sector enterprises need to be separated from the government. The need for a clear separation of the government from enterprises is recognized and affirmed by the Chinese leadership. The "14 Rights of State Enterprises" and the experimental reform of selected state enterprises, including some power enterprises, provides a framework for such separation. These "14 Rights" have now been clearly granted to power enterprises by Article 7 of the Electric Power Law. A pilot experiment to implement separation of government from enterprises is under way in Fujian Province.

What is needed is a speedy completion of the experiment and the formulation of a plan for central and other provincial power sector enterprises. In addition to the separation of government and enterprise, there needs to be a rationalization of government decisionmaking and the commercialization and corporatization of power enterprises.

### **Rationalization of Government Decisionmaking**

The first step in rationalizing central government decisionmaking in the power sector has been announced and will begin soon. MOEP is to be abolished in the latter part of 1996. The MOEP's commercial and enterprise parts are to be transferred to the newly formed National Power Company, and its governmental functions are to be dispersed among various higher-level government institutions.

As detailed in Chapter 6 of the report, this would be just the first step of a four-stage process of rationalization. A similar plan for the rationalization of government decisionmaking at the provincial and lower government tiers is also needed. This is of special importance because much of generation and transmission and all of distribution is under the control of provincial or subprovincial organizations. This rationalization of government decisionmaking must also be combined with the development of a new regulatory system.

## **Regulatory and Legal Framework**

Unlike a planned economy, which is based on directives and orders, a socialist market economy requires the following:

- Commercial activities directed by market signals (and not by government).
- The substitution of voluntarily negotiated contracts for government directives.
- A clear separation of the rights and responsibilities of government organizations and enterprise.

For power sector reforms to succeed, a legal framework is required that will be compatible with the foregoing features of a socialist market economy.

The Electric Power Law lays the foundation for a comprehensive system of laws and regulations governing the power sector in a socialist market economy:

- It defines certain of the rights and responsibilities of the central and territorial governments in the power sector.
- It affirms the principle that the power sector should be run on a commercial basis, involving negotiated transactions between enterprises driven by market signals and competitive pressures.
- It upholds the commercial autonomy of power enterprises and the right of investors to recover invested capital and earn a reasonable profit.
- It lays down general guidelines for the determination of power tariffs.
- It outlines the rights and obligations of customers with respect to power enterprises and special considerations in the supply of electricity to rural and national minority areas.

The Electric Power Law, however, provides only a broad framework. Details have to be filled in by regulations of the State Council and other government institutions.

## **Commercialization and Corporatization of Enterprises**

The commercialization of the power sector will involve the corporatization of power enterprises. This will require the following:

- A separation of management from ownership.
- Clear specification of ownership interests in power sector assets.

- Specification of the rights and obligations of the management, employees and owners.
- An accounting system that is consistent with international practices.
- Strengthening of internal management.
- Spin-off of noncore activities, such as housing, clinics, hotels, and restaurants.

Because most of the power sector is and will remain state-owned, the corporatization of power enterprises will need a separation of the role of the government as owner from its usual role of furthering social and economic development. This will require the creation of new institutions that perform the role of owner on behalf of the state.

## **TWO REFORM MEASURES TO ENHANCE EFFICIENCY**

### **Enterprise Restructuring**

As in other industries, the power sector needs a restructuring of power enterprises to enhance efficiency and to eliminate commercially nonviable enterprises. Such restructuring includes not only a merger and consolidation of power enterprises, but also a division of enterprises engaged in multiple activities.

Such restructuring should be guided by both the technical consideration of the economies of large scale and the economic consideration of introducing competition into the power sector.

### **Encouraging the Development of New Power Markets**

In a power sector operating on the basis of a socialist market economy, there are two types of transactions: intraenterprise transactions and market transactions. Intraenterprise transactions arise when a single power enterprise engages in generation, transmission, and distribution activities. This is the current situation for many provincial power enterprises. At present, intraenterprise transaction are much more common than market transactions. Market transactions are mostly limited to sales by power production enterprises to provincial power enterprises and to regional groups.

In keeping with the goal of developing a socialist market economy, there is need for expanding the scope of market transactions within the power sector. Actions that would accomplish this goal include the following:

- Further encouragement of IPPs.
- Establishment of “power purchasing agencies.”

- 
- Development of interprovincial and inter-regional power pools.
  - Separation of generation from distribution in rural areas.

The success of encouraging efficient new markets will depend critically on achieving nondiscrimination between intraenterprise and market transactions. It may be possible to achieve fairness, efficiency, and nondiscrimination by requiring power enterprises to do the following:

- Organizationally separate generation, transmission, and distribution activities and to keep separate accounts for each.
- Pay their generation departments or affiliates according to the same principles that determine the prices paid to nonaffiliated power producers.

While these actions may seem reasonable, the experience of other countries suggests that it may not be workable in practice.

A simpler and ultimately more effective solution would be to require provincial power enterprises and regional groups to sell their generating assets to nonaffiliated companies. A similar separation would also be required between distribution and transmission, and transmission and generation.

### **REGULATION OF THE POWER SECTOR IN A SOCIALIST MARKET ECONOMY**

Although it is now widely accepted that the first step to market socialism in the power sector is to remove government from the power enterprise, **this first step is not sufficient**. Once government is out of the enterprise, government needs to reform the way it controls power enterprises. It must transform the existing system from old-style command and control to that of supervision of autonomous, commercially oriented power enterprises. Therefore, the last and perhaps most important step in transforming the power sector is the reform of the existing regulatory system. This is the principal subject of this report.

This report focuses on how the government should supervise and control the power sector. **The fundamental and unavoidable truth is that the government cannot expect power sector reforms to succeed if it regulates power sector enterprises in the same way that it regulated traditional state-owned enterprises.** Regulation that works in a centrally planned economy will simply *not* work in a socialist market economy.

#### **The Meaning of Regulation**

Regulation is not a new or mysterious concept. Regulation simply means government control of an enterprise's activities. When a government regulates, it imposes

direct and indirect controls on the actions of state-owned and nonstate-owned enterprises in a particular sector. Government controls on tariffs are the most common form of economic regulation. Regulation, however, often goes beyond simple price controls.

In the last five years, new power sector regulatory systems have been established in more than 10 countries. According to World Bank experience in many of these countries, the initial reaction of most overseas government officials to proposals to create a new power sector regulatory institution has usually been skepticism and confusion.

A recent World Bank paper on this topic notes that the typical reaction of most government officials to creating a new regulatory system is the following:

“But this is nothing new! Our government has always controlled the activities of state-owned enterprises through different ministries. And these controls have created many problems. We don’t need to reinvent the past and put a new label on it.”

Much of the confusion about regulation comes from the fact that one word is being given two different meanings. There is an old-style regulation and a new-style regulation. The old-style regulation (which is often referred to as supervision, control, management, and oversight) has been the prevailing mode in China and other countries where state-owned enterprises have dominated the power sector.

Typically, it has involved direct government management of virtually all power sector activities through government directives. Such regulation is extensive, slow, nontransparent, and often exercised by many ministries and institutions at all levels of government.

**The old-style regulation is not an option for China if the nation is going to succeed in creating a socialist market economy.** Commercialization of power enterprises, the introduction of competitive market mechanisms and attracting additional sources for funding new investments will not occur (or only in very limited amounts) if China maintains its current regulatory system.

**A socialist market economy in the Chinese power sector requires a new style of regulation that is limited and transparent, and that “allows power enterprise managers to manage.”** A socialist market economy can only function if the government relaxes its direct control of the power sector and restrains itself to supervising power sector enterprises to ensure that such enterprises operate within pre-established rules.

The fundamental premise of this report is that the choice between these two regulatory approaches is ultimately a pragmatic choice. Since the goal is to bring market socialism to the power sector, it is critically necessary to create a new regulatory system that is limited in scope and open in operation, and that protects both investors and consumers.

## **The Basic Questions of Regulatory Design**

The purpose of this report is to present a plan on how this transformation can be accomplished. To develop this plan, the report addresses the following basic questions:

- What sector activities and enterprises should be regulated?
- What are the economic and legal control mechanisms required to regulate these activities?
- How should responsibilities be divided between new central and provincial regulatory entities and other central and provincial government authorities?
- Who “regulates the regulators?”
- How are regulatory rules created and enforced?
- What legal changes are required to implement the new system?
- What are possible steps in an action plan to implementing the new regulatory system over a period of several years?

Recently created or long-existing regulatory systems in a number of other countries have been carefully studied during the preparation of this report. (See Appendix 4 for a description of the regulatory systems for the power sector in four countries.) However, the specific recommendations of this report were developed to reflect the particular institutional, legal, and physical realities of China.

## **The Seven Principles**

In answering these questions, the following seven principles have been applied:

- The new regulatory system must achieve a socialist market economy within the power sector.
- The new regulatory system must establish a credible commitment to domestic and foreign investors that they will recover reasonable costs, earn a profit commensurate with the risk that they take, and be able to operate with genuine commercial autonomy.
- The new regulatory system must establish a credible commitment to power consumers that they will be protected against monopoly abuses of state and nonstate power enterprises.

- The new regulatory system should not replace the government as the source of national energy or social policy.
- The new regulatory system must be stable and provide reasonable certainty to all participants.
- The new regulatory system must be able to accommodate different power sector structures in different parts of China.
- The new regulatory system must be consistent with all laws and regulations.

These principles have governed the development of the specific recommendations and the proposed implementation plan set forth in this report.

### **Organization of the Report**

This report contains six chapters, of which this first one provides an introduction:

- Chapter 2 examines the relationship between power sector structure and regulation. It suggests several structural changes to improve the economic performance of the power sector. It also describes the activities that will need to be regulated.
- Chapter 3 recommends a regulatory system that will support a socialist market economy in the power sector based on the structural changes recommended in Chapter 3. This chapter describes the regulatory tasks that need to be performed by the central and provincial regulatory authorities. It proposes legal and economic techniques for performing these tasks that will encourage commercial autonomy for power enterprises. The chapter also presents recommendations on internal structure, design, and decisionmaking procedures for the new regulatory institutions.
- Chapter 4 proposes a legal framework for implementing the recommended regulatory system.
- Chapter 5 focuses on reforms to current tariff regulation. It proposes a number of specific tariff reforms.
- Chapter 6 presents a four-stage implementation plan for developing the proposed regulatory system and legal framework over a period of 10 years.



## CHAPTER 2. SECTOR STRUCTURE AND REGULATION

The focus of this report is on regulation. Designing a regulatory system is impossible without also considering the sector structure. **The most important determinant of what should be regulated is the structure of the power sector.** Some activities will require regulation in one structure, but not in other structures. In addition, some structures are more difficult to regulate than others. This chapter will discuss the likely interaction between structure and regulation in the Chinese power sector.

### MEANING OF SECTOR STRUCTURE

Sector structure refers to organization, ownership, and market arrangements within the power sector. For example, in a particular region or province, a single power enterprise could perform all four functions of generation, transmission, dispatch, and distribution. Alternatively, these activities could be performed by separate power enterprises. This particular structural characteristic is referred to as vertical integration. If the activities are performed by separate enterprises, another important consideration is whether the power enterprises are affiliated (that is, under interconnected or common ownership) or are completely independent of each other (that is, no direct or indirect ownership connection between the enterprises).

Another structural characteristic is the degree of horizontal integration. This refers to the geographic scope of the enterprise. A power enterprise could operate in a county, in a province, or in several provinces. In a centrally planned economy, it is typically the case that the geographic boundaries of enterprises will coincide exactly with government administrative units, such as a prefecture, county, or province. This facilitates government administrative control.

In a socialist market economy, it would be a mistake to force the boundaries of power enterprises to continue to coincide exactly with traditional administrative units. Stated differently, **the administratively appropriate unit in a centrally planned economy may not be commercially efficient in a socialist market economy.**

Another important structural question is: Who can buy from whom? For example, large industrial installations could be limited to purchasing from their local provincial power company or could be permitted to purchase power on a short- or long-term basis from power enterprises inside or outside the province. This second option appears to be prohibited by the Electric Power Law and the State Council regulation on power utilization issued in April 1996.

This type of market sale is not prohibited in other countries, such as the United Kingdom, Argentina, Chile, and Norway. It is a type of market transaction that should be permitted at some time in the future. However, other than sales by cogeneration facilities to adjacent industrial companies, it is not recommended for the near term because the option for cross-boundary sales introduce unnecessary complications in reforming a power sector.

Structural reform is different from power enterprise reform. Structural reform focuses on how the sector is organized—which power enterprises perform which functions—and the types of power markets that are allowed to exist in the sector. Enterprise reform focuses on corporatization and commercialization. It means giving autonomy to power enterprises to pursue commercial objectives. The focus of enterprise reform is on what happens *inside* the enterprise.<sup>1</sup> The focus of structural reform is on what happens *outside* of the enterprise.

### THE NEW REGULATORY SYSTEM MUST ACCOMMODATE DIFFERENT STRUCTURES

China is a large country with widely varying degrees of development and different power sector structures in different provinces and regions. This means that different provinces or regions are likely to choose different structural models, and the rate of reform will vary from one part of the country to another. This is inevitable and should not be opposed. Indeed, the variety of structures and conditions present within the Chinese power sector provides a unique opportunity for experimentation. However, this variation has an important implication for the design of the new regulatory system. It means that the **new power sector regulatory system must be designed to accommodate regional and provincial diversity in structure.**

A good rule for designing national regulatory authorities in large countries (China, India, Brazil, Canada, and the United States) is to start with general rules unless there is a high degree of certainty that a single detailed rule should apply everywhere in the country. General rules are better than specific rules in accommodating structural diversity in a large country. It is always possible to follow with a more detailed rule if more specificity is needed.

---

<sup>1</sup> Enterprise reform can lead to structural reform. For example, a provincial power company could create internal “profit centers” in generation, transmission, dispatch, and distribution. This enterprise reform could lead to structural reform if the profit centers are eventually converted into separate, nonaffiliated companies.

## **REGULATION WILL FAIL IF THE STRUCTURE IS FLAWED**

### **A Potential Problem in the United Kingdom**

Some sector structures are harder to regulate than others. An example from the United Kingdom will make this clearer. As this report is being written, the British government has to decide whether to allow the two major generating companies to become owners of two of the 12 existing distribution companies in the country. The British electricity regulator has urged his government to deny these acquisitions. He has stated that this vertical merger will create an incentive for the distribution companies to buy from their affiliate generators rather than from the other generators who offer the lowest prices. This will hurt the customers of the distribution companies because they will pay more for their electricity supply than necessary. He also said that it will be very difficult to detect and correct this undesirable behavior.

### **An Actual Problem in the United States**

There is another example from the United States. The United States has decided, as a matter of national policy, that there should be open access to the high-voltage transmission network so that different power enterprises that are not physically contiguous can buy and sell power from each other. The problem, however, is that it is difficult to implement this policy in the United States because there are more than 100 private and public power enterprises that own portions of the high-voltage transmission network, and many of these enterprises also own generation facilities. This structural characteristic (that is, cross-ownership of generation and transmission facilities) often creates an incentive for the owner of the network to try to deny access to the network to other owners of generation facilities so that the owner can protect its sales from competition. The Federal Energy Regulatory Commission, the national regulatory entity, has said that stopping this anticompetitive practice is very difficult.

### **Lesson Learned**

The lesson to be learned from these two examples is that some industry structures are more conducive to market competition than others. As discussed in Chapter 3, it will be the government, not the regulator, that decides on the structure of the sector. **But it is important to recognize that if the structure is flawed (that is, not conducive to effective market competition), it will be very difficult to correct this flaw through regulation.** Therefore, careful attention needs to be paid to promoting sector structures that help rather than hinder market competition. Regulation is a poor substitute for market competition.

## THE CURRENT STRUCTURE OF THE POWER SECTOR

China does not have a single unified power sector. Instead, it is a multilayered structure. In some areas, the entities at different levels are affiliated. In other areas, the entities at different levels are independent of each other. Of the 13 power networks with capacities of 1 GW or more, five are multiprovincial and are operated by the regional groups, and eight are operated by provincial power enterprises. In addition, there is a growing number of independent power producers (IPPs) that build and operate power generation plants. There are also many affiliated power producers that typically build plants under a joint venture arrangement. At the distribution level, there are more than 1,500 local distribution enterprises at the county or prefecture level. Finally, there are a number of service companies that perform engineering and construction work.

Since 1985, there has been a distinct movement toward more vertical separation of generation. This trend has resulted from the need to obtain access to new sources of financing and a desire to get access to new technologies. It has also been encouraged by the government's willingness to allow joint ventures between Chinese enterprises and foreign companies.

Following are several widely recognized problems with the current structure of the power sector:

- The relationship between the regional groups and the provincial power companies is unclear.
- Provincial power companies often have to obtain approvals from their corresponding regional group for many decisions. This means that the regional group is often regulating and managing at the same time.
- Regional groups and provincial power enterprises own power plants and buy power from nonaffiliated generators. This is likely to create a conflict of interest that may lead to inefficient operations.
- Provincial power companies may favor their affiliated distributors over nonaffiliated distributors in times of shortage.
- Independent distribution entities have an incentive to build small, inefficient, and polluting coal and diesel-fired power plants.

## EXPECTED CHANGES IN STRUCTURE

The government is pursuing reforms to separate enterprise management from the government. To implement this policy, MOEP will go out of existence later this year. Its governmental functions will be dispersed among other higher-level national

organizations. At the same time, a new power enterprise, the National Power Company (NPC), will come into existence. NPC will be the holder of the states' assets in the power sector. The creation of NPC is consistent with the policy goal of separating enterprise management from government.

The regional groups are expected to be "daughter" subsidiary companies of NPC. Also, the new National Power Grid Company will be a subsidiary of NPC. The existence of NPC will help to ensure that all power enterprises that wish to transmit on the interregional grid will be treated equally.<sup>2</sup>

However, there still may be a problem on intraregional transmission grids owned by the regional groups. If the regional groups also own generation, they may be reluctant to give equal transmission service to other enterprises that wish to make competing generation sales. This could thwart the development of a competitive wholesale market in some regions, as has happened in the United States. **Therefore, consideration should be given to requiring the regional groups to sell their current generating assets to nonaffiliated generation companies.** (The same concern arises if there is cross-ownership of generation and intraregional transmission grids by provincial power companies.)

There are two other important implementation issues for NPC:

- Will NPC assume a passive or active management role?
- Will NPC lead to an early definition of enterprise property rights?

Each problem is discussed in turn.

### **Passive Versus Active Management Role**

It is critical for NPC to assume a passive management role. If it assumes an active management role, it will be impossible for power enterprises to operate on an autonomous basis as guaranteed by Article 7 of the new Electric Power Law. The technique of "ownership without control," as used in other countries, should be adopted. In the Chinese context, this means that **NPC would assume the role of a shareholder and would be concerned solely with improving the value of its investment in the power sector. Concerns about national energy policy, achieving social objectives, and regulation should be left to other government institutions.**

---

<sup>2</sup> Norway and Britain also have separate national transmission companies. In India, Powergrid, a public corporation owned by the national government, owns some but not all of the interregional transmission. In Brazil, the national government's efforts to create a national transmission enterprise may be thwarted by the unwillingness of certain state (that is, provincial) governments to transfer ownership or control of their network facilities to the national government.

## Defining Property Rights

The fundamental prerequisite for successful enterprise reform is defining “property rights.” This is perhaps the most difficult problem of the transition from a centrally planned to a socialist market economy. It is impossible for an enterprise to operate on a commercial basis if it does not know the size of its assets and who the owners are. It is not enough to say that the state owns the assets. The enterprise must know which levels of the state own its assets and to whom it is commercially responsible. This is a controversial issue and is subject to many disputes. **Unless the ownership issue is resolved, almost all the regulatory and legal reforms recommended in this report will not achieve the goal of a socialist market economy in the power sector.**

### THE PURCHASING AGENCY MODEL: A USEFUL TARGET

Given the size of China and the variety of currently existing ownership arrangements, it is unrealistic to recommend one structural model that should apply everywhere in the country. Nevertheless, **the purchasing agency or single buyer model is a useful intermediate structural model for many parts of China.** The preconditions already exist in many provinces and regions. There is also ample international experience from which China can obtain important information. Variations of the purchasing model have been adopted or are being seriously considered for adoption in Northern Ireland, Portugal, Poland, Spain, Thailand, Orissa (India), and the United States.

Following are the key characteristics of the purchasing agency model:

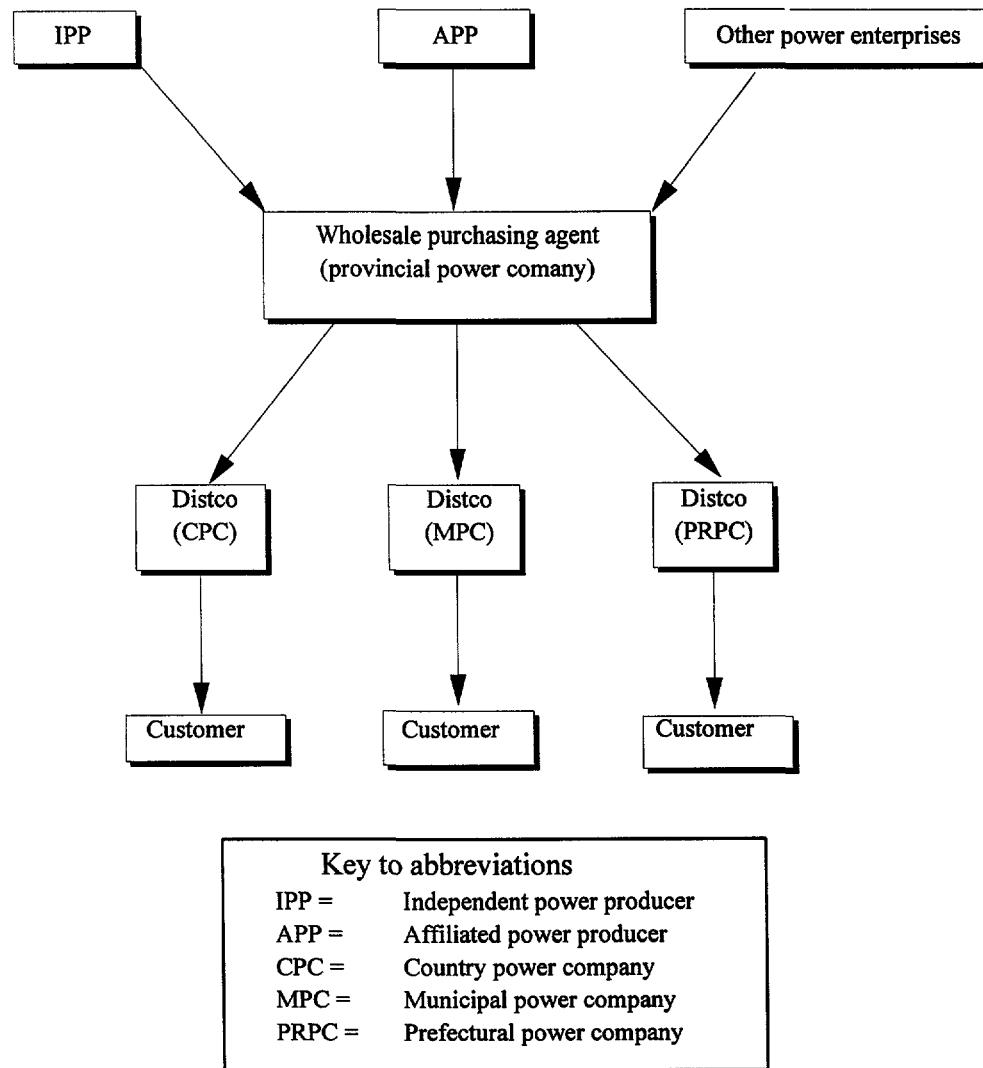
- A single buyer or purchasing agent that is the only buyer of power from generators in a specified geographic area.
- Independent and affiliated generators located inside or outside the geographic area compete for the right to make power sales to the single buyer.
- The single buyer usually owns the transmission facilities within this area and also performs the dispatch function.
- The single buyer is also the only seller of power in the specified geographic area to affiliated and independent lower-level power supply (distribution) enterprises, such as county, prefectural, and municipal power enterprises.

Some of the major design issues in establishing the purchasing agency structure are listed in Appendix 1.

Figure 2.1 shows how the purchasing agency model might be applied in the Chinese context. In this figure, the purchasing agent is shown as a provincial power company. However, this does not mean that the purchasing agent must always be limited

to provincial power companies. As discussed below, regional groups could be the purchasing agents in some parts of the country.

**FIGURE 2.1: PURCHASING AGENCY MODEL**



*Source:* Study Team.

### What Are the Advantages of the Purchasing Agency Model for China?

The six principal advantages to encouraging the adoption of the purchasing agency are:

- 
- It is not a totally new structure. First steps have been taken toward this structure in many parts of China.

Separate distribution and generation entities already exist in many provinces and regions. There are more than 1,600 separate distribution entities (mostly at the county level) currently in existence throughout the country. In Zhejiang Province, entities that are separate from the Zhejiang Power Bureau distribute more than 50 percent of the electricity sold to final customers. There are also many separate generation enterprises throughout the country. It has been estimated that there are 40 power investment companies currently in operation. This is the result of multichannel financing, which is likely to continue in a socialist market economy.

- This structure can easily accommodate competitive bidding for the purchase of power with or without joint ventures.

There are many foreign companies that want to build power plants in China, but China has not taken full advantage of this potential for competition. As a consequence, it may be paying more for power than it should when it purchases from independent power producers.

- It will encourage more investment in transmission and distribution.

Transmission and distribution investments are the “forgotten sisters” of the power sector. More investment needs to be channeled toward these two functions. This is more likely to happen if there are separate enterprises performing these functions.

- It can serve as a transition step toward a more fully competitive market.

Most countries that have chosen the “purchasing agency” structure view it as a transition step toward a more fully competitive structure. It may be worth paying particular attention to how it is being implemented in Poland. Poland, like China, is moving away from a centrally planned economy.

- It provides an efficient mechanism for implementing social and economic policies of the central government.

Maintaining the monopoly over sales to power distribution enterprises allows the government to continue to require cross-subsidization across customer classes and regions to pursue socially desirable objectives. In addition, the government retains control over technology and fuel selection through the regulatory entity’s review of the purchasing agency’s investment plans and purchase decisions. (See Chapter 3 for a discussion of this review process.)

At the time of this review, the government can instruct the purchasing agency to limit its purchases to electricity generated from certain fuels or require that some specified percentage of its power purchases must come from generating plants using renewable and less polluting technologies.

- It can be combined with continuing ownership by independent distribution entities of the existing small generating units.

It would be difficult to force the independent distribution entities to give up their ownership of their small generating plants. Once a purchasing agency comes into existence, steps should be taken to try to discourage distribution entities from building new plants.

### **Is the Purchasing Agency Structure Consistent with a Socialist Market Economy?**

The answer is a definite “yes.” It creates a market. The market is initially a narrow market because it is dominated by a single commodity—long-term firm power sales to the purchasing agency. The competition is also somewhat limited—several generators competing for the right to sell to a single buyer. However, it can eventually evolve to a more fully developed market where there are many sellers competing for the right to sell to many buyers. The purchasing agency structure can also be combined with a type of trading mechanism called “power pools.” Power pools increase sector efficiency by creating one or more additional markets where other power commodities can be bought and sold. Powers pools are described below.

### **Potential Roles for the Regional Groups**

An important issue that must be decided is the future role of the five regional groups in the power sector. There are five main options:

#### **Option 1**

- Regional group is eliminated.

#### **Option 2**

- Regional group remains in existence, but is a passive subsidiary asset holding company of the National Power Company.

#### **Option 3**

- Regional group remains in existence as a subsidiary asset holding company of the National Power Company.
- It functions as an active manager of the provincial power enterprises.

#### **Option 4**

- Regional group remains in existence, but is a passive subsidiary asset holding company of the National Power Company.
- It owns and operates the region's high-voltage network.
- It operates a regional power pool.

#### **Option 5**

- Regional group remains in existence as a passive subsidiary asset holding company of the National Power Company.
- It owns and operates the region's high-voltage network.
- It acts as a purchasing agent for the region.

Initial observations on these five options are the following:

- “One size does not fit all.” Different options may be appropriate for different regional groups.
- Option 1 is not viable.
- Option 2 would lose the considerable technical expertise that the regional groups have acquired on how to operate the interconnected network.
- Option 3 is undesirable. It would interfere with the goal of power enterprise autonomy embodied in Article 7 of the Electric Power Law. The regional groups, like the National Power Company, should serve as passive holding companies. The provincial companies under a regional group should not have to seek the approval of the regional group for operating and investment decisions.
- If either Option 4 or 5 is selected, the regional groups should sell their generating assets as soon as possible to totally independent generation companies. It is unrealistic to believe that a regional group could be fair and impartial as a pool operator or purchasing agent if it continued to own generation.
- If the provincial power enterprises act as their own purchasing agents in a particular region, then it would be natural for the regional group to act as the power pool and transmission operator (Option 4).

- Options 4 and 5 are probably incompatible. If a regional group acts as a purchasing agent, there is no need for a power pool *within* the region. Optimization in the use of generating assets is achieved through central purchasing and central dispatch by the purchasing agency. A within-region power pool would not produce any additional efficiencies. However, an interregional power pool could produce additional cost savings.
- The benefits of a regional group acting as either a power pool (Option 4) or a purchasing agent (Option 5) will *not* be achieved unless two-part producer tariffs are adopted. The present widespread use of one-part tariffs that combine capital and energy costs in a single charge is leading to inefficient and unnecessarily costly dispatch. This problem is discussed more fully in Chapter 5.

The East China Group appears to be in the early stages of studying how a pool trading mechanism can be developed within its region. Option 4 may also be appropriate for several of the other groups. Region-specific studies are required to make this determination. The World Bank will be providing assistance for these studies in three regions.

### **CREATING WHOLESALE MARKETS: THE ROLE OF POWER POOLS**

The only significant competition currently existing in the power sector is competition among generation enterprises that want to enter into a long-term power sales agreements with provincial power enterprises and regional groups. However, there is a way to expand this limited competition by creating new trading mechanisms for other types of wholesale power. In other countries, these are often called power pools.

In China, power pools could complement the existence of purchasing agencies by creating additional trading opportunities that would improve the overall efficiency of the sector. **Power pools can be created before, during, or after the creation of purchasing agencies.**

#### **What Are Power Pools?**

Experience in the United States and Europe shows that additional operating efficiencies can be achieved if separate power enterprises create mechanisms to expand wholesale<sup>3</sup> trade among themselves in short- and intermediate-term power sales. These arrangements are often referred to as power pools. A power pool is simply an agreement

---

<sup>3</sup> Wholesale trades are power transactions where the buyer of the power will resell the power to another power enterprise or to final consumer. It is sometimes also referred to as a "sale for resale." A sale to a final consumer is usually referred to as a retail sale.

among separate enterprises to formalize the trading arrangements. Trades can be exchanges of power or actual sales.

The experience of other countries shows that even when capacity is short, there are almost always opportunities for additional trading that will allow the purchasing enterprise to lower its costs and the selling enterprise to earn additional revenue. Several power pools and related service organizations in the United States and Europe now use “electronic bulletin boards” on which power enterprises post offers to “buy” and “sell” power. In a sense, these arrangements are the equivalent of an electronic stock exchange. These bulletin boards are usually located on commercial computer networks, though some of them may soon be available on the Internet.

### **Nontrading Benefits**

Power pools can also produce other benefits in addition to increased fuel efficiencies. In the case of an emergency, the pool agreement will often contain provisions that require other pool members to come to the assistance of the enterprise that is facing the difficulties. Another significant benefit is savings in installed and operating reserves. This allows the separate power enterprises to achieve the same targeted level of reliability with less installed capacity than if each were operating separately. This last benefit would allow increased demand for power to be satisfied with less installed capacity than would have been required absent the power pool.

### **Application to China**

In the current Chinese context, the following general recommendations for creating power pools would apply:

- Membership in power pools should be voluntary.

If the pool is capable of producing genuine benefits for its members, power enterprises will see it in their commercial self-interest to join the pool. Similarly, trading should be voluntary. The fact that a member makes a sale to another member or to the pool does not create a real or implied obligation to make the same sale at some later time.

- Pools should initially be organized among purchasing agency enterprises.

Purchasing agencies are likely to realize the greatest benefits from pooling. Initially limiting membership to purchasing agencies will simplify the development of power pools. However, if other types of power enterprises believe that they would benefit from membership, then they should be allowed to join the pool. The maximum benefits are obtained when the pool is an “open” rather than a “closed” club.

- Initially, new power pools should be loose rather than tight.

In a loose pool, each enterprise retains full control over the dispatch of generating units that it owns or controls through long-term power purchase contracts. In a tight pool, each pool member gives up control over generating units that it owns or controls to a central pool operator. Two loose pools in the United States that may be particularly relevant to China are the Mid-America Power Pool (MAPP) and the Florida Coordinating Group (FCG).

- Provision should be made to change the design of the power pool as the structure of the power sector changes.

A pool that is appropriate for the purchasing agency structure may not be functional if a region or province evolves to a structure where distribution enterprises and some final customers are allowed to buy power directly from generators. California and other parts of the United States are undergoing this structural change. One part of the transition process requires a major redesign of the existing California Power Pool.

Appendix 2 contains a list of the basic design issues that must be addressed in developing interprovincial or interregional pools among purchasing agencies in China.

### THE ROLE OF INDUSTRY ASSOCIATIONS

In market economies, power enterprises often form trade associations similar to the China Electricity Council. Such trade associations generally fall into two categories:

- Organizations that develop and maintain technical operating standards.
- Organizations that promote the commercial interests of their members, as well as provide educational services.

The China Electricity Council should be allowed to perform both of these functions.

A technical organization could assist Chinese regulatory entities by developing detailed operating standards to promote and maintain the reliability of network operation. In effect, this is a form of technical “self regulation.” It helps regulatory entities by making use of technical expertise that is difficult to maintain on a continuing basis at the regulatory entity.

The regulatory authority should review and approve these technical standards. The regulatory entity must be vigilant that the engineering and technical standards are not used as a method for pursuing anticompetitive behavior.

---

The second type of organization that promotes the commercial interests of its members is common in market economies. Two power sector examples are the Edison Electric Institute in the United States and the International Union of Producers and Distributors of Electrical Energy (UNIPEDE) in Europe. It is common for them to provide comments to regulatory authorities on proposed regulations.

However, once the power sector moves to a more competitive structure, it becomes more difficult for these organizations to develop a consensus opinion on proposed regulatory actions. Usually, new organizations come into existence representing subgroups (for example, generators and distributors) within the power sector. This is natural and should not be opposed.

#### **A POTENTIAL STRUCTURAL AND REGULATORY PROBLEM OF THE PURCHASING AGENCY STRUCTURE**

The single biggest problem in implementing the purchasing agency structure is to avoid both the perception and the reality that the purchasing agency may be unfairly and inefficiently favoring some power production enterprises over others. (The same problem exists in power pools.) The problem arises if the purchasing agency enterprise owns some of the generators that it is buying from. In theory, this problem could be solved if the purchasing agency signs contracts with affiliated power producers (APPs) that are the same as the contracts that it signs with independent power producers(PPPs).

In reality, much depends on how a contract is implemented and enforced. Chapter 5 recommends the use of two-part tariffs for the purchase power contracts signed with both affiliated and independent power producers. This recommendation by itself, however, does not ensure that two similarly written contracts will be implemented in the same way. For example, a purchasing agency could pay higher prices to its affiliated power production enterprise by assuming an artificially high heat rate in developing the energy (kWh) charge that the producer is paid. Another technique for favoring affiliates is to be less vigilant in testing for availability which, in turn, determines the amount of capacity payments (the kW charge). The general problem, then, is not in how the contracts are written, but in how they are enforced.

The worldwide regulatory experience suggests that it is not easy for regulatory Authorities to detect and stop these subtle forms of favoritism. In the late 1980s, the regulatory commission in California found several instances of unfair favoritism in the contracts between one California power enterprise and its affiliated power production enterprise. The commission considered different ways to stop this favoritism, but concluded that none of the regulatory techniques were workable. Finally, it issued an order that said that the affiliated power production enterprise was allowed to sell power anywhere in the world except to its affiliated power supply enterprise.

The same conclusion was reached by the British electricity regulator. As described earlier, he recommended to his government that it deny applications for the purchase of distribution companies by power-generating companies. He concluded that it would be difficult, if not impossible, for future regulators to detect and stop favoritism.

**Worldwide experience suggests that a critical step to achieving competitive power markets is for the buyers to be unaffiliated with the sellers.** There is a considerable danger that the purchasing agency structure will not work in China unless steps are taken to adopt this policy in China. As a long-term solution, therefore, it is recommended that purchasers and pool operators to be completely unaffiliated with wholesale sellers of power.

### WHAT NEEDS TO BE REGULATED IN THIS STRUCTURE?

Table 2.1 provides lists the activities that need to be regulated under a purchasing agency structure. It addresses the threshold question of what needs to be regulated for each type of power enterprise. Chapter 3 examines how the regulation should be performed and which level of government should conduct the regulation.

**TABLE 2.1: REGULATORY TASKS UNDER THE PURCHASING AGENCY MODEL**

Power enterprises	Tariffs	Service obligations	Investment plans	Project approvals	Service quality	Financial activities	Sector coordination
Independent power producers	Yes, absent competition	No	No	No	No	No	Yes
State-owned generation companies	Yes, absent competition	No	No	No	No	No	Yes
Distribution companies	Yes	Yes	Yes /a	Yes /a	Yes	Yes	Yes
Provincial power companies	Yes	Yes	Yes /a	Yes /a	Yes	Yes	Yes
Regional power companies	Yes	Yes	Yes /a	Yes /a	Yes	Yes	Yes
National Power Company	Yes	Yes	Yes /a	Yes /a	Yes	Yes	Yes

/a Approval of individual projects should be required only when a project falls outside the scope of a previously approved investment plan.

*Source:* Study Team.

---

Listed below are some general and specific observations about the assessments presented in this table:

- The regulatory tasks for independent power producers and state-owned power production enterprises are the same. (See Rows 1 and 2 of Table 2.1.) This implies that state-owned and nonstate-owned companies should be regulated in the same way. The reason is obvious. State-owned companies will never succeed in becoming true commercial enterprises if they continue to be given favored or gentle treatment by the regulatory entity. At some point, they must learn to face the full rigors of the socialist market economy.
- The general principle of regulation is: “Regulate only those entities that have monopoly power. Do not regulate the activities of entities that compete in a competitive market.” **There should be no tariff regulation of generators (state- or nonstate-owned) that are selected as winners in a competitive procurement process.** (See Column 1 , Rows 1 and 2, in Table 2.1.) This will be the regulatory policy of the Thai government when it reviews the winners in the current competitive bidding process being conducted by EGAT, the national electricity company of Thailand. It is also the current policy of the Philippine government in reviewing IPP tariffs.
- There is no direct regulation of the investment plans of independent power producers and state-owned generation companies. This does not mean that the investments of these two types of enterprises go totally uncontrolled. When the regulatory entity reviews the investment and purchasing plans of the purchasing agency (described in Chapter 3), it will be indirectly reviewing the investments planned by these generators. There is no need for a second review. A general operating rule of regulation is that “once is enough.”
- Similarly, there is no direct regulation of the “service quality” offered by state- and nonstate-owned generators. This, too, is controlled indirectly. The regulatory entity imposes service obligations on the purchasing agency (as well as lower-level distribution enterprises). This will force the purchasing agency to impose service obligations in its power purchase contracts with all generators. It is unnecessary for the regulator to establish additional service quality standards on generators.
- The regulatory entity should not mandate the same service quality for all customer groups served by a particular distribution enterprise. This mistake was almost made by a national electricity regulatory entity in a Latin American country. When it issued a draft of its proposed “service quality” regulations, a rural residents’ association in effect said, “We do not need the same high standard as urban residents. In the rural areas, it would cost too

much money to provide this same service quality standard. We are willing to accept a lower quality or service.”

- A power pooling agreement is like a multilateral, wholesale contract. Typically, it covers types of transactions, pricing formulas, quality of service, nature of service obligations, and other mutually agreed-to obligations. Table 2.1 does not contain a separate row for power pools. This is because it assumed that a power pooling agreement would be filed with the regulatory entity by a regional group or some other existing power enterprise that is already listed in the table.
- Similarly, there is no separate entry for industry trade or technical associations. This is because these organizations generally do not generate, transmit, dispatch, or distribute power. However, this does not prevent the regulatory authority from consulting with these organizations on matters such as service quality and network codes.



## CHAPTER 3. PROPOSED REGULATORY SYSTEM

This chapter sets forth detailed recommendations for the establishment of a regulatory system for the Chinese power sector. As described in Chapter 2, structural reform will leave many segments of the power sector monopolistic. These segments, notably the networks and the power supply enterprises, will need to have their activities supervised to ensure proper coordination of power markets and power sector activities, to achieve national and provincial policy objectives, and to protect the interests of customers.

It also describes the regulatory tasks, mechanisms, and structures necessary to implement a system of regulation designed to facilitate the introduction of a socialist market economy into the power sector. As explained in Chapter 1, the system of regulation needed to support the socialist market economy is fundamentally different from the current system of direct management and control of the power sector through administrative directives in a centrally planned economy. **Regulation within a socialist market economy is a means for the government to supervise the activities of commercial enterprises. It substitutes “light-handed” rules that rely on incentives for “heavy-handed” rules that rely on orders.**

The objective of protecting the interests of customers from monopolistic abuses will become more important as reforms to introduce the socialist market economy deepen and as power enterprises pursue commercial objectives more aggressively.

As the reforms recommended in this chapter are implemented, it is important to protect against implementing too much regulation. The objective of recommended reforms is **not** to replicate the current system of direct management and control of the power sector in a new group of organizations. Rather, the objective of the recommended reforms is to achieve a fundamental change in how the government relates to the power sector, with the government relying on socialist market mechanisms to direct many of the activities of the power sector that are currently managed by the government. **Any country moving from a centrally planned economy to a socialist market economy must constantly guard against a tendency to overregulate. Too much regulation is clearly inconsistent with the goal of enterprise autonomy in a socialist market economy.**

Regulation is intended to simulate the results of a competitive market. Whenever possible, competition is preferable to regulation. When a sector cannot accommodate competition, it is recommended that regulation be limited to what is absolutely necessary, and that the number of regulations, rules, and directives be kept to a minimum. The same issue should not be subject to multiple regulatory approvals.

---

Regulatory institutions should begin as small organizations and be allowed to expand only as they demonstrate the need to grow. One way to do this is to use consultants until a decision is made as to whether permanent staff are required to perform particular tasks. This technique has been successfully used by new regulatory organizations in the power sector in Argentina, Colombia, Norway, and the United Kingdom.

### **REGULATORY TASKS**

Table 2.1 shows the enterprises and activities that will need to be regulated with adoption of the purchasing agency model. This chapter gives more details on how these activities should be regulated—the techniques of regulation—to encourage nonstate investment and to avoid interfering with managerial and operational autonomy.

Consistent with the framework set forth in the Electric Power Law, the regulator should be authorized to do the following:

- Define the specific service obligations of power enterprises and establish standards for the quality of service.
- Determine and supervise specific tariff levels for power enterprises, consistent with general principles laid down by the Electric Power Law and State Council regulations.
- Approve the investment plans of power enterprises, to the extent that the plans are consistent with national and provincial plans.
- Establish accounting standards for power enterprises within guidelines established by the Ministry of Finance.
- Oversee the financial planning of power enterprises.
- Oversee industry structure, including coordination and power pooling agreements among power enterprises.
- Make and enforce regulatory requirements and decisions.
- Resolve disputes among power enterprises.
- Such other matters as are required by law.

These tasks and the allocation of regulatory responsibilities between central and provincial regulatory institutions are discussed in detail below. Chapter 4 recommends a legal framework to accommodate these tasks and to implement the regulatory system put forth in this chapter.

## **Service Obligations**

The Electric Power Law establishes the broad principle that power supply enterprises shall be subject to an obligation to serve (Article 25). In addition, the Electric Power Law (Articles 22 and 29) establishes the following:

- The obligation for network enterprises to transmit and distribute power generated by independent power companies.
- The obligation for power supply enterprises to supply power to customers under normal circumstances.

Because the Electric Power Law, by its nature, does not include more specific service obligations, the regulator should be authorized to establish through licenses specific service obligations for power enterprises. Specific service obligations are needed for the following:

- To maintain coordination among generation, transmission, and distribution enterprises.
- To ensure reliability.
- To prevent the abuse of monopoly power.
- To safeguard customers' interests.

## *Scope of Obligations*

Service obligations of power enterprises established by the regulator should identify the following:

- The geographic area in which the power enterprise must serve.
- The time within which the enterprise must meet requests for service (including, as appropriate, targets for extending service to undeveloped areas).
- The needs of customers that the enterprise must serve.
- Under what conditions the power enterprise must provide service (including conditions for suspending service).
- The quality of service standards that the enterprise must follow.
- Limitations on the power enterprises' business activities.

The best means to establish service obligations is through a license issued to the power enterprise by the regulator. Such licenses can take a variety of forms and need not list each specific service obligation. Chapter 4 makes specific recommendations on the form and procedures for issuing licenses.

#### *Limitations on Other Business Activities*

Limitations on the regulated power enterprises' business activities are to ensure that the regulated enterprises are using resources efficiently and incurring costs that are related only to their service obligations. Such costs will have to be recovered from their power customers to maintain the financial viability of such regulated enterprises.

Any limitations imposed on the power enterprises, however, need to reflect the transition the power sector is currently undergoing. Many power enterprises are currently engaged in activities not directly related to what would be viewed as their service obligations within a socialist market economy, notably medical services, transportation, and education. With commercialization of power enterprises, these nonpower sector activities should be gradually separated from the power enterprises. The business limitations included in licenses issued to power enterprises need to reflect the gradual nature of this transition.

**For independent power companies and state-owned generation companies that operate in a competitive market, it is recommended that service obligations be defined solely by the power purchase agreement. (See Table 2.1.)**

Regulatory oversight of the power enterprise purchasing power from the independent power producer as part of that purchaser's investment plan will ensure that the generation project conforms to sector development plans and to industrial policies, as required under Articles 14 and 27 of the Electric Power Law.

#### **Tariff Determinations**

Establishing tariffs for regulated power enterprises is perhaps the most important regulatory task and is central to achieving sector efficiency and the socialist market economy within the power sector. Tariff regulation has profound implications for users and producers of electricity and for industrial development.

In establishing specific tariff levels, the regulator will fill in the details of the tariff guidelines established by the State Council under Articles 37, 41, 44, and 45 of the Electric Power Law. Chapter 5 provides specific recommendations for tariff methodology.

**Tariffs for power sales need not be regulated if there is adequate competition.** With respect to power sales from power production enterprises, one of the regulator's

primary tasks will be to determine whether there is adequate competition so that the tariffs can be left unregulated.

For independent power companies (power production companies that are not owned by networks or power supply enterprises) and state-owned power production enterprises that operate in a competitive environment, the regulator needs to have discretion to allow the price to be established through competition, that is, to be negotiated between the independent power company and the purchaser without regulatory approval. In other countries, this regulatory technique is often referred to as “market-based pricing.”

Article 37 of the Electric Power Law, which authorizes the State Council to develop special methods for power producing enterprises with special situations, is broad enough to permit market-based pricing under appropriate circumstances, while ensuring that tariff regulation can be applied when necessary.

Market-based pricing should be permitted whenever the tariff paid to a power production enterprise is established through competitive bidding. The Laibin B project will provide an early opportunity to test a market-based approach to setting tariffs.

The regulator should also develop criteria for determining when competition has been adequate for power sales outside the context of competitive bidding. The regulator should consider developing a database of price and nonprice terms of power purchase agreements as a means of assessing whether competition is adequate. This technique is referred to as “yardstick” regulation in other countries.

**Once a market-based tariff is approved for a power purchase agreement, neither the regulator nor any other government institution should be able to reevaluate the tariff set forth in the agreement.** An opportunity for subsequent regulatory review would severely detract from the attractiveness of an investment in the eyes of developers and would harm sector coordination by creating significant uncertainty over the development and financing of power projects.

Tariffs that are subject to regulatory approval should be initially developed by power enterprises and then proposed to the regulator for the regulator’s approval, rather than having the regulator directly develop tariffs. Power enterprises will have the best access to the relevant information. In addition, this approach would support the commercial orientation and managerial autonomy of power enterprises.

**For power enterprises that have their tariffs regulated, the tariffs should permit the enterprises to recover reasonably incurred costs plus a rate of return that is competitive with alternative investment opportunities within the socialist market economy.** Tariffs should permit regulated power enterprises to recover all the costs that are incurred consistent with investment plans approved in accordance with the recommendations outlined below.

## **Approval of Investment Plans and Projects**

With the exception noted below, the regulator should oversee power enterprises' investment decisions to ensure that the investments are consistent with the following:

- The power enterprise's service obligations as defined in its license.
- National and provincial development objectives.
- State-directed allocations of national resources.

### *Encouragement of Enterprise Autonomy*

**Neither the regulator nor other government institutions should, however, engage in investment planning on behalf of power enterprises.** Power enterprises should develop their own investment plans, so that management responsibility is appropriately left to power enterprises. Power enterprises should base their investment plans (including plans to purchase power) on commercial objectives, taking into account national and provincial energy and industrial plans.

Importantly, the regulator's responsibilities should be limited to reviewing such investment plans to ensure consistency with the power enterprises' service obligations, other regulatory requirements, and national and provincial development plans.

Once approved by the regulator, such investment plans should be implemented without further review by the regulator. However, to the extent that the investment plan developed by the power enterprise relies on the use of a resource of broader importance than just the power sector, the power enterprise may still have to obtain applicable government approval to gain access to that resource. For example, the approval of the investment plan by the regulator will not eliminate the power enterprises' obligations to obtain separate government approval to gain access to land, foreign exchange, and state-funded financing.

### *Power Production Enterprises*

**The regulator should not review the investment plans of independent power companies or state-owned power production enterprises that operate in a competitive environment.** These power enterprises' investments will be designed to satisfy such enterprises' obligations under power purchase agreements with regulated purchasers. The regulated purchasers will execute only those power purchase agreements that are consistent with investment plans that have been approved by the regulator.

In addition, there is no need for regulators to review the financing plans of independent power companies that operate in a competitive environment. These plans will be closely reviewed by lending institutions to ensure that their loans will be repaid. The

lending institutions will review the investment plans of the power production enterprises to ensure that the enterprises' investments (a) will not be inconsistent with their service obligations under the power purchase agreements, and (b) will not result in costs in excess of the tariffs set forth in the power purchase agreements.

The only exception to the foregoing recommendation should be when the power purchase agreement includes a "cost plus" provision that enables the power production enterprise to recover all its costs, thus imposing the risk of cost increases on the purchasing power enterprise. It is doubtful, however, that power purchasers would agree to "cost plus" contracts. Competitive bidding should result in arrangements that shift the risk of increased costs, and therefore the responsibility for cost containment, to the power production enterprise.

#### *Approval Process*

**Investment plans should be subject only to prior regulatory approval.** This approach would enhance the financing of investments at reasonable cost because, once a power enterprise begins the financing and construction of a project or enters into a power purchase agreement, the regulator will not be able to "second guess" the project and undermine the revenue stream for the project.

Investment plans should be proposed by the power enterprises for a term of several years (for example, five years). Investment plans should be general rather than specific and should identify the following:

- The aggregate amount and type of capacity that the power enterprise plans to construct and/or purchase for the term of the investment plan.
- An estimated schedule for such investments.
- Potential financing sources.
- Proposed technology and fuel sources.

This approach would appropriately shift management responsibility to power enterprises.

#### *Individual Projects*

**Individual project investments that are consistent with an approved investment plan should not otherwise require regulatory approval.** The approval of specific investments would lead to inappropriate regulatory involvement in the management of power enterprises. Although an individual investment might present local issues that cannot be addressed within the context of a general investment plan, these local issues would more appropriately be addressed by having the provinces establish development

plans and by requiring a power enterprise's investment plan to adhere to that provincial plan.

If, during the term of an approved investment plan, a power enterprise desires to make an investment that is not covered by the preapproved investment plan, that investment will have to obtain regulatory approval. This approach would enable the regulator to consider projects that fall outside the scope of preapproved investment plans.

### **Accounting Standards**

The regulator should develop accounting standards for the power sector that are consistent with guidelines established by the Ministry of Finance. These accounting standards would result in the submission of information to the regulator in a uniform format and in the form necessary for the regulator to be able to perform its regulatory responsibilities. Special accounting standards for power sectors are common in many countries. For example, in the United States, the national power regulator has established a “Uniform System of Accounts” that is used by regulated power enterprises throughout the country.

### **Financial Regulation**

“Financial regulation” refers to regulatory oversight of a power enterprise’s financing decisions for the purpose of ensuring that those decisions do not jeopardize the enterprise’s financial health and result in additional costs that must be paid for by customers. **Financial regulation should be undertaken only for power enterprises that have monopoly power.**

“Financing decisions” include decisions to issue debt or equity, to pay dividends, and the like. Financial health may be evaluated according to pre-established standards, such as debt-equity ratios.

Other types of regulation that affect the financial health of power enterprises, but do not address financing decisions, are not considered “financial regulation.” For example, successful tariff regulation ensures power enterprises’ financial health while protecting customers against unreasonable costs. In the case of China’s many older and financially unsound enterprises, it may be appropriate for the regulator to require those enterprises to propose a strategy that would accomplish financial recovery within a specific period. It may also be appropriate for the regulator to recommend the closure of enterprises that are beyond recovery, consistent with government standards.

**The regulator should require that the investment plans of power enterprises identify the types of financing arrangements from which the power enterprise will choose in financing future investments.** In approving the investment plan, the regulator should determine the following:

- Whether the anticipated costs of the proposed financing mechanisms are reasonable.
- Whether those financing mechanisms are otherwise consistent with maintaining the financial health of the enterprises.

This recommended review, in the context of power enterprises' investment plans, should be the only financial regulation of power enterprises. This approach would enable the regulator to oversee a power enterprise's financial planning without becoming involved in particular financing decisions. This regulatory approach is consistent with the management autonomy contemplated in Article 7 of the Electric Power Law.

The regulator should be authorized to disallow the recovery of financing costs through a power enterprise's tariffs only if those financing costs are inconsistent with the enterprises' approved investment plan and are determined by the regulator to be unreasonable. This approach increases certainty for regulated enterprises. This, in turn, will lower financing costs.

The financial activities of independent power companies should not be regulated. The power purchase agreement will define the project's revenues and will be the principal basis for obtaining the financing for the project. As explained above, the financial community can be relied upon to ensure that unsound projects are not financed and that the financial structure of the project is adequate to meet the independent power company's obligations under the power purchase agreement. In fact, the reduction of regulatory risk through the elimination of unnecessary regulatory oversight of financing matters will enhance the successful financing of an independent power project.

### Quality of Service Standards

Building on existing technical regulations applicable to the power sector, **the regulator should establish generally applicable standards to govern the availability and quality of service provided by power enterprises.** Oversight of the availability and quality of service is essential to ensure that power enterprises do not provide inferior service. The regulator may wish to seek the assistance of the China Electricity Council in developing such standards.

The Electric Power Law recognizes the need for quality of service regulation. Article 18 requires electric power production and network services to conform to principles of safety, quality and economy.

Quality of service standards should include technical standards applicable to the operation of the power sector, including the following:

- Standards for voltage and frequency control.

- Standards for the design of interconnections.
- Technical rules for operation of the transmission network and dispatch of generation plants.

The regulator may rely on the power enterprises to develop in the first instance these technical standards, subject to the review and approval of the regulator.

Quality of service standards should also include “performance” standards for services provided to customers, pertaining to such matters as the following:

- Metering and billing.
- Connection services.
- Responding to outages.
- Responding to customer complaints.

**The regulator should not establish quality of service standards for independent power companies or for state-owned power production enterprises that operate in a competitive environment.** As with service obligations and tariffs, these entities’ obligations concerning quality of service should be defined solely by the power purchase agreement, without subsequent regulatory approval.

### **Oversight of Industry Structure**

Economic efficiency in the power sector requires coordination among generation, transmission, and distribution. As explained in Chapter 2, power sector structures that hinder coordination, and therefore impair efficiency, should be restructured. Regulation is generally ineffective in correcting the inefficiencies and abuses of a flawed sector structure.

Therefore, the regulator should be authorized to recommend structural changes for the power sector to the government that would improve coordination and efficiency in the power sector. The ultimate decision on power sector structure, however, will remain with the government.

**The regulator should be authorized to review mergers, reorganization, coordination and power pooling agreements, and other arrangements involving power enterprises that could affect the manner in which the power sector or power markets operate to ensure that such arrangements do not impair sector efficiency or competition.** The regulator should examine specific proposals upon application by power enterprises, in accordance with standards and procedures established in regulations issued by the regulator.

As a means of promoting competition in generation and thereby improving economic efficiency, the regulator should establish standards and procedures for competitive bidding and power pooling by power enterprises.

### **Enforcement**

**Regulation is meaningless if power enterprises do not comply with regulatory requirements and decisions.** The regulator must be able to enforce its decisions and the legal and regulatory requirements applicable to power enterprises. The regulator, as opposed to a court or separate tribunal, has special expertise to determine violations of its decisions and to fashion appropriate remedies or sanctions.

The regulator therefore should be authorized to do the following:

- To determine whether a violation has occurred.
- To fashion a remedy to the violation.
- To be able to impose that remedy if the violator does not comply with the regulator's directions.

Remedies or sanctions for noncompliance could include the following:

- Warnings.
- Fines.
- Suspension of licenses.
- Disqualification of responsible persons from holding executive positions in power enterprises.
- Compensation in cases of harm.

**The regulator's enforcement decisions should be subject to appeal, to prevent the regulator from using its enforcement authority effectively to reinterpret its decisions or to discriminate or act preferentially toward different power enterprises.** Appeals should be permitted only by an affected party and only for the limited purpose of ensuring that the enforcement action is consistent with the law and regulatory requirements and that the regulator has not acted arbitrarily.

Power purchase agreements involving independent power companies or state-owned power supply enterprises that operate in a competitive environment should identify the appropriate institution to enforce the power purchase agreements. Unless specified in the

power purchase agreement, the regulator should have no role in enforcing the power purchase agreement.

The regulator's staff should be authorized to investigate complaints and to make recommendations for enforcement action. Use of staff will reduce the administrative burdens on the management of the regulator and eliminate the need for the regulator to rely on other government institutions to investigate service complaints. Article 57 of the Electric Power Law authorizes the administrative department of electric power to appoint electric power supervisors and inspectors.

### **Dispute Resolution**

The regulator should be authorized to resolve service and contractual disputes, such as billing disputes. This would encourage customers to pursue their grievances against power enterprises. Because regulatory procedures cannot supersede civil law, the parties could also pursue service disputes in civil courts.

To enhance efficiency, the regulator should have a special dispute resolution division that is empowered to acquire information and to make decisions. Those with grievances should be able to appeal these decisions to the regulator if the monetary value of the dispute exceeds a certain amount.

## **ALLOCATION OF REGULATORY TASKS**

The allocation of regulatory tasks has two dimensions:

- The allocation of regulatory responsibilities among government institutions at the same level of government, such as the allocation of regulatory responsibilities among central government institutions (hereinafter referred to as the “horizontal” allocation).
- The allocation of regulatory responsibilities between different levels of the government, such as the allocation of responsibilities between central and provincial governments (hereinafter referred to as the “vertical” allocation).

### **Horizontal Allocation**

All regulatory responsibilities for the power sector to be allocated to a particular level of government should be consolidated within one government institution. Therefore, all the foregoing regulatory tasks to be performed at the central government level should be consolidated within one central government institution.

The foregoing recommendation does not mean that other government institutions do not have an important function to perform with respect to the power sector. The regulatory

institution should not be involved in making policy for the power sector. **Policy will remain the responsibility of other government institutions.** Box 3.1 sets forth tasks that will not be the responsibility of the regulatory institutions.

**BOX 3.1: RESPONSIBILITIES NOT ASSIGNED TO REGULATORY INSTITUTIONS**

- Allocation of subsidies to particular regions, customer classes, technologies, and fuel sources.
- Development of national, provincial, and local energy, development, and industrial plans.
- Approval of government funding to finance the construction of power facilities.
- Approval of the use of national, provincial, and local resources, such as foreign exchange, land, and water resources.
- Design of power sector industry structure and the use of private funding and foreign participation.
- Use of particular fuels and technologies.
- Maintenance of fuel stocks for national security.
- Development of environmental standards applicable to the power sector.

*Source:* Study Team.

### Vertical Allocation

The question arises as to whether regulation of the power sector should be consolidated at one level of government or whether it should be multilayered. Given the wide differences in the levels of development and the structure of the power sector across provinces, **it is recommended that the regulatory authority be a multilevel organization with regulation concentrated at the central and provincial levels of government.**

The vertical allocation of regulatory tasks between the central and provincial levels of government should be determined on the basis of the following considerations:

- The principles and rules intended to be applied to the entire power sector should be determined at the central government level to ensure uniformity and consistent application.
- Power enterprises whose facilities are located in more than one province should be regulated at the central government level.
- Power sector activities that have an extraprovincial impact and transactions that are interprovincial should be regulated at the central government level.

- Power enterprises and activities located entirely within one province should be regulated at the provincial government level to ensure that regulatory decisions conform with local conditions.

The recommended division of responsibilities between the central and provincial governments is set forth in Table 3.1.

As can be seen from Table 3.1, **the central government regulatory institution would establish the principles that govern operation of the power sector, and the provincial regulatory institutions will apply those principles to local concerns and to power enterprises and activities limited to one province.**

The central government regulatory institution will establish tariff principles, issue licenses to extraprovincial power enterprises, and review and approve the tariffs of the National Power Company, the regional power enterprises, and contractual arrangements involving two or more provinces, such as power sales, coordination, and interprovincial power pooling arrangements.

The provincial regulatory institutions will apply national standards to local conditions. Provincial regulatory institutions will issue licenses to intraprovincial power enterprises, establish service quality standards applicable to power supply enterprises (as long as minimum central government standards are satisfied), and approve tariffs for power supply enterprises' sales to customers.

The Electric Power Law needs to be carefully reviewed to determine the consistency of the foregoing vertical allocation of regulatory tasks. In particular, Article 6 appears to require the establishment of regulatory institutions below the provincial level of government. In addition, Article 38 may require central government institutions to become involved in the tariff regulation of provincial power enterprises, which this report recommends should be assigned to provincial government regulatory institutions.

### **CREATION OF THE REGULATORY INSTITUTIONS**

Article 6 of the Electric Power Law assigns the responsibility for supervision and control of the power sector for the whole of China to the administrative department of electric power under the State Council and to the territorial governments above or at the county level. Because regulation is the central component of government supervision of the power sector, the regulatory institutions should be organizations created by and responsible to the State Council.

**TABLE 3.1: THE VERTICAL ALLOCATION OF REGULATORY TASKS**

National	Provincial
<b>Tariffs</b>	<b>Tariffs</b>
<ul style="list-style-type: none"> <li>• Establishes principles and methodologies for tariff determinations.</li> <li>• Determines transmission tariffs for regional and national power grids, and interprovincial power sales.</li> </ul>	<ul style="list-style-type: none"> <li>• Approves power supply tariffs paid to power production enterprises, absent competition.</li> <li>• Determines tariffs for intraprovincial transmission, distribution and retail sales.</li> </ul>
<b>Procedures and standards</b>	<b>Procedures and standards</b>
<ul style="list-style-type: none"> <li>• Approves procedures for the dispatching power plants.</li> <li>• Approves technical standards for power sector enterprises.</li> <li>• Establishes minimum quality of service standards and reviews provincial quality of service standards.</li> </ul>	<ul style="list-style-type: none"> <li>• Implements the dispatching procedure.</li> <li>• Implements and monitors compliance with quality of service standards.</li> </ul>
<b>Licenses and contracts</b>	<b>Licenses and contracts</b>
<ul style="list-style-type: none"> <li>• Formulates model licenses for network and power supply enterprises.</li> <li>• Formulates model contracts for power purchases from power production enterprises.</li> <li>• Issues licenses to regional power enterprises.</li> <li>• Approves regional power pooling arrangements.</li> </ul>	<ul style="list-style-type: none"> <li>• Issues licenses to the provincial networks and power supply enterprises.</li> <li>• Reviews and approves power purchasing plans of power supply enterprises as part of their investment plans.</li> <li>• Approves intraprovincial coordination arrangements.</li> </ul>
<b>Investment approval</b>	<b>Investment approval</b>
<ul style="list-style-type: none"> <li>• Issues standards and procedures for reviewing investment plans.</li> <li>• Approves the investment plans of the national and regional power enterprises.</li> <li>• Approves interprovincial projects outside preapproved investment plans.</li> </ul>	<ul style="list-style-type: none"> <li>• Approves the investment plans of the provincial networks and power supply enterprises.</li> <li>• Approves intraprovincial projects outside approved investment plans.</li> </ul>
<b>Dispute resolution</b>	<b>Dispute resolution</b>
<ul style="list-style-type: none"> <li>• Establishes dispute resolution procedures.</li> <li>• Resolves disputes involving national and regional power enterprises.</li> </ul>	<ul style="list-style-type: none"> <li>• Resolves intraprovincial disputes.</li> </ul>
<b>Financial regulation</b>	<b>Financial regulation</b>
<ul style="list-style-type: none"> <li>• Establishes accounting standards for power enterprises.</li> <li>• Reviews accounts of the national and regional power enterprises.</li> </ul>	<ul style="list-style-type: none"> <li>• Reviews the accounts of provincial networks and power supply enterprises.</li> </ul>
<b>Sectoral developments</b>	<b>Sectoral developments</b>
<ul style="list-style-type: none"> <li>• Reviews sectoral developments and makes recommendations to central government.</li> <li>• Reviews and approves mergers, corporate reorganizations and other sectoral coordination arrangements.</li> <li>• Implements steps for promoting competition as directed by central government</li> </ul>	<ul style="list-style-type: none"> <li>• Reports on sectoral developments within the province to the national regulatory authority.</li> <li>• Implements steps for promoting competition within the sector in accordance with the central government directives.</li> </ul>

Source: Study Team.

## National and Provincial Regulatory Institutions

**At the central government level, a national regulatory authority (hereinafter referred to as the “National Power Regulatory Commission”) should be created separate from other government institutions and should be responsible to the State Council.** At the provincial level (including municipalities with provincial status and autonomous regions), a parallel provincial authority (hereinafter referred to as the “provincial power regulatory commission”) should also be created separate from other provincial government institutions.

The decision of whether there should be third-level regulatory authorities at the prefecture level should ideally be left to the provincial authorities to decide in the light of local conditions. One general rule for the whole country is not satisfactory. Any such institutions would, however, be accountable to the provincial power regulatory commission. In addition, the Electric Power Law needs to be closely examined to determine the degree of flexibility given to provincial authorities to make this determination.

**To ensure coordination of regulation between the national and provincial levels, it is important to institute the principle that provincial power regulatory commissions will be supervised by and report to the National Power Regulatory Commission.** Thus, provincial power regulatory commissions would be vertically linked to the National Power Regulatory Commission and horizontally linked to provincial governments, as explained below, by virtue of the provincial governments’ appointment of members to the provincial power regulatory commissions. The vertical link would be crucial in ensuring consistency in regulation across the country. The horizontal link, in turn, would be important in ensuring the coordination of regulation with the policies and development plans of provincial governments.

## Separation from Other Government Organizations

The foregoing recommendation also raises an important issue of whether regulation should be entrusted to an existing government institution or to a new institution created solely for the purpose of regulation of the power sector. **The separation between regulation and policymaking, as outlined in the foregoing discussion of the horizontal allocation of regulatory responsibilities, is crucial for effective regulation.** Absent this separation, social policy objectives unrelated to the standards intended to govern supervision of the power sector within a social market economy will inevitably influence regulatory decisions.

It is important to emphasize that although the national and provincial regulatory institutions would be separate from other government institutions, they would remain part of the government. **The power regulatory commissions would not be outside or above the government.** In accordance with the Electric Power Law, the National Power

Regulatory Commission would be responsible to the State Council, and the provincial power regulatory commissions would be part of the provincial government.

## **INTERNAL STRUCTURE AND PROCEDURES OF POWER REGULATORY COMMISSIONS**

### **Multimember Commissions**

The National Power Regulatory Commission and the provincial power regulatory commissions should consist of multimember panels, each with five members. The members of the panel (hereinafter referred to as “commission members”) will make decisions on behalf of the regulatory institution by majority vote. Multimember commissions offer the following advantages:

- Greater depth and continuity of expertise.
- Better and less arbitrary regulatory decisions.
- Improved transparency of the regulatory process.
- Better protection from undue influence from other government institutions and regulated power enterprises.

The majority of countries implementing power sector reforms and creating new regulatory systems are adopting multimember commission structures, including Argentina, Colombia, India, Pakistan, South Africa, and Spain. Multimember commissions have been utilized in the United States since the development of regulatory systems more than 70 years ago.

### **Appointment and Removal of Commission Members**

Recommendations call for the State Council to appoint the commission members of the National Power Regulatory Commission. The commission members of the provincial power regulatory commissions should be appointed by respective provincial governments within the guidelines laid down by the State Council.

The principal recommendations for the commission members are as follows:

- The term of appointment for commission members should be long enough to build expertise and ensure continuity, and short enough to permit periodic change. A period of between five and seven years is recommended.
- The terms of commission members should overlap so as to balance continuity and change, which means that the first set of commission members would be appointed for different periods.

- To retain commission members with a particular expertise, commission members should be allowed to be reappointed at the end of their term.
- Commission members should not be removed from office before the expiry of the term of office except on grounds of violation of the conditions of appointment.
- Commission members should not have any financial interest in power enterprises and/or acquire a financial interest for a certain period after leaving office. In addition, commission members should be prevented from accepting employment with regulated power enterprises for two years after their employment with the power regulatory commissions.
- Both the National Power Regulatory Commission and provincial power regulatory commissions should have an odd number of commission members as a tie-breaking mechanism.
- Commission members should have working experience with enterprises that have been corporatized and commercialized. This background will help commission members to understand the problems facing the regulated power enterprises.

### **Professional Staff**

The National Power Regulatory Commission and the provincial power regulatory commissions should employ professional staff. The following should govern the employment of such staff:

- High-level staff should be governed by the same employment and financial restrictions as are applied to the commission members.
- The professional staff should include a variety of experts necessary for effective regulation, including accountants, economists, engineers, and lawyers.
- The chairmen of the National Power Regulatory Commission and the provincial power regulatory commissions should have the authority to hire and dismiss professional staff.

### **Consultative Process**

**Before taking regulatory action, the National Power Regulatory Commission and the provincial power regulatory commissions should be required to notify interested parties (including other government institutions) of the proposed regulatory action and to consider the comments of parties whose interests may be directly**

**affected by that action. The different views should be made public so the regulators can benefit from “comments on the comments.”**

In addition, the National Power Regulatory Commission and the provincial power regulatory commissions should be permitted to consult with the affected parties as the power regulatory commissions deem necessary to acquire enough information to reach a decision.

The participation of regulated entities and affected parties in the regulatory process enhances the effectiveness of regulation by:

- Improving the information available to the power regulatory commissions.
- Enabling the power regulatory commissions to explore the implications of potential decisions with those parties, thus improving the quality of regulatory decisions.
- Giving power enterprises an opportunity to observe directly the regulatory process and to evaluate the application of regulatory criteria to specific factual cases, thus improving the understanding of power enterprises of the regulatory process and the enterprises’ ability to predict regulatory decisions.
- Reducing the potential for arbitrary regulatory decisions, as a result of the scrutiny that will be brought to the regulatory process by interested parties.

Regulators do not have “perfect” knowledge. The principal benefit of an open consultative process is that the regulators will make better decisions by setting access to the experience and expertise of different groups within the industry. Although the participation of regulated power enterprises and affected parties is highly valuable for the forgoing reasons, the proposed mechanisms nevertheless leave the regulator significant discretion to control the regulatory process. As a result, the participation of regulated power enterprises entities and affected parties need not unduly impair the efficiency of the regulatory process.

The process for consultation should require the power regulatory commissions to provide written notice of proposed regulatory actions. Affected power enterprises and other interested parties should then be allowed a pre-established period for submitting written comments to the power regulatory commissions. Generally, the period allowed to interested parties for preparing such comments should be at least 30 days.

### **Accountability**

**The National Power Regulatory Commission and the provincial power regulatory commissions should be accountable for their actions.** The power regulatory commissions should be accountable to the State Council in the following respects:

- **Procedural accountability:** The procedures adopted by the power regulatory commissions must be fair and transparent.
- **Substantive accountability:** The regulatory decisions must be consistent with relevant laws, State Council regulations, and other legal requirements.
- **Financial accountability:** The power regulatory commissions must make proper and economical use of allocated funds.

The provincial power regulatory commissions should be accountable to the National Power Regulatory Commission, which in turn should be accountable to the State Council. The type of accountability in the form of appeals from regulatory actions is addressed in Chapter 4.

The power regulatory commissions should submit annual reports, including financial accounts, to the State Council.

### **Funding of the Regulatory Authorities**

The power regulatory commissions will need a secure source of funding to operate effectively. Funding should occur as follows:

- The funds for both the National Power Regulatory Commission and the provincial power regulatory commissions should be allocated from the central government budget.
- Given the strained budgetary situation, it is recommended that the central government should raise funds for both the National Power Regulatory Commission and the provincial power regulatory commissions first through a small levy on the prices paid by customers, and second through an annual license fee paid by regulated power enterprises.

## CHAPTER 4. PROPOSED LEGAL FRAMEWORK

This chapter proposes a legal framework to implement the regulatory system recommended in Chapter 3 for China's electric power sector. The term *legal framework* refers to a coordinated structure of laws and other legal instruments that together define the regulatory system within which the power regulatory commissions and power enterprises must operate. The legal framework should perform the following functions:

- Establish the National Power Regulatory Commission and the provincial power regulatory commissions.
- Define the power regulatory commissions' authority and responsibilities.
- Define power enterprises' and customers' rights and obligations.
- Establish the regulatory process.
- Provide for enforcement of regulatory decisions.

As explained in Chapter 1, promotion of a socialist market economy requires government to assume a different role in the management of the power sector than under a centrally managed economy. **Government will rely on the regulatory and legal framework to supervise operation of the power sector rather than directly managing the power sector through administrative directives.**

A well-designed legal framework will ensure that the government is afforded adequate supervision over the power sector to protect the national interest. Such a framework will also limit the government's ability to directly manage the power sector and protect the commercial autonomy of power enterprises. A well-defined legal framework is therefore essential to achieve the government's goals in the power sector.

### OBJECTIVES

The fundamental objectives in designing a legal framework are to provide certainty to regulated companies and customers while providing flexibility for regulation to respond to particular factual circumstances and to changes within the power sector. In the Chinese context, more specific objectives are the following:

- To minimize the power regulatory commissions' involvement in management of the power sector.
- To protect the power regulatory commissions from government interference and from undue influence by regulated power enterprises.
- To ensure the proper focus of regulation by making the power regulatory commissions accountable for their decisions.

To achieve these objectives, **the legal framework must require the power regulatory commissions to follow well-defined legal requirements**. Legal instruments must clearly articulate the power regulatory commissions' authority, responsibilities, and institutional structure, as well as power enterprises' and customers' rights and obligations. In addition, the legal framework must actually be implemented. The responsibilities, rights, and obligations established through the legal framework for the power sector must be upheld and supported within the Chinese legal system at large.

### **NEW ELECTRIC POWER LAW**

On December 28, 1995, the Standing Committee of the National People's Congress enacted a comprehensive new law that applies to every part of the power sector. The Electric Power Law became effective April 1, 1996, and is intended to support reforms necessary to introduce the socialist market economy to the power sector.

Consistent with the direction of reforms for the Chinese economy, the Electric Power Law has the following specific objectives:

- To encourage the development of the power industry consistent with development of a socialist market economy and the environment.
- To encourage the development of poor and rural areas.
- To encourage private investment in power generation, but not in other power sector activities, such as transmission and distribution.
- To protect the legal interests of power enterprises, investors, and power customers.
- To encourage the development of renewable resources and new technology.
- To protect the safety of power facilities and installations.

The Electric Power Law covers the construction of power facilities and the supply of power in China (except in Hong Kong, Macao, and Taiwan) and applies to both Chinese and foreign companies. The Electric Power Law includes 10 chapters and covers, among

other things, electric power construction, electric power and electric network management, supply and utilization of power, power tariffs, rural electric power construction and agricultural use of power, and the protection of electric facilities.

The Electric Power Law includes several provisions directly relevant to the design and creation of the legal framework for the power sector, including the following:

- Article 6 sets forth the government institutions responsible for regulation of the power sector.
- Article 7 guarantees power enterprises' rights to operate autonomously subject to government supervision.
- Articles 10 through 12 set forth requirements governing power sector planning.
- Articles 18 through 23 set forth requirements for power production and electric network system service.
- Article 25 requires issuance of power supply licenses to serve customers within exclusive geographic service territories.
- Articles 26 through 34 set forth the service requirements that must be satisfied by power supply enterprises and the specific rights and obligations of customers.
- Articles 25 through 35 set forth principles that govern tariff determinations and that allocate tariff responsibilities among different levels within the government.
- Articles 56 through 58 authorize inspections for the purposes of enforcement of legal and regulatory requirements.
- Articles 59 through 74 set forth penalties for violations of various provisions of the Electric Power Law.

The Electric Power Law generally specifies broad principles that must be implemented through the issuance of additional State Council regulations and other legal instruments. The Electric Power Law provides a solid foundation upon which to establish the recommended regulatory system, but additional legal instruments will need to be created to establish the complete regulatory system recommended in Chapter 3 and to further deepen reform of the power sector.

#### **PROPOSED USE OF LEGAL INSTRUMENTS**

Several different types of legal instruments can be used to build upon the Electric Power Law and establish the regulatory system recommended in Chapter 3. These legal instruments should define the power regulatory commissions' authority, responsibilities,

and institutional structure, as well as power enterprises' and customers' rights and obligations. These legal instruments range from additional laws passed by the central government to the power regulatory commissions' case-by-case determinations addressing particular factual circumstances. They include the following, in descending order of priority:

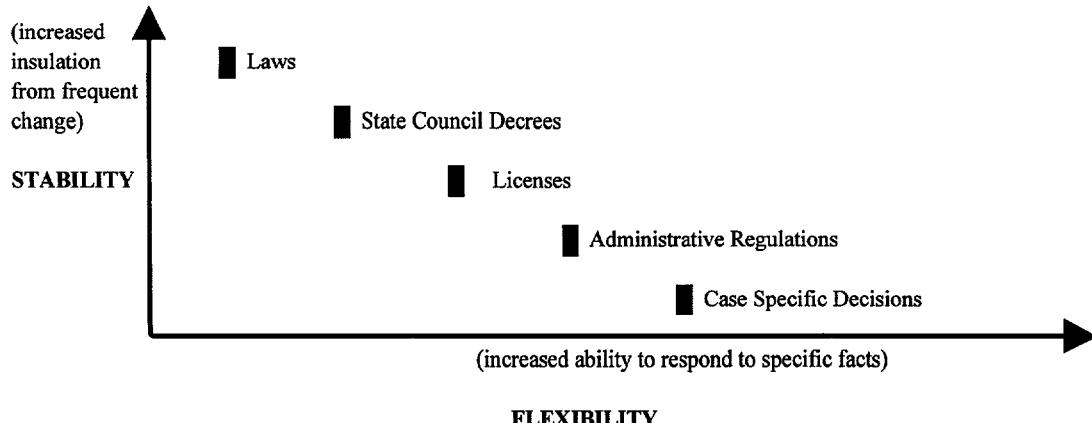
- Additional laws issued by the National People's Congress.
- Regulations issued by the State Council (State Council regulations).
- Regulations issued by central government ministries and other institutions, including the National Power Regulatory Commission (administrative regulations).
- Regulations issued by provincial governments.
- Technical standards, licenses, and case-by-case decisions issued by ministries or other government institutions, including the National Power Regulatory Commission and the provincial power regulatory commissions.
- Contracts and other legal arrangements negotiated by power enterprises.

### **Criteria for Selection**

The legal instrument that is best suited to resolve a particular issue depends on whether the resolution of that issue requires stability over time and consistency among various power enterprises, as opposed to flexibility and the ability to respond to particular factual circumstances. Ideally, because laws provide the most stability, **laws should be used to define the power regulatory commissions' authority, responsibilities, and institutional structure.** **Laws, State Council regulations, and administrative regulations should be used to resolve other broad issues that warrant stability and consistent application.** In contrast, case-by-case determinations should be used to resolve factual issues affecting specific parties. Figure 4.1 illustrates the tradeoff between stability and flexibility.

### **Recommended Utilization**

Table 4.1 summarizes the recommended use of legal instruments in establishing a legal framework for regulation of China's electric power sector.

**FIGURE 4.1: TRADEOFF BETWEEN STABILITY AND FLEXIBILITY**

Source. Study Team

**TABLE 4.1: RECOMMENDED USE OF LEGAL INSTRUMENTS**

Topics (regulatory entities)	Electric Power Law	State Council decrees	National regulator rules	Provincial regulator rules	Licenses	Case-by- case decisions
Regulatory entities' jurisdiction	X	X				
Regulatory entities' authority	X	X				
Regulatory tasks/allocation of responsibilities		X				
Principles and criteria to govern regulatory decisions	X	X		X		
Structure/organization of regulatory entities	X	X				
Procedural requirements	X	X		X		
Budget		X				
Appeals		X		X		
Reporting requirements		X		X		X
Audits		X				X
Service obligations and responsibilities	X	X		X		X
Activity limitations				X		X
Commercial rights and authority	X	X				X
Tariff methods	X	X		X		X
Quality standards			X		X	X
Relationship to regulatory entities		X				
Reporting requirements				X		X
Enforcement actions				X		X
Dispute resolution	X	X				X

Source: Study Team.

## Laws

The Electric Power Law provides the foundation of the legal framework for regulation of the power sector. The Electric Power Law broadly addresses the following matters:

- Overall design of the industry.
- Authority of the electric power administrative departments under the State Council.
- Certain principles for making regulatory decisions.

The stability of the power sector has been enhanced by having the Electric Power Law address these matters as laws, which are not frequently changed.

However, the Electric Power Law does not expressly address many matters that require the stability generally associated with laws, such as the creation and precise authority of the national and provincial regulatory institutions, the allocation of regulatory responsibilities among different government institutions, and the standards and procedures for appeals of regulatory decisions.

Many of these matters can be adequately addressed through State Council decrees. The Electric Power Law should be interpreted as permitting these matters to be addressed through State Council decrees. Such an interpretation would accommodate the recommendations in this report and thereby advance China's goals with respect to the electric power sector.

With perhaps two exceptions, the Electric Power Law is relatively general in defining the principles that will govern regulatory decisions, the structure of the regulatory institutions, and the power enterprises' and customers' rights and obligations. Excessive specificity in the laws would hamper flexibility and would be difficult to enact. The Electric Power Law is appropriately broad in scope, thereby permitting flexibility in responding to particular factual circumstances and evolutions within the industry.

### **However, in two instances the Electric Power Law may be too specific:**

- Articles 37 through 41 include very precise requirements for tariffs that may make it difficult to implement certain types of tariff reforms that would be beneficial to the country and facilitate the introduction of the socialist market economy.
- Articles 6 and 38 include language that may make it difficult to implement the regulatory responsibilities for allocation between the National Power Regulatory

Commission and the provincial power regulatory commissions recommended in Chapter 3.

As with any law, the Electric Power Law may therefore need to be amended or supplemented by additional laws as the need to deepen legal reform becomes evident.

### State Council Regulations

State Council regulations are best suited to matters that require both (a) high legislative priority and certainty and (b) flexibility to respond, over time, to changes in the structure of the power sector and the organization of the Chinese government. For example, **the creation, authority, and internal structure of the National Power Regulatory Commission and the provincial power regulatory commissions should be established by State Council regulation.**

State Council regulations that are issued under the Electric Power Law should be relatively general, leaving the development of specific standards to regulations issued by the National Power Regulatory Commission and the provincial power regulatory commissions. The application of those standards to individual power enterprises should be left to case-by-case determinations by the national provincial regulatory authorities.

The Electric Power Law gives the State Council broad supervisory power with respect to the electric power sector. See Article 6. Using that authority, the State Council should issue regulations that would establish the National Power Regulatory Commission and the provincial power regulatory commissions. Recommendations call for the **State Council regulations to address the following:**

- The National Power Regulatory Commission and the provincial power regulatory commission's **authorities and responsibilities**, including the authority of the National Power Regulatory Commission to issue a uniform system of regulations applicable to the whole of the power sector.
- The power regulatory commissions' **institutional structure**, addressing the topics outlined in Chapter 3.
- The **allocation of the regulatory functions and tasks** between the National Power Regulatory Commission and the provincial power regulatory commissions and among the power regulatory commissions and other central, provincial, and local government institutions as recommended in Table 3.1, including responsibility for tariffs, power allocations, licenses, investment and power project approvals, and enforcement.
- **Procedures** governing regulatory actions, including (a) the consultation process outlined in Chapter 3, (b) quorums for regulatory decisions; and (c) procedures

for coordination between the power regulatory commissions and other central and provincial government organizations.

- The power regulatory commissions' **funding sources** and budgetary process (for example, fees imposed on regulated companies to generate sufficient revenue to fund the power regulatory commissions' budget as approved by State Council).
- **Reporting requirements** applicable to the National Power Regulatory Commission and the provincial power regulatory commissions, such as requirements for annual reports on regulatory decisions and the power regulatory commissions' finances and proposed budget.
- **Auditing requirements** applicable to the power regulatory commissions (for example, identification of auditing authority, and frequency and scope of audits).

In addition to the broad grant of authority in Article 6, the Electric Power Law requires the State Council to issue regulations for the following:

- The control and dispatching of electric networks; see Article 23.
- The supply and utilization of power; see Article 24.
- The safety of electric facilities; see Articles 52–53.
- Power tariffs; see Article 45.
- The control of electric power for agricultural and rural uses; see Article 51.

The State Council has already issued the first three State Council regulations. However, these regulations, and the two remaining State Council regulations under preparation, reflect the fact that the power sector has not completed its transition to a socialist market economy. Therefore, **these State Council regulations will need to be periodically revised to adjust to the new conditions of the power sector as it completes its transition to a socialist market.**

### **Regulations Issued by the Power Regulatory Commissions**

Regulations issued by the National Power Regulatory Commission (and, to a lesser extent, the provincial power regulatory commissions) will perform a function similar to laws and State Council decrees, in the sense that each of these legal instruments will apply uniformly to all affected power enterprises. Regulations issued by the power regulatory commissions will be more detailed, however, reflecting the power regulatory commissions'

closer involvement and expertise on issues arising in the industry. These regulations are used to “fill in the details” of the broad guidelines established by the government through laws and State Council decrees.

Indeed, the greater specificity associated with regulations issued by power regulatory commissions is essential to enable power enterprises to gauge their compliance with laws and decrees and to prevent the power regulatory commissions from acting arbitrarily. At the same time, because regulations are more flexible, power regulatory commissions can use regulations to experiment and to respond to changes over time. This flexibility is particularly important in the evolving industry in China.

Based on the foregoing considerations, the power regulatory commissions should be authorized to issue regulations on matters of general applicability within the scope of their authority. With reference to the regulatory tasks outlined in Chapter 3, **the National Power Regulatory Commission should be authorized to establish the following, through regulations:**

- **Specific tariff methodologies** consistent with principles set forth in the Electric Power Law and State Council decrees.
- **Procedures and detailed criteria for issuance of licenses** for network and power supply enterprises.
- **Safety and quality of service standards.**
- **Power enterprise accounting standards** within guidelines established by the Ministry of Finance.
- **Reporting requirements** for regulated power enterprises.
- **Specific sanctions** for violations of regulatory requirements.
- **Procedures for enforcement actions.**
- **Specific standards and procedures for approving investment plans and individual investments.**
- **Procedures for dispute resolution.**

### **Licenses**

The Electric Power Act gives licensing authority to the administrative department of the State Council and to the administrative department of the relevant provincial, regional, or local authority (see Article 25). This licensing authority should instead be delegated to

the National Power Regulatory Commission and the provincial power regulatory commissions as recommended in Chapter 3.

The power regulatory commissions should be authorized to issue licenses to all power enterprises other than independent power companies, particularly the network and power supply enterprises. Licensing should be used to control market entry because licensing provides a means of both of the following:

- Imposing legally mandated service obligations.
- Identifying the rights that the power enterprise enjoys as a result of incurring those obligations.

**For independent power companies that operate in a competitive environment, market entry should be controlled by market forces rather than through licensing or other means of direct government control.**

#### *License Content*

The licenses to be issued under the recommended legal framework would be more detailed and extensive than the licenses that are granted to power sector entities under the current system of power sector management. Under the current system, licenses are short and nonspecific as to service obligations. Under the recommended regulatory system and legal framework, licenses would be more detailed and would be the primary means for establishing a licensee's rights and service obligations. Licenses to define power enterprises' service obligations have been or are being implemented in a number of countries, including Argentina, Bolivia, Brazil, Chile, India, Pakistan, the United Kingdom and, for hydroelectric plants, the United States.

**As recommended in Chapter 3, licenses should state the licensee's service obligations in specific terms and should identify, in general terms, the regulatory requirements that shall apply during the license term.** Among other topics to be addressed, licenses should state at a minimum the following:

- The geographic territory the licensee must serve.
- The needs of the customers that the licensee must serve.
- The specific services the licensee must provide customers, including either the specific quality of service standards or a reference to the regulations that define the quality of service standards.

- The **technical, safety, environmental, and other administrative regulations** with which the licensee must comply.
- The **licensee's commercial rights** to tariffs that recover costs plus reasonable profit and rights to refuse to provide services for which it is not compensated.
- The **duration** of the license.
- The **reasons for which the license may be revoked.**

In addition, licenses may address additional topics of significant commercial interest to the power enterprise, including the methodology to be applied in determining tariffs and the procedures to be applied upon termination of the license. Alternatively, these topics could be addressed by regulations issued by the National Power Regulatory Commission. The decision on which topics should be included in licenses and which topics should be addressed by regulations depends upon the degree of commercial certainty desired for power enterprises.

**The licensee's consent should be required to alter the license conditions during the license term.** Under this approach, the regulations issued by the National Power Regulatory Commission would be the primary means for establishing a licensee's specific regulatory responsibilities, and case-by-case determinations would be the primary means for making tariff determinations and approving investment plans.

In effect, the power regulatory commissions would have flexibility to change applicable requirements in response to developments that occur during the license term. At the same time, the use of licenses would lead to more balanced rights and obligations under the license, thereby promoting the stability of regulation and the licensee's long-term viability.

#### *License Application Process*

State Council regulations and more detailed implementation regulations issued by the National Power Regulatory Commission should specify the requirements and criteria that power enterprises must be able to satisfy in order to obtain a license. These standards and detailed criteria should focus on applicants' financial and managerial capabilities.

**The license application process should also be designed to encourage and consider proposals by alternative suppliers.** This approach would ensure that the licensee is best suited to serve an area. Although the Electric Power Law provides that only one power enterprise may be established in a given supply area (see Article 25), the Electric Power Law does not preclude competition among power enterprises in obtaining either the right to serve in a supply area or the right to continue to serve in a supply area.

### *Duration of Licenses*

Licenses should be issued for only limited terms to give the power regulatory commissions an opportunity to revise the license conditions and to consider proposals by alternative suppliers. The license term should be sufficiently short so that the licensee is not unduly protected from revisions to its license conditions or from competition from potential alternative suppliers.

At the same time, the license term should be sufficiently long to provide certainty and predictability to the licensee within the normal planning horizon for power enterprises. The duration of the term should not discourage the licensee from making desirable capital investments for fear of not being able to recover its investment during the remaining term of the license. For example, a 25-year term might reflect a normal planning horizon for balancing the typical useful life of electrical facilities against the rapidly changing environment in China. Because the licensee will make significant investments in fulfilling its license obligations, the licensee should be permitted sufficient opportunity to earn a return on those investments.

### *Compensation upon Loss or Revocation*

If a license is revoked during the license term or is not renewed at the termination of the license, as would be the case if the license is awarded to a competitor, the ousted licensee should be required to sell all essential facilities used in meeting its license obligations to the new licensee. Regulations issued by the National Power Regulatory Commission should specify the principles that will be used to determine the compensation to be paid for the transferred facilities so that all applicants for licensees are aware of the compensation that will be paid at the termination of their licenses.

One approach for compensation would be to require that the facilities to be transferred be made available for public sale, with the proceeds of the sale going to the ousted licensee. If the facilities are not sold in a public sale, or if the offered price is unreasonably low, the facilities should be transferred at a price that the power regulatory commissions determine are fair, taking all relevant factors into account. If, however, the license is revoked for gross violations of the law or other legal requirements, the compensation should be the lower of the depreciated book value of the facilities or the fair market value of the facilities.

### **Contracts**

**Commercial operation of the electric power sector, as contemplated in the Electric Power Law, requires (a) providing autonomy to power enterprises to enter into commercial transactions without undue government interference, and (b) certainty and predictability in power enterprises' future rights and obligations.**

Contracts consistent with the law should be protected by the law and not subject to subsequent revision by government institutions or the power regulatory commissions. Absent such certainty and predictability, power enterprises will not be able to plan effectively their activities, that is, to assess meaningfully the risks that are associated with an enterprises' obligations and to design means of mitigating those risks.

Under the current system of power sector management, most contracts for the power sector must be preapproved by government authorities and, once approved, remain subject to subsequent revision. Requiring prior regulatory approval of virtually all contracts undermines the commercial autonomy of the power enterprises and could result in the power regulatory commissions indirectly managing the power sector. Certainty and predictability regarding future rights and obligations are impossible if the contracts that define those rights and obligations are subject to subsequent revision or if the parties cannot rely on those rights and obligations being enforced.

In effect, to enable power enterprise to operate in a commercially autonomous fashion and to engage in effective planning, the legal framework needs to do the following:

- Minimize the requirements for government approval of power enterprise contracts.
- Eliminate the opportunity for subsequent government or regulatory interference with rights and obligations that have been defined by contract.
- Provide a means of enforcing those rights and obligations.

**Absent these protections, the power sector reforms contemplated in this report may merely institute a revised form of central planning, which would encourage power enterprises to rely on government approval of commercial transactions rather than assume direct management responsibility.**

The foregoing analysis applies to all contracts involving power enterprises, including power purchase agreements, transmission service agreements, interconnection agreements, and fuel supply agreements. In each case, **any opportunity for government or other regulatory involvement (such as contract modifications) should precede the execution of the contract, to enable power enterprises to engage in effective planning once their rights and obligations are defined.**

Moreover, prior approval should be required only if such approval is essential to meet the government's objectives in the electric power sector. There are many contracts that do not rise to a level of importance that warrants subjecting them to regulatory review. **The power regulatory commissions should expressly identify in regulations the types of contracts that require preapproval.**

Even for those contracts that are of significant importance, there are many ways to avoid obtaining regulatory approval of individual contracts. First, contracts within the scope of investment plans that have been approved by the appropriate power regulatory commission should not have to obtain regulatory approval. This category of contract should include purchases from independent power producers. Second, power enterprises should develop model contracts that would be preapproved by the power regulatory commissions. Regulatory approval would not be needed as long as contracts were substantially consistent with such model contracts.

Of course, an individual contract may raise policy issues not limited to the operation of the power sector, such as the use of foreign exchange or access to state-funded financing. In these instances, access to these limited government resources would still have to be approved by the appropriate government institution.

Independent power companies require certainty of contracts for another reason. The opportunity for subsequent government or regulatory interference would increase the power enterprise's risks beyond the degree of risk that the power enterprise would otherwise incur. For example, the power enterprise would incur a significantly greater risk of a reduced revenue stream. In the face of such regulatory risk, project developers will execute a power purchase agreement only if they have the opportunity to earn a higher return. In effect, the opportunity for subsequent government interference would deprive the nation of independent power production at more attractive prices.

### **Case-by-Case Decisions**

One of the key functions of regulation is to apply, to specific factual circumstances, guidelines that have been previously established through laws, State Council decrees, and regulations issued by the power regulatory commissions. The power regulatory commissions therefore must be authorized to engage in such case-by-case determinations and, indeed, should have no discretion to avoid making those determinations.

**The power regulatory commissions' authority to make case-by-case determinations should apply to all matters that warrant examination of specific facts, including tariff determinations, approval of investment plans and specific projects, enforcement actions, and dispute resolution.**

### **ENFORCEMENT OF REGULATORY DECISIONS**

Chapter 3 recommends that the National Power Regulatory Commission and the provincial power regulatory commissions be authorized to enforce their decisions. This next section discusses the legal framework necessary to implement this enforcement authority.

## Enforcement Procedures

State Council regulations should authorize the National Power Regulatory Commission and the provincial power regulatory commissions to take enforcement actions against power enterprises.

State Council regulations should permit enforcement actions against regulated power enterprises to be initiated when a power enterprise or customer complains, or at the power regulatory commission's own initiative. Allowing complaints by affected parties encourages those parties' participation in the regulatory process, which will increase the likelihood that a violation of a regulated power enterprises' obligations will be remedied and reduce the likelihood that a violation will occur.

Allowing the power regulatory commissions to initiate enforcement actions would reflect the commissions' greater access to information concerning regulated power enterprises' activities and greater familiarity with those power enterprises' obligations.

Regulations issued by the power regulatory commissions should specify the penalties that may be imposed for particular violations. As discussed in Chapter 3, pre-established standards announcing the penalties associated with violating regulatory requirements would facilitate compliance with regulatory decisions by deterring violations.

State Council regulations, in combination with the regulations issued by the power regulatory commissions, should specify the procedures that the power regulatory commissions must follow in determining violations of regulatory requirements and imposing penalties.

To enhance the transparency, acceptability, and quality of enforcement decisions, claims that a power enterprise has violated regulatory requirements or a regulatory decision should be presented to the challenged power enterprise in writing. In addition, **a power regulatory commission's determination of a violation and imposition of sanctions should occur only after the challenged power enterprise has been given the opportunity to respond in writing to the alleged violation.**

State Council regulations should require the power regulatory commissions' enforcement decisions to be in writing and subject to appeal.

## Monitoring Compliance

State Council regulations should authorize the National Power Regulatory Commission and the provincial power regulatory commissions to compel regulated power enterprises periodically to provide information about their activities to the power regulatory commissions. The specific reporting requirements should be set forth in regulations issued by the power regulatory commissions.

The periodic reports required of the power enterprises should be narrowly focused to avoid undue administrative burdens on the regulated companies. Moreover, independent power companies should not be required to provide periodic information, since enforcement actions against independent power companies should be initiated only by the other party to the power purchase agreement.

**State Council regulations must also give the power regulatory commissions the authority to compel power enterprises to produce all information that might be relevant to a complaint filed against that power enterprise.** This authority will ensure that the power regulatory commissions have access to sufficient information to evaluate power enterprises' compliance with regulatory requirements.

### **Sanctions**

State Council regulations should authorize the power regulatory commissions to impose a range of sanctions for different types of offenses, with different degrees of severity. This approach would give the power regulatory commissions discretion to respond to the severity of the offense.

Sanctions should include monetary penalties, orders requiring specified action, divestiture of assets and, under extreme circumstances, license revocation or revision. In general, license revocation should occur only when the power regulatory commission determines that the licensee is unwilling or unable to satisfy its license obligations.

The power regulatory commissions should have the authority to refer certain matters, such as fraud or gross negligence affecting public safety and health, to other government institutions for criminal prosecution consistent with Chinese law.

### **REGULATORY PROCESS**

A well-designed regulatory process is essential for an effective regulatory system. A well-designed regulatory process is one that reduces the appearance of arbitrary action and thereby increases the acceptability of regulatory decisions from the perspective of both power enterprises and customers. Moreover, a well-designed regulatory process reduces the very likelihood of arbitrary action by helping ensure that the power regulatory commissions faithfully apply the relevant standards. As a result, the power enterprises are more able to predict the outcome of regulatory decisions and to plan their activities accordingly. This certainty is essential for the sound management of electric power enterprises and therefore for the success of China's goals in the electric power sector.

**Regulatory decisions are least likely to be arbitrary when the affected parties can identify the standards that the power regulatory commissions are required to apply and can understand how the power regulatory commissions have applied those standards in reaching particular decisions.** In other words, the acceptability and

certainty associated with regulatory decisions is enhanced by the transparency of the regulatory process.

At the same time, the regulatory process must be structured to minimize delay in making decisions both to increase the certainty associated with the regulatory process and to reduce the cost of regulation.

This section discusses three mechanisms for enhancing the transparency of the regulatory process and thereby promoting the acceptability and certainty associated with regulatory decisions.

### **Pre-established and Publicly Available Standards**

As a prerequisite to effective regulation, the National Power Regulatory Commission and the provincial power regulatory commissions should issue a publicly available written summary that contains, in an organized and coherent form, all the legal and regulatory requirements that presently apply to power enterprises, as well as all the standards and procedures that presently apply to regulatory decisions. These materials should be made available for public review in a document room located at both the National Power Regulatory Commission and the provincial power regulatory commissions. Prior knowledge of regulatory requirements and procedures permits the following:

- Enables regulated power enterprises to conduct their activities according to the expectations of the government and power regulatory commissions.
- Enables affected parties to determine whether the power regulatory commissions have acted according to applicable standards and procedures, which will increase the quality of regulatory decisions and create a foundation for appeal.
- Enables regulated power enterprises and others to predict whether the power regulatory commissions will reach a particular decision, which will help those entities to plan their activities more effectively.

The value of making this information generally available to the public has made it possible for regulatory institutions in both the United Kingdom and the United States to put this information on the Internet so that it is available electronically to any interested party.

The National Power Regulatory Commission and the provincial power regulatory commissions' summary should identify all currently applicable requirements, standards, and procedures and should be issued and reissued in a timely fashion as those requirements, standards, and procedures change. Updating is essential because retroactive application of

newly established standards would appear arbitrary and would destroy certainty and predictability.

### **Written Decisions**

**State Council regulations should require the National Power Regulatory Commission and the provincial power regulatory commissions to issue their decisions in writing and to explain, in writing, how their action complies with the pre-established legal requirements as set forth in laws, State Council decrees, and administrative regulations.** This requirement would enhance the acceptability and transparency of regulation and provide a basis for appeals of regulatory actions, thus ensuring that the power regulatory commissions act within the legal requirements.

### **Appeals and Monitoring**

State Council regulations should allow the National Power Regulatory Commission and the provincial power regulatory commissions' specific decisions (including decisions regarding enforcement) to be challenged by affected parties through an appeal to a higher authority, for the limited purpose of ensuring that those decisions comply with the procedures and standards established through laws, decrees, and administrative regulations.

**Appeals of specific decisions are the most effective means of ensuring that the power regulatory commissions act within the scope of their authority while insulating the decisions of the power regulatory commissions from interference by policymaking institutions.** Appeals should be permitted only by parties that are directly affected by the decision to avoid appeals by policymaking institutions and to ensure that the appeals process is not unduly burdensome.

State Council regulations should also specify the reasons for appeals of regulatory decisions. These grounds for an appeal should be restricted to (a) the power regulatory commission that is not following the established procedures, and (b) a regulatory decision that is not being consistent with relevant laws, State Council regulations, relevant regulations issued by power regulatory commissions, and other legal requirements.

**Appeals against the decisions of the provincial power regulatory commissions should, in the first instances, be made to the National Power Regulatory Commission.** In the event that the provincial power regulatory commissions are established before the creation of the National Power Regulatory Commission, such appeals should be made to the higher government institution that the State Council has empowered to exercise power sector regulatory responsibilities.

State Council regulations should establish a specially appointed panel to consider appeals of decisions of the national regulatory authority. To preserve the independence of the regulatory process, the panel should not be composed of individuals that might represent

interests within the power sector. Further, to avoid undue burdens on regulated entities, the panel should be required to issue timely decisions.

After the National Power Regulatory Commission has been established as a separate administrative department, the government should not engage in formal monitoring of the activities of the National Power Regulatory Commission and the provincial power regulatory commissions. For example, the government should not require the power regulatory commissions to report each of their decisions to the government or to issue periodic reports to the government summarizing their recent decisions. Monitoring of the power regulatory commissions' activities would inappropriately enable the government to influence, if not directly control, individual regulatory decisions.

The National Power Regulatory Commission and the provincial power regulatory commissions should be required to respond to general inquiries from the government, such as inquiries about the power regulatory commissions' approach on particular broad issues, but not including inquiries about specific matters before the power regulatory commissions. The government's ability to ask meaningful questions would be enhanced by the requirement that the power regulatory commissions issue all decisions in writing and provide an adequate explanation of the reasons for their decisions. In addition to general inquiries, the power regulatory commissions should issue reports to the government on industry activities, consistent with the power regulatory commissions' unique position to acquire and disseminate information about industry performance and trends.



## CHAPTER 5. TARIFF REFORMS

The structural and regulatory reforms, recommended in the earlier chapters, will, in the absence of comprehensive tariff reforms, fail to increase the efficiency of the sector at the investment, production, and usage levels. Tariff reform is the basic foundation for introducing a socialist market economy in the power sector. Therefore, it is the subject of this separate chapter.

Following a brief summary and critique of the current pricing system, this chapter focuses on the tariff reforms that are needed to increase the market orientation of the sector and achieve the three goals of prices in a socialist market economy:

- Optimal use of the electricity sector's capital, fuel, and labor to maximize output at lowest cost (productive efficiency).
- Rationing of the available supply among potential users to ensure that electricity is assigned to consumers that are prepared to pay because they expect the highest economic benefits (allocative efficiency).
- Mobilization of funds to ensure that investments are financed by revenues generated by the sector rather than by government allocations (sustainability of the sector's development and increase in nonstate financing).

It is recommended that the ongoing tariff reforms be accelerated. Specifically, this means moving toward market-based prices in the competitive segment of the industry (generation) and regulated prices based on marginal cost principles (both for the structure and level of tariffs) in the monopolistic segments of the sector. This approach requires: (a) two-part or multipart tariffs; (b) nondiscrimination among customers; (c) recovery of full supply cost at all delivery levels; and (d) charging customers according to the characteristics of their demand, not simply their total usage of electricity. If deviations from these principles are required to meet financial and social objectives, these should be undertaken in a way that will minimize the distortions in the structure of tariffs. These recommendations are consistent with the Electric Power Law. A complete summary of the tariff reform recommendations is presented in Table 5.1.

**TABLE 5.1: SUMMARY OF TARIFF RECOMMENDATIONS**

Type of tariff	Recommendation
Producer	<ol style="list-style-type: none"> <li>1. Switch from a one-part to a two-part tariff.</li> <li>2. Acquire new generating supplies through competitive procurements.</li> <li>3. Focus on prices, not profits.</li> <li>4. Do not establish uniform producer prices based on administratively determined estimates of long-run marginal cost.</li> </ol>
Interenterprise	No recommendations at this time.
Separate transmission	<ol style="list-style-type: none"> <li>1. Use two-part transmission tariffs based on long-run marginal costs.</li> </ol>
Bulk	<ol style="list-style-type: none"> <li>1. Use two-part tariffs based on long-run marginal costs.</li> <li>2. The tariff should include generation and transmission.</li> </ol>
Consumer	<ol style="list-style-type: none"> <li>1. Use one or multipart tariffs based on marginal costs.</li> <li>2. Clearly separate taxes and fees from the electricity price.</li> <li>3. Unify the prices charged to customers with similar cost and demand characteristics.</li> <li>4. Change prices to reflect the cost of providing service at different voltage levels.</li> <li>5. Impose a capacity charge on customers when the expected benefits exceed likely metering costs.</li> <li>6. Accelerate the movement of seasonal and time of day tariffs for larger customers based on estimates of the supplying system marginal cost.</li> </ol>
All	<ol style="list-style-type: none"> <li>1. Tariffs should always recover the full economic costs of supply.</li> <li>2. Tariffs should not favor affiliates over nonaffiliates.</li> </ol>

*Source:* Study Team.

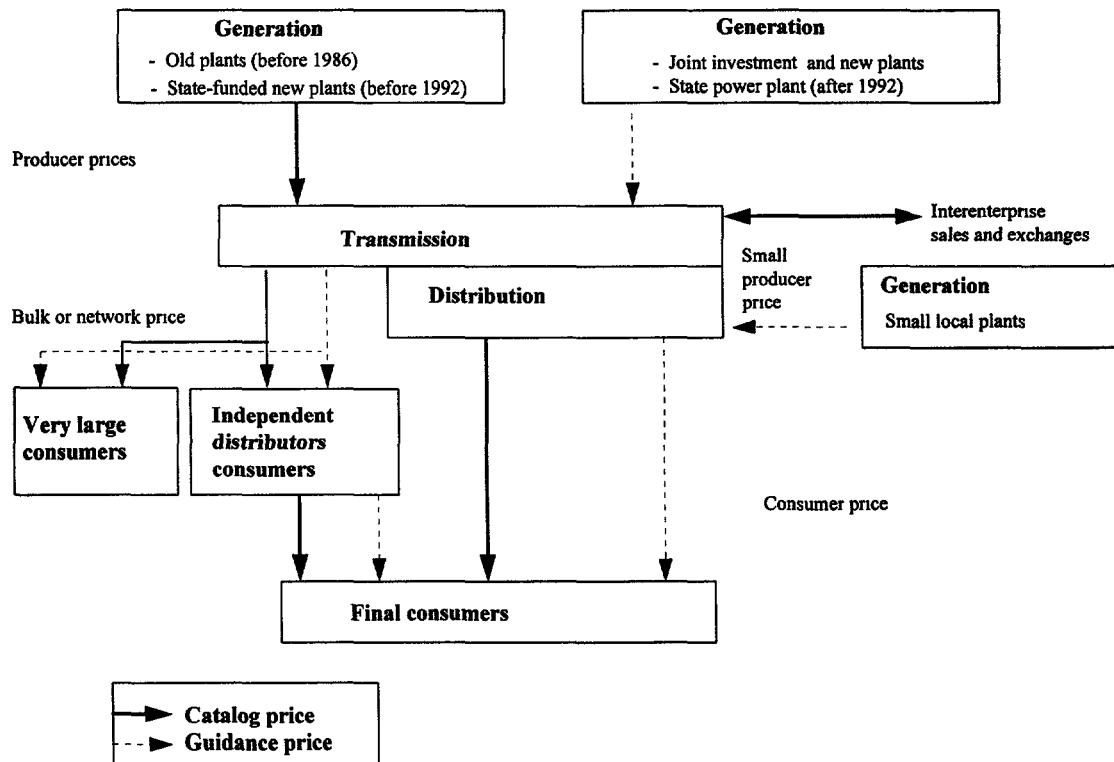
### CURRENT TARIFF SYSTEM

In a command-and-control economy, resource allocation, rationing, and funds mobilization are performed at a central level. Prices are usually set to cover the direct operating costs of the providers of goods and services. Capital costs are generally not reflected in the prices because investment funds are centrally allocated. This means that the full economic cost of the commodity or service will not be fully recovered. Such pricing is fundamentally incompatible with a socialist market economy and the principles of the Electric Power Law.

With the movement toward a socialist market economy, the power sector has gone a long way in reforming its pricing system and adapting it to emerging market conditions. However, the current system, described in Figure 5.1, is the result of a series of incremental changes that were made in response to various immediate needs, rather than as part of a systematic long-term price reform program. While the pricing system improved in many areas, especially resource mobilization through the “new plant–new price” policy, the piecemeal reforms introduced further distortions and led to the creation of new (and surely

unintended) problems. As a consequence, the power sector has been unable to achieve the three basic pricing goals.

**FIGURE 5.1: CURRENT TARIFF STRUCTURE**



Source: Study Team.

### Producer Prices

Prices for power purchased by provincial power companies are determined on a plant-by-plant (and sometimes even on a unit-by-unit) basis, depending on the origin of investment funds and the construction date of the plant. These prices are usually referred to as “network tariffs.”<sup>1</sup>

<sup>1</sup> The term *network tariffs* is confusing to non-Chinese power sector officials. In most countries, a network tariff is a tariff for the provision of transmission services, not a tariff for the sale of power from specified generating units or plants. This report adopts a standard terminology for the different types of tariffs to reduce misunderstandings. See Box 5.1.

### BOX 5.1: FIVE BASIC POWER SERVICES

Five basic types of power services are likely to dominate the power sector as it becomes more market oriented. These services are the following:

- **Producer or generator sales:** Long-term firm sales of power by independent and affiliated power producers under either build-own-transfer (BOT) or build-own-operate agreements.
- **Interenterprise sales:** Short- and long-term wholesale sales between regional groups of provincial power entities. These are “opportunity” sales because they are often unanticipated and difficult to predict. They require good transmission connections and can be increased through the creation of power pools. (See Chapter 2.)
- **Transmission service:** This is a separate transportation service provided to a buyer and seller by a third power entity. This “unbundled” transmission service and related ancillary services increase the geographic size of the market by allowing noncontiguous buyers and sellers to enter into transactions that otherwise might not be feasible.
- **Bulk or network sales:** These are sales by provincial power entities to high-voltage (HV) industrial customers and power distribution bureaus and companies. They represent a resale of the power that has been purchased from generators. They are usually long-term firm power sales to supply the customer’s total electricity demand.
- **Consumer sales:** These are retail sales to final consumers. They are typically long-term firm sales though their reliability may be diminished by shortages of generation capacity.

Each of these five types of services has an associated tariff. The focus of this chapter is on the tariffs for producer, bulk power, and consumer sales, since these three services will have the greatest immediate impact on the transition to a socialist market economy.

*Source:* Study Team.

Power sale prices from virtually all power plants constructed before 1985 (primarily with government allocations) and from plants—or shares of plants—constructed with subsidized government loans between 1985 and 1992, are based on catalog price tables issued every year by MOEP. These prices cover direct operating costs, especially labor, fuel, and maintenance. They do not cover capital costs (depreciation, interest, and return on investment).

Prices for power purchased from power plants not financed by the central government between 1986 and 1992 and from all power plants built after 1992 are based on the “new plant–new price” policy. Under this policy, power is sold to provincial power companies at *debt-repayment prices* to provide sufficient revenues for the repayment of loan capital with interest, generally within 10 years. These prices are determined annually by the provincial power companies and submitted for approval to the provincial power bureaus. The “new plant–new price” policy produces significantly higher producer prices. On average, prices of electricity from the most recent plants are 15 to 25 fen per kilowatt-

hour, about 65 to 100 percent higher than prices of electricity from old power plants. This reflects in part the fact that the capital costs are being recovered over a relatively short period.

### Consumer Tariffs

In most parts of China, two types of consumer tariffs remain. *Administered prices*, or *in-plan prices*, are based on the catalog prices issued annually by MOEP and differentiated at the provincial level. Additional fees and surcharges are often added to the administered prices by provincial, municipal, and county authorities. These administered prices plus fees and surcharges are charged for electricity supplied to enterprises under in-plan quotas, generally set at 1985 consumption levels. *Guidance prices*, or *out-of-plan prices*, include administered (or state catalog) prices, mark-ups for the higher cost of power purchased from new plants, plus additional fees and surcharges. Consumers pay guidance prices on any consumption that exceeds their 1985 consumption levels.

### CRITIQUE OF EXISTING TARIFFS

Power prices are still set and controlled by the government at the central level (*catalog prices*), provincial level (*guidance prices, surcharges*), and even municipal and country levels (*surcharges*). Despite the substantial progress achieved in correcting the deficiencies of the pricing system, it still does not meet two of the major objectives of the power sector reforms initiated by the government in 1985:

- Increased investments in the sector to alleviate current power shortages.
- Improved utilization of the country's scarce resources, through economies of scale and optimal use of existing assets.

The absence of clear pricing principles prior to the enactment of the Electricity Law, and the fragmentation, opacity, and complexity of the approval process discourage investors from making the investments that would normally be expected in a more market-oriented environment.

Prices are set without any reference to economic efficiency or willingness of final users to pay (market value of electricity). They are usually negotiated between the electricity supplier and government authorities, at different levels, based on average accounting historic costs rather than on economic supply costs to the different consumer classes (customers with common characteristics of demand). Customers do not get the right price signals. As a consequence, the sector fails to produce electricity at the lowest possible cost (productive inefficiency), and the electricity does not go to those consumers who could produce the most benefit for the overall economy (allocative inefficiency).

---

Government authorities at different levels still tend to use power prices rather than macroeconomic and policy instruments to control inflation, despite the established fact that such attempts have been unsuccessful in many countries in Latin America and elsewhere during the 1970s and early 1980s. This results in delays in tariff adjustments and further deterioration of the financial situation of most provincial power companies and drastic reduction of their self-financing capabilities.

### **The Problem with Producer Prices**

At the generation level, the implementation of the “new plant–new price” policy has led to contractual arrangements between purchasers (usually provincial power companies) and the generators (Huaneng, Joint Investment Power Plants, and local power plants), based on “take-or-pay” provisions providing for a minimum use of the power plants (generally 5,000 hours per year, equivalent to a capacity factor of 57 percent) charged at an energy (kWh) price covering variable costs (fuel and maintenance), repayment of debt (capital cost and interest), and a reasonable profit. The same price is applied to electricity purchased in excess of the minimum “take-or-pay” provision.

The problem with this combination of a minimum “take-or-pay” provision and a one-part tariff is that it leads to (a) overinvestment in base generation capacity, despite higher up-front investment costs because the current pricing system makes it difficult (if not impossible) to recover investments in peaking capacity; and (b) uneconomic dispatch because provincial power companies (dispatchers and purchasers) faced with higher prices from new and efficient power plants limit power purchases to contractual minimum amounts and rely more on old, inefficient power plants to minimize their financial costs. This violates a basic rule of power sector operation. Power should be generated from lower variable cost units rather than from higher variable cost units (see Figure 5.2). As a consequence, scarce resources are being wasted. The same amount of electricity could be generated at lower cost with a more rational pricing system. The current pricing system fails to achieve the basic goal of producing electricity at the lowest possible cost to the economy.

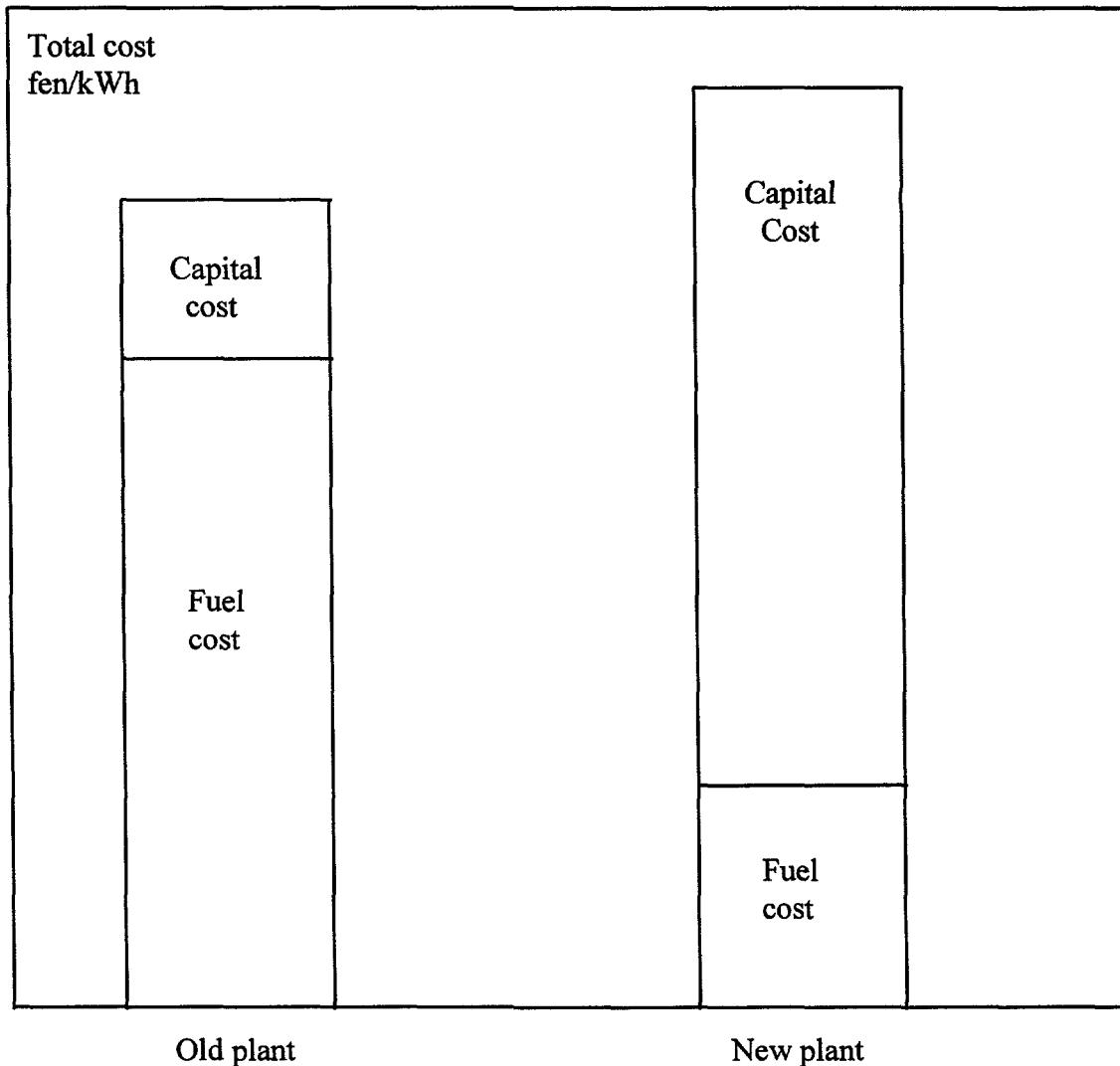
### **The Problem with Consumer Tariffs**

While the multiple-tier producer price system may have been useful for mobilizing new financing sources and for phasing in higher prices to consumers, it invariably means that customers with exactly the same consumption characteristics (and therefore with the same cost of supply) can be paying different average prices because it is incorrectly assumes that they are being served by different mixes of new and old power plants. This price distortion results in these inefficiencies:

- The competitiveness of the new industries is reduced because of high electricity prices that are well above supply costs.

- Old and usually inefficient industries enjoy low prices that are well below supply costs and have insufficient or no incentive to reduce wasteful use of electricity.

**FIGURE 5.2: THE CURRENT PRODUCER TARIFFS RESULT IN UNECONOMIC DISPATCH**



*Note: Under the current system, the old plant would be dispatched first, because it has lower “total costs” (because its fixed charges have been paid off or are not reflected in the sale price), even though production from the new plant would be more productivity efficient.*

*Source:* Study Team.

---

In addition, there are other problems with consumer prices that introduce distortions and lead to significant efficiency losses:

- Voltage differentials remain low and do not reflect the cost of supply.
- The demand charges are low and, when applied, cover only a small part of the fixed costs.<sup>2</sup> Tariff studies carried out by provincial power companies in Henan, Hainan, Fujian, and other provinces show that current demand charges cover only 20 to 40 percent of the fixed costs of supply. This results in cross-subsidies and price distortions that lead to inefficient use of the capacity at the disposal of the customers, and economic losses at the macroeconomic level.
- Time-of-day and seasonal tariffs, when introduced, do not take into account the load curves profiles and the time patterns of marginal costs of supply. The resulting differences between prices and marginal costs might even increase long-term inefficiencies by providing the wrong price signals to consumers.

The various surcharges and fees added to the consumer tariffs played a role in increasing the mobilization of investment resources for building new power plants. However, this indirect and cumbersome method of raising funds for power development induced unintended problems:

- It caused a deterioration in the financial situation of the provincial power companies and reduced their self-financing capabilities because provincial and/or local governments coupled surcharges and add-ons—which they fully control—to the required price increases to cover costs of supply, which they perceive as involuntary transfers to the power companies.
- It compounded the failure of the sector to take full advantage of economies of scale and increased its fragmentation because of the propensity of local governments to build their own plants rather than invest in the state companies' power plants. The magnitude of short- and long-run efficiency losses resulting from this uncoordinated development has not yet been fully estimated, but it is likely to be enormous. Over one-half of the nation's recent capacity addition is composed of inefficient units of 125 MW and below, even though national policy has emphasized the addition of larger generation units (300 and 600 MW).
- It created transmission bottlenecks because most of the surcharges fund new-generation capacity that is not matched by the required investments in

---

<sup>2</sup> Costs that do not vary with the level of the output, usually capital and administrative costs.

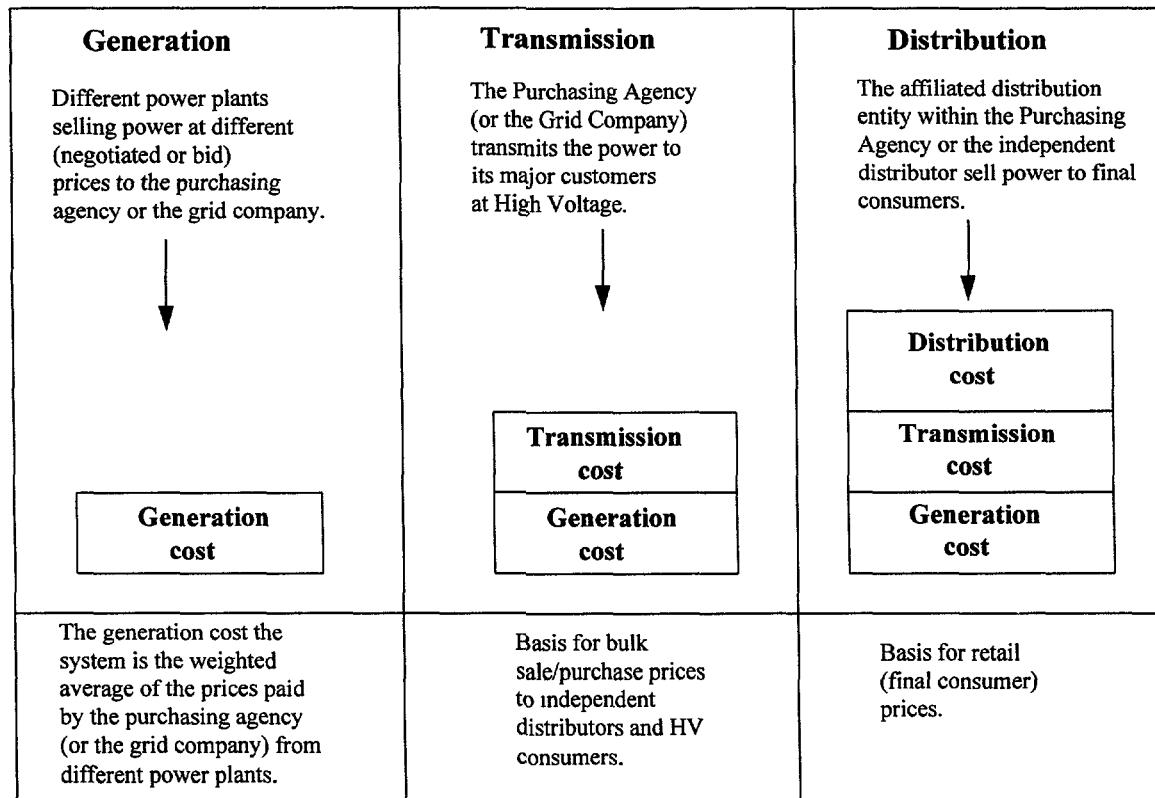
transmission networks because of the poor financial situation of the provincial power state companies.

### THE NEED FOR A COMPREHENSIVE REFORM OF THE PRICING SYSTEM

The Electric Power Law provides the broad principles of a new pricing system keyed to the cost of supply of electricity. However, more detailed State Council regulations are necessary to implement these principles.

An efficient pricing policy for the electric sector should be based on the costs at each stage in the process of delivering electricity from generation to its end use. Moreover, to meet the requirements of the socialist market economy and ensure efficient allocation of scarce resources, prices should be based on the incremental costs of supply at each stage of the delivery process. Figure 5.3 illustrates the cost components of electricity supply.

**FIGURE 5.3: COST STRUCTURE OF ELECTRICITY DELIVERY**



*Source.* Study Team.

---

Economic theory indicates that in a competitive environment, “market clearing” prices reflect marginal cost of supply and lead to correct allocation of resources and economic efficiency. If significant barriers to introduction of competition or “natural monopolies” exist, prices should be regulated and based on marginal costs of supply at the different stages of the electricity delivery process (see Figure 5.3). However, it must be noted that while the principles of marginal cost pricing are simple, in practice (a) marginal costs are difficult to determine because of existing distortions (suboptimal generation mix and transmission-distribution systems) and lack of reliable information; and (b) they generally do not cover full financial costs. Therefore, long-run marginal cost-based tariffs will usually need to be adjusted to meet corporate goals or financial requirements of the project.

### **Recommendations for Producer Prices**

**Switch from a one-part to a two-part tariff.** At present, the norm for producer tariffs is a one-part tariff. All costs, variable and capital, are recovered in a single kWh charge. As noted earlier, a one-part tariff system is incompatible with the universal rule for optimal dispatch of generation: minimize the variable costs of production. This means that the country is needlessly wasting precious fuel. Therefore, it is recommended that China switch to a two-part tariff design for both new and existing generating plants. One part of the tariff would be a kWh charge keyed to the variable costs of producing electricity. The second part of the tariff would be a kW charge designed to recover capital costs. Payment of the kW charge would be keyed to measures of plant availability. Adequate two-part tariffs will (a) encourage generators to maximize the availability of power plants because they are contractually linked to the payment of the fixed charge; and (b) minimize fuel consumption because power plants are dispatched according to their fuel costs only, leading to optimum use of existing plants.

**Acquire new generation supplies through competitive procurements.** Competitive procurement to acquire new capacities is the most effective way to ensure that investment requirements are met at the lowest costs. Competition will ensure that “fixed costs” are objectively determined and minimized, and will get the best possible price from the market. The concern expressed in China over whether potential investors would artificially increase the bid price in a collaborative effort seems not to be warranted. Recent experience worldwide indicates that there are more than an adequate number of developers, and competition is intense. Moreover, this concern could be addressed by combining competitive bidding with a fixed ceiling price. Bidders would be informed that the buyer would pay no more than the ceiling price, but they would be free to offer lower prices. Ongoing experiences in Thailand and Poland are particularly relevant to China because both countries are pursuing competitive procurement within a purchasing agency sector structure similar to the structure recommended for China in Chapter 2.

In cases of objective barriers to the establishment of a full competitive environment, generation prices for some plants could, during the transition to a competitive purchasing agency, be regulated with reference to marginal costs of supply or to the market prices of other plants under similar conditions. However, there is a risk that the reference to marginal or avoided cost will not ensure sufficient supply if the potential investors have better investment opportunities in less regulated systems in China or in other countries.

**Focus on prices, not profits.** In most countries, much time and attention has been devoted to discussions of the rate of return on equity that developers should be allowed to earn. The concern with profits is understandable. However, the preoccupation with profits is misplaced because what ultimately matters is the minimization of supply prices. It is therefore recommended that the focus of regulatory review for future procurement should be on the effective price that the buyer will pay for the power rather than on an estimate of the profits that the developer will earn. This is the current government policy in the Philippines, Poland, Thailand, and the United States. It appears that a similar policy may soon be adopted by India.

**Do not establish uniform producer prices based on administratively determined estimates of long-run marginal cost.** It has been suggested that in the future producer prices be established on a uniform basis. While there are many possible ways to do this, the proposal that seems to have received the most attention has the following elements:

- New and existing power plants would be divided into three categories based on whether the plant generally performs a peaking, intermediate, or baseload function in the production process.
- All plants in a particular category would receive the same kW payment.
- The kW payment would be based on annually adjusted government estimates of the long-run marginal cost of operating that particular type of plant.
- Payments for variable costs (principally, fuel costs) would be keyed to a plant's actual running costs.

There are a number of significant problems with this proposed approach to setting producer prices. First, it is inconsistent with the basic principles of the Electricity Law. Article 36 of the Law provides that "the formulation of electricity price should provide for compensation of reasonable costs and earning of reasonable profits after payment of taxes and duties according to law...". Power plants built at different sites using different technologies with different financing conditions and particularly constructed at different times will have completely different costs. Therefore, if a uniform tariff is applied, profits will not necessarily be "reasonable" for different plants. This is immediately evident when one considers the cost profile of constructing power plants in China in the last 10 years.

---

The unit cost of power plant construction has quadrupled in the last decade and is likely to escalate further. Payment of a capacity equal to the marginal cost of capacity expansion to all the power plants would result in large windfall profits for all previously constructed plants and higher than acceptable prices to the rest of the economy.

Second, it is inconsistent with competitive procurement. The reason for pursuing competitive procurement as in the Laibin B pilot project is to get the best possible price from the market. If all power plants in a specified category receive the same price, then there is no point in holding a competitive procurement because the buyer (and ultimately the Chinese economy) will lose the benefit of the lower price. In other words, the two policies—competitive procurement and administratively determined uniform prices—are contradictory.

Third, it will discourage potential developers and make it difficult to finance new plants. Even if the administratively determined marginal cost is more likely to increase in the future and the buyers actually will pay higher prices, from a developer's perspective, it increases the risk because the price that he receives could change significantly on a yearly basis. It would be very difficult to get project financing when the future stream of revenues is subject to such risk. Neither the financiers nor the developers would be willing to take the future market risks (demand and price), which are completely beyond their control. In the competitive procurement process, the developers compete for the entry of a long-term power market, not for the daily or yearly spot markets, which are subject to change. Their prices and long-term contractual arrangements are guided by the marginal and/or avoided costs at the time of the decision to build the plant, and they vary with the development and changing characteristics of the system.

Fourth, it will generate too many or too few offers. If the price is set too high, it will generate many offers of new generating capacity. Clearly, not all of these offers will be capable of being financed. Therefore, some mechanism will have to be put in place to choose from among the competing offers. Since the proposed scheme precludes the use of prices as a selection tool, the selection will have to be made on the basis of differences in the nonprice terms and conditions of the different offers. This is not easy to do and increases the chances of discouraging potential investors. The United States used a uniform fixed price approach when it first started to encourage independent power production. One former US government official has described this approach as "the single biggest policy mistake" that was made.

In sum, the uniform price approach is detrimental to the development of the power sector, and the ultimate consequence would be borne by the Chinese economy. If the administratively determined price is high enough to compensate all the increased risks perceived by the investors and to ensure adequate profit for the most costly power plants so that all the investment requirements would be met, the consumers would have to pay unnecessarily high prices. Otherwise, there would not be adequate investment coming into

---

the sector to finance the needed expansion for economic development. In both cases, it is the consumers and the nation's economy that would suffer, not the investors.

Article 37 of the Electricity Law provides for "the same quality and price for the same electric network."<sup>3</sup> This provision is rather general, but the intent seems to be toward equity. That is, producers would be treated equally, just as consumers of the same type are treated equally under Article 41. The principle of equity would not be achieved if two baseload plants built 20 years apart are paid the same capacity price. Article 37 further provides for the State Council to make exceptions to the "uniformity" requirement for good reason. Consequently, the proposed State Council regulations could be used to define the scope of the equity principle embodied in Article 37 and to remove any possible inconsistency with Article 36.

### Recommendations for Bulk Sales Tariffs

Provincial power utilities (such as purchasing agencies) have two different types of customers: high-voltage (HV) customers and affiliated and nonaffiliated power distribution bureaus or companies.<sup>4</sup> Sales to these customers should be governed by bulk sales tariffs that provide for the recovery of the cost of power generation or purchases and full costs incurred in transmitting this power to their customers (see Figure 5.2). These tariffs are not new to China. Their principal shortcoming is that they do not generally include the costs of transmission.

Transmission charges should be based on long-run marginal costs for delivering electricity from power plants to the power purchasing agency's customers. They should reflect the structure of transmission costs and consist of two parts: (a) a fixed charge that recovers fixed costs, mostly capital and administrative costs; and (b) an energy charge that recovers variable costs related to the transmission system, mainly maintenance and technical loss costs. The fixed (capacity) charge allocates fixed costs to customers proportionally to their contribution to the peak of the system; and the energy (variable) charge allocates the variable costs based on actual electricity consumption (see Figure 5.4).

The power purchasing agency model by itself does not require formal publication of transport tariffs. However, provincial power companies must be required to clearly separate

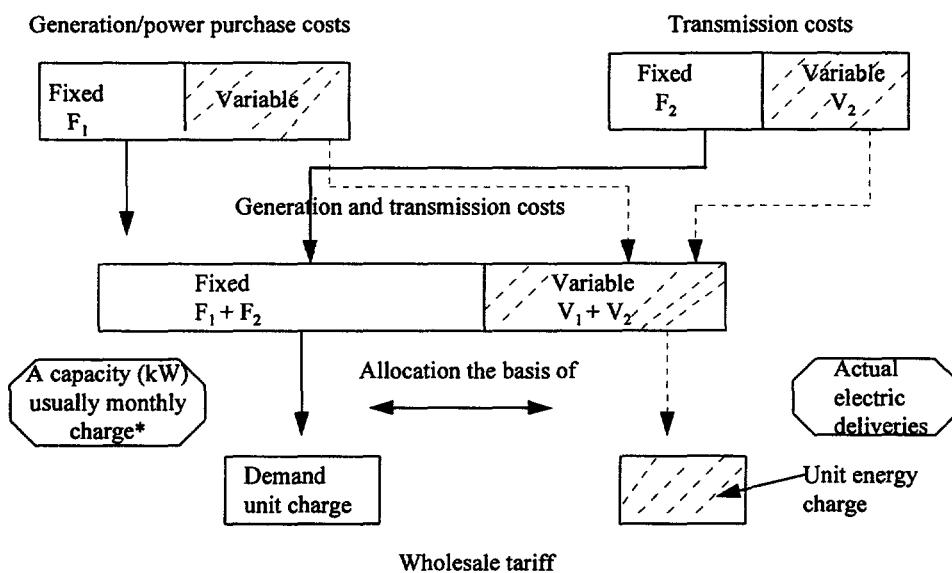
---

<sup>3</sup> It has been suggested that the United Kingdom represents a case in which all power plants, whether new or old, get the same uniform price. However, in reality this is not true. The revenues earned by most generating units do not come from the half-hourly spot market. Instead, they are derived from long-term "contracts for differences" signed between the generators and one or more customers (usually distribution companies). The prices differ from contract to contract (that is, they are not uniform) and are typically fixed for several years.

<sup>4</sup> Power Distribution Bureau (PDB) or centers refer to distribution subsidiaries of the power purchasing agency, usually operating as profit centers, and Power Distribution Companies (DisCo) refer to legally and financially independent distribution units.

the cost of generation and power purchases and the cost of transmission when they propose wholesale tariffs to the regulator for approval. This would ensure full transparency and effective regulation of the tariffs. Separate transmission tariffs would be required if the purchasing agency offered “unbundled” transmission service to neighboring power enterprises or to captive bulk supply customers within its own service area. As discussed in Chapter 2, the decision to provide separate transmission service should be initially at the discretion of the power enterprise. At some later time, the government’s policymakers (not the regulators) may wish to impose a mandatory transmission obligation on all power enterprises to create bigger and more active markets that would increase competition.

**FIGURE 5.4: PRINCIPLES FOR DETERMINING BULK SALES TARIFFS**



\*Methodologies for determining the best means for allocating the fixed costs to the capacity charge are complicated, and detailed data related to the load of the system and the customers’ companies must be given flexibility for implementing these broad principles.

Source: Study Team.

### Recommendations for Consumer Tariffs

Retail tariffs should be based on marginal-cost pricing principles to ensure adequate allocation of supply among end users and efficient use of electricity. The application of marginal-cost principles implies that tariffs distinguish between customers with different demand characteristics and cost of service only.

Retail tariffs should cover wholesale prices plus the full economic costs of distribution. For wholesale tariffs, their structure should reflect the structure of supply

costs. Two-part tariffs with a capacity (kW) charge and an energy (kWh) charge, reflecting as much as possible the structure of supply costs, should be applied to customers when expected benefits outweigh costs of metering.

A first and urgent step is to separate electricity prices from taxes and special fees (such as construction fees and education fees) and collapse all surcharges into the overall tariff collected by provincial or local power companies. This would improve their financial capabilities, promote a coordinated development of the sector, and allow them to take full advantage of economies of scale.

**The special problem of multiple-tier consumer prices.** The multiple-tier system means that consumers in the same service area retain different types of power allocation quotas, carrying different prices. Two customers with exactly the same consumption characteristics can easily be paying different average prices, because of different mixes in quota allocations. For example, new industries are paying higher prices than old industries by 30 to 40 percent in Zhejiang and Jiangsu Provinces and by about 80 to 100 percent in Henan Province.

The multiple-tier price system may have been useful for phasing in higher prices to consumers, but it has now become a major impediment for progress toward economic pricing and results in distorted consumption behavior. It has outlived any usefulness that it once may have had and should be eliminated in favor a unified consumer tariff. Consumers receiving the low prices have insufficient incentive to conserve energy, and these consumers tend to be precisely the old industries that most need to modernize and use energy more efficiently. Allocations of cheap power have, in effect, become subsidies to protected industries (fertilizers are a case in point in China), and the potential for political influence is pervasive. As the system allows different prices to be paid by similar consumers for purely administrative reasons, it also is blatantly unfair.

Unification of the consumer tariff means that the same tariff should apply to all consumers in a given area, with no exceptions. A single tariff would continue to provide for different prices for different consumer categories, as well as variations based on voltage and time of day, since service costs vary by these characteristics. In the absence of competition, consumers with the same service characteristics, however, should pay the same price. Where there are different service costs in different service areas, it may be useful to adopt different tariffs for the different service areas.

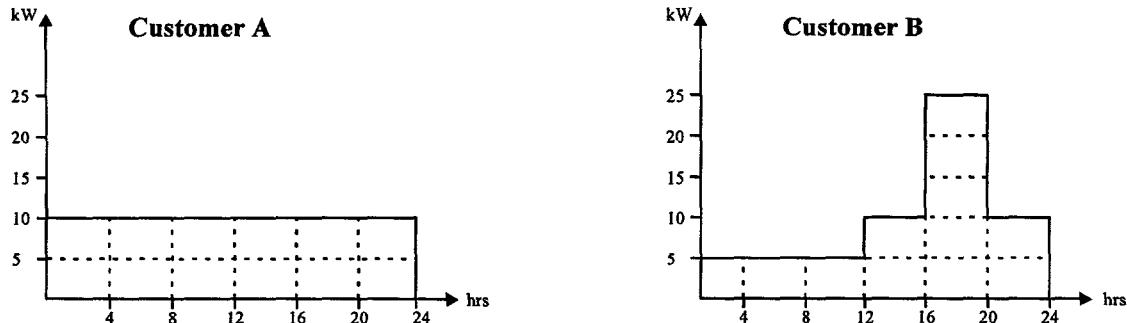
Unification of the consumer tariff has been reaffirmed by article 37 of the Electricity Law. Implementation at local levels, which started before the passage of the Law, has been slow. Implementation efforts need to be strengthened and speeded up where at all possible.

**Consumer tariff structure.** Much progress has been made in many ways to increase tariff levels and to bring them in line with supply costs on average. However, consumers still do not get the right signals to optimize their power supply requirements (for

example, voltage level, maximum capacity) and use the power supplied as efficiently as possible. The major aspects that require attention in the upcoming regulations are the following:

- **Voltage differentials.** These should be gradually increased to reflect the costs of supply at the different service levels. Currently, the differentials reflect only about one-half of the differences between the marginal costs of supply at the different voltage level. This would provide an incentive to customers to request supply at the appropriate technical and economic voltage level and avoid shift of the costs of transformers to other customers.
- **Cost-based demand (capacity) charge.** A cost-based capacity charge should be applied to large and medium-size consumers and to other categories of consumers when the expected benefits outweigh the transaction (especially metering) costs. Cost-based capacity charge is required because customers may impose different capacity costs on the system for the same electricity consumption (see Figure 5.5).

**FIGURE 5.5: CAPACITY COSTS**



Customers A and B have the same daily consumption. However, Customer B's consumption pattern requires higher investment costs.

Source. Study Team.

**Time-of-day tariffs.** The regulations should continue support to the introduction of seasonal (when justified) and time-of-day tariffs in wholesale and retail (especially large consumers) power rates. However, unlike ongoing experiments, the pattern of rates, by time of day and season of the year, should follow the variation of marginal costs of the system rather than be based on time periods and price differentials centrally (and administratively) determined. The variation of the marginal costs of supply are specific to each system and require in-depth knowledge of the daily, seasonal, and yearly load curve and detailed technical and economic characteristics of the generation units. Discrepancies

---

between the prices and marginal costs will lead to long-term inefficiencies and higher costs of electricity supply.

**“Lifeline” tariffs.** The adoption of “lifeline” tariffs for residential consumers should be encouraged by the new regulations. Under such a scheme, households would pay full cost for electricity consumption over a basic lifeline level. These tariffs are intended for low-income households and are applied for a monthly consumption of about 50 kWh per month. They would also avoid subsidizing high-income households, which usually account for the largest share of household electricity consumption.

## The Importance of Regulation

The principle that tariffs at different supply levels should reflect full economic costs does not imply that power purchasing agency and distribution companies will be entitled to pass on to consumers costs due to management inefficiencies at the investment and operation levels or only to maximize revenue or profits. In case of monopoly, these issues can only be addressed with the establishment of a regulatory framework and implementation of regulatory techniques to ensure that costs are determined objectively and tariff structure are conducive to efficiency.

Table 5.2 summarizes the tariff review process for the five types of transactions. The two most important columns are the “Who submits” and “Who approves” columns. As a general rule, it is recommended that the tariff be submitted by the seller rather than the buyer (though the buyer should be allowed to assist the seller). Sellers will have the strongest interest in getting the tariff approved and will be better able to provide any additional information that may be requested by the regulatory authorities.

Tariff approval authority is split between the provincial and national regulatory authorities. The provincial regulatory authorities would have direct responsibility for reviewing tariff filings for producer, bulk, and consumer sales. This does *not* mean that the provincial authority would have total discretion in deciding the grounds for approval or disapproval. As discussed in Chapter 3, the provincial regulatory authorities would act under guidelines established by the national regulatory entity. (See Table 3.1, The Vertical Allocation of Responsibilities.) If either the seller or buyer believes that a provincial regulatory decision violates the guidelines of the national regulator, then the aggrieved party has a clear legal right to appeal the provincial decision to the national regulatory entity.

The national regulatory authority would also have direct authority over tariff filings for separate transmission service and interenterprise power sales. Both services are critical for creating national and regional power markets. Since the long-range policy goal is to create large and active bulk power markets, it is important that the regulatory responsibility for these markets remain with a national entity. If the authority for regulating these transactions were to be given to provincial regulatory authorities, there is a danger that they would favor the interests of buyers and sellers in their province over the more important

national interests. This phenomenon has been observed in other large countries, such as Argentina and the United States. The experience from these two countries suggests that it is very important to clearly define the division of tariff review responsibilities as soon as possible to avoid unnecessary disputes between different parts of the government.

**TABLE 5.2: TARIFF REVIEW PROCESS**

Type of tariff	Seller	Buyer	Who submits	Who approves
Producer	IPP or APP	PPC	IPP/APP/PPC	Provincial regulator
Bulk sales	PPC	Disco large industry	PPC	Provincial regulator
Retail	PPC/Disco	End customers	PPC/Disco	Provincial regulator
Separate transmission	PPC/RG/NPGC	All power enterprises customers?	PPC/RG/NPGC	National regulator
Interenterprise	All power enterprises	All power enterprises	Selling enterprise	National regulator

APP: Affiliated power producer.

IPP: Independent power producer.

PPC: Provincial power company.

Disco: Independent distribution company and/or Power Supply Bureau.

RG: Regional group.

NPGC: National Power Grid Company.

*Source:* Study Team.

## **CHAPTER 6. IMPLEMENTATION OF REGULATORY SYSTEM**

This chapter proposes a staged process by which the proposed regulatory system and legal framework can be implemented. The staged implementation program consists of organizational reform of the government institutions responsible for regulation of the power sector and the adoption of the legal instruments necessary to create the proposed regulatory framework.

Many of the reforms recommended in this report will require a fundamental reorientation of the fashion in which the government interacts with and supervises the power sector. These reforms will take time to implement. The goal of the proposed implementation program is therefore to create a regulatory system and legal framework in conjunction with the gradual adjustment of the power sector to the requirements of a socialist market economy.

**The process for implementing the recommended reforms will have be flexible. The proposed implementation plan will have to be adjusted to accommodate difficulties encountered in implementing reforms and future power sector developments.**

### **STAGED IMPLEMENTATION OF REFORMS**

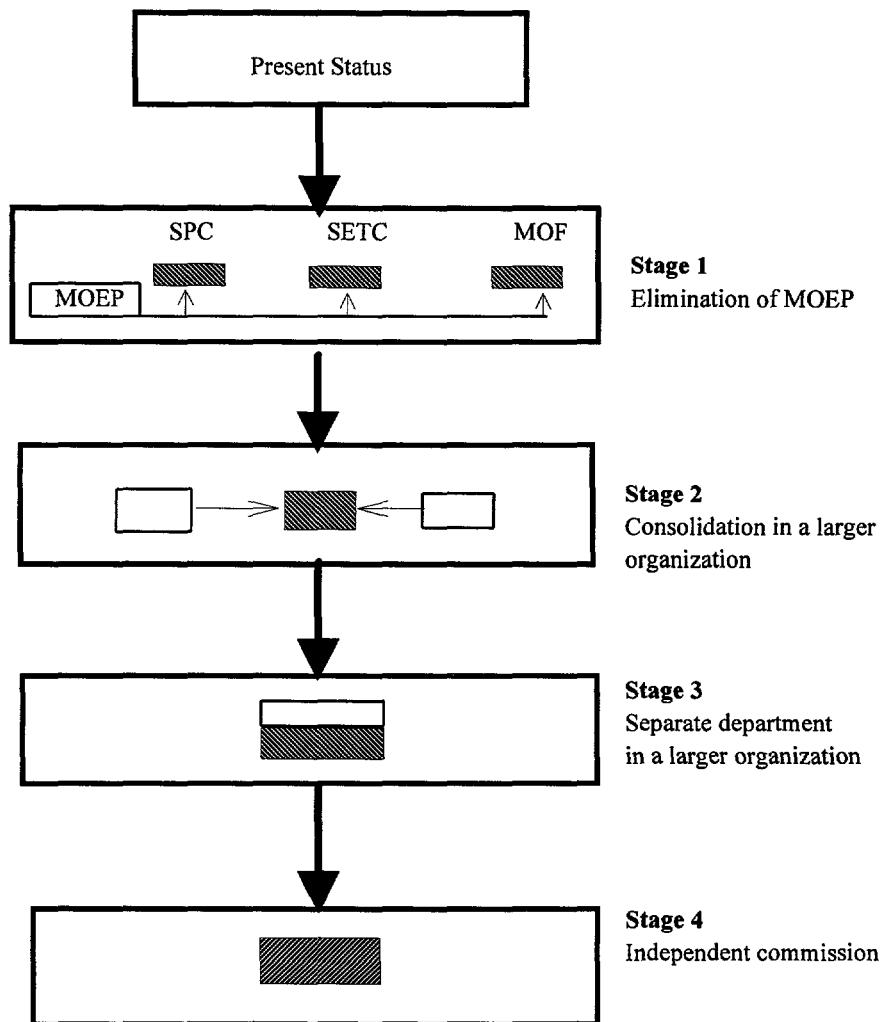
The institutional and legal reforms recommended in this report would be implemented in the four stages described below. Figure 6.1 illustrates the institutional reforms intended at each stage.

#### **Stage 1 (1996–1997)**

Stage 1 will focus on the separation of government function from the management of power enterprises. Stage 1 is intended to achieve the following:

- Elimination of the MOEP.
- Allocation of government functions previously performed by MOEP.
- Adoption of legal instruments that are a precondition to further reform of the power sector.

**FIGURE 6.1: IMPLEMENTATION STAGES**



*Source:* Study Team.

The following specific actions are needed to implement the Stage 1 reforms:

- Issuance of a directive abolishing MOEP and allocating MOEP responsibilities among different central government institutions, such as the State Planning Commission, the State Economic and Trade Commission, and the Ministry of Finance.

- Establishment of the National Power Corporation through appropriate legal instruments, including a corporate charter, issued in accordance with the Company Law, and a license.
- Completion of the five State Council regulations required by the Electric Power Law.
- Preparation of a report on the regulatory responsibilities currently allocated among different central government institutions and a proposal for consolidation of power sector regulatory responsibilities within one higher government institution.
- Preparation of guidelines for competitive bidding programs, including a model power purchase agreement with terms and conditions that have been preapproved by central government.
- Development of model licenses and criteria and procedures for issuing licenses for network and power supply enterprises.

### **Stage 2 (1997–2000)**

Stage 2 will focus on concentrating regulation at both the central and provincial government levels and beginning to formulate the basis for the recommended regulatory system and legal framework for the power sector. Although this stage is expected to take two to three years, careful planning may be able to reduce this period to one year. During Stage 2, the following will be achieved:

- Concentration of power sector regulatory functions at the central and provincial levels within one central and one provincial government institution.
- Adoption of the legal instruments necessary to define the regulatory relationship between power enterprises and the government.
- Training of national and provincial regulators in regulatory techniques appropriate for a socialist market economy.

The following actions need to be taken to implement the reforms during Stage 2:

- Issuance of a State Council regulation that consolidates electric power regulatory functions within one government institution at both the central and provincial government levels.
- Issuance of the 40 or more regulations intended to establish the rules within which the commercially autonomous power enterprises are intended to operate

and establish proposed regulatory framework (see Appendix 3 for a preliminary summary of required regulations).

- Issuance of regulations for detailed criteria and procedures for issuing licenses to power enterprises.
- Issuance of licenses to network and power supply enterprises.

### **Stage 3 (2000–2005)**

Stage 3 will focus on rationalizing the regulatory functions within the government organizations that had been entrusted with such responsibilities in the preceding stage. This will be a lengthy stage because it will require difficult internal organizational reforms. During Stage 3, the following will be achieved:

- Power regulation will be set up within a separate division or department within the central and provincial government institutions responsible for power sector regulation.
- The legal framework will be perfected.

The following actions need to be taken to implement the reforms during Stage 3:

- Issuance of a State Council regulation to establish national and provincial power sector regulatory authorities within the government institutions. The regulation will specify the authority, structure, and procedural requirements for the national and provincial power sector regulatory authorities.
- Implementation of the structure and internal procedures for the national and provincial power sector regulatory authorities. National and provincial power sector regulatory authorities will be established as a separate department with a multimember commission structure within the central and provincial government institutions.
- Issuance of procedures for appealing decisions of provincial power sector regulatory authorities to the national power sector regulatory authority.
- Revision of the five State Council regulations required by the Electric Power Law and other regulations, as necessary, to accommodate operation of the power sector consistent with socialist market economy.

## **Stage 4 (2005–2007)**

Stage 4 will complete implementation of the recommended reforms by establishing an independent regulatory system and regulatory framework. During Stage 4, the following will be achieved:

- The power sector regulatory authorities will be established as the power regulatory commissions under the State Council, but will be separate from other government institutions.
- The power regulatory commissions will exercise their regulatory responsibilities consistent with the procedures recommended in this report.

The following actions need to be taken to achieve the objectives of Stage 4:

- Issuance of a State Council regulation to establish national and provincial power regulatory commissions as separate administrative departments under the State Council.
- Issuance of a State Council regulation to empower an existing higher institution or establish a special tribunal for appeals of decisions of the national power regulatory commission, including any substantive standards for review and procedural requirements.
- Finalization of all internal procedures for the national and provincial power regulatory commissions.
- Issuance of regulations designed to protect against anticompetitive and unfair business practices within the power sector.

### **IMMEDIATE REFORMS**

Notwithstanding the need to introduce institutional and legal reforms gradually, certain legal instruments are needed for power enterprises to be able to operate and conduct business. These legal instruments are common to each stage of the implementation plan. Table 6.1 lists these legal instruments.

The legal instruments listed in Table 6.1 need be implemented immediately and then revised, as necessary, during each stage of the implementation plan as further institutional and regulatory reforms are successfully implemented.

**TABLE 6.1: IMMEDIATE LEGAL ACTIONS NECESSARY  
TO ESTABLISH REGULATORY FRAMEWORK**

---

- Investment and planning approval process regulations.
  - Financial planning regulations for regulated enterprises.
  - Power enterprise accounting standards.
  - Internal procedures requiring (a) written regulatory decisions, (b) notice and an opportunity for comment on proposed regulatory decisions, and (c) publication of all regulatory decisions.
  - Application filing requirements (for example, licenses, tariff changes, and investment approvals).
  - Safety and quality of service standards.
  - Technical standards for operation of power enterprises, including network grid codes.
  - Power enterprise reporting requirements.
  - Service complaint and enforcement procedures.
  - Dispute resolution procedures.
- 

*Source:* Study Team.

## **APPENDIX 1: DESIGN QUESTIONS FOR THE PURCHASING AGENCY MODEL**

1. At what level should the purchasing agency be created? Provincial or regional?
2. Should the purchasing agency also own and control transmission and dispatch?
3. How can power purchase contracts be written with existing power plants to ensure that they compete on an efficient basis with new power plants?
4. Once power purchase contracts have been written with existing plants, how can these plants be sold to independent (that is, not affiliated with the purchasing agency) generating companies?
5. Should the existing plants be sold on an individual plant basis or in groups of plants?
6. Is it feasible for the purchasing agency to be owned by its customers? If this is feasible, would this reduce the need for regulation of the purchasing agency?
7. What is required to ensure a smooth transition from the purchasing agency model to a more fully competitive sector structure with many buyers and many sellers?



## APPENDIX 2: DESIGN ISSUES FOR NEW POWER POOLS

### General Issues

1. How can operating efficiencies be maximized through exchanging economically generated power?
2. How can operating reserves be minimized through pool-wide sharing?
3. How can maintenance schedules be coordinated to minimize costs and maintain reliability?
4. What emergency procedures should be jointly developed and implemented?
5. How should generating units be committed to meet pool-wide power requirements?

### Potential Pool Transactions

1. Which of the following transactions would be feasible for the pool?
  - **Economy energy:** Other members have cheaper electricity.
  - **Scheduled outage service:** Other members assist in meeting a member's power requirements when it has generating units out of service under a mutually arranged schedule.
  - **Unscheduled outage service:** Other members assist in meeting a member's power requirements when one or more of its generating units are out of service unexpectedly.
  - **Deficiency service:** Other members assist in meeting a member's power requirements when it has insufficient owned or purchased installed capacity to meet its load and share of operating reserves.  
*Note:* This service may not be feasible in a region that is facing systematic generating capacity shortages.
  - **Operating reserve service:** When a member purchases operating reserves from other members.
2. How should these services be priced?



## **APPENDIX 3: EXPECTED POWER SECTOR REGULATIONS**

1. Rules on Connection of Power Plants to Power Grids and Interconnection Between Power Grids
2. Rules on Supervision and Inspection of Power Utilization
3. Rules on Compensation for Damage to Home Electrical Appliances
4. Rules on Issuance of Licenses for Electricity Supply
5. Rules on Management of Synchronized Independent Power Plants
6. Rules on the Administration of Rural Tariffs and Fees
7. Rules on Approval Procedure for Foreign Capital Utilization in the Power Sector
8. Rules on Qualification Control for Power Project Construction
9. Rules Against Unfair Competition during Power Project Construction
10. Implementation Rules of Accounting Standards for the Power Sector
11. Rules on General Terms of Bidding Contracts for Power Construction
12. Rules on Quality Control of Power Engineering
13. Rules on Connection of Wind-Power Plants with the Network
14. Rules on Protection of the Working Rights for Laborers in the Power Sector
15. Rules of Preliminary Design Review and Approval for Power Projects



## **APPENDIX 4: INTERNATIONAL CASE STUDIES IN POWER SECTOR REGULATION**

This appendix contains case studies on power sector regulation in four countries—India (the state of Orissa), the United Kingdom (England and Wales), Colombia, and the United States. The case studies focus on three aspects of regulation:

- The institutional basis of regulation—who regulates, what powers and responsibilities these entities have, and what the process of regulation is.
- The control mechanisms—what the regulatory rules are.
- The interaction between sector structure and regulation—how structure determines what has to be regulated.

### **THE FOUR CASE STUDIES**

England and Wales and Colombia have relatively new regulatory entities. The new English regulatory system was established as one element of a radical power sector reform that combines major restructuring with very significant privatization. In contrast, the Colombian reform has been more gradual. The Colombian case combines some restructuring with incremental privatization. As a consequence, the Colombian regulatory entity regulates both public and private entities. While Colombia has chosen to move slowly, the final structure will be similar to England's: a vertically deintegrated sector that is open, unbundled, and competitive. The Colombian regulatory system, however, is quite different from England's. Colombia has eight national electricity regulators. England has one. In addition, Colombia is unique because three government ministers are formal voting members of the regulatory commission. In other countries, the regulatory entity sometimes reports to a minister, but rarely is the minister a voting member of the commission.

The Orissa reform is a state-level reform that is still in its early stages. It is of particular interest to China because the Orissan government has chosen the single buyer-

single seller model<sup>1</sup> as the near-term trading model for its sectoral structure. This is the structural and trading model that may be most suitable for many parts of China over the next five to ten years (see Chapter 2). Orissa has also chosen to create an independent regulatory commission that bears some resemblance to the US regulatory system. Prior to the reform, regulatory decisions were taken by several state ministries.

Since the US regulatory system has been in existence for more than 70 years, it is the oldest and most fully documented of the four. It is the outgrowth of many separate and sometimes conflicting legal and political decisions. In contrast, the other three countries studied have been able to create new regulatory systems with relatively fewer constraints. Since the United States is a large country, it has to deal with issues of how to split regulatory responsibility between the national and state regulatory entities. The national-provincial division of authority is a major concern in designing any new regulatory system for China (see Chapter 3).

The US case is also of interest to China because the US power sector is in the midst of major structural reform. One major difference is that in the United States these reforms are taking place in a largely privately owned power sector, while in China the reforms are being pursued in a state-owned power sector. Many countries are reluctant to create a US-style regulatory system because they believe it is too slow and too legalistic. The “independence” given to US regulatory commissions is frequently viewed as unfeasible or undesirable in other political systems.

Basic information on each of the regulatory systems is presented in Table A4.1.<sup>2</sup> The usefulness of the case studies requires that they be tied to the discussion, analysis, and recommendations for China that appear in the main body of the report. Therefore, separate sections in italics have been included throughout the appendix that attempt to assess the relevance of different aspects of the foreign regulatory and reform experience to the Chinese context. These sections are designated with the heading “Observations.” Cross-references are also included so that the interested reader can relate the foreign experience to discussion of similar issues and problems in the Chinese power sector.

---

<sup>1</sup> This term may be confusing to some readers. It means that a single buyer is responsible for acquiring generating supplies from existing and new generators. Ideally, in the case of new generators, there will be many independent power producers (IPPs) competing for the right to sell power to the single buyer. The single buyer, in turn, is the single wholesale seller in the specified geographic area to affiliated and nonaffiliated distribution entities. The single buyer-single seller model is described more fully in Chapter 2.

<sup>2</sup> More detailed information on the sector's structure and regulatory systems for the power systems of 18 countries can be found in a recently published World Bank report: Philip Gray, (ed.), *Industry Structure and Regulation in Infrastructure: A Cross-Country Survey*, Occasional Paper No. 25, Private Sector Development Department, May 1996. This report contains similar information for the gas, railways, telecommunications, and water and sewage sectors.

**TABLE A4.1: KEY CHARACTERISTICS OF REGULATORY ENTITIES**

	India (Orissa)	England and Wales	Colombia	United States (Federal)
When entity was created	1996	1989	1992	1920
Number of members	Three.	One (Director-General).	Eight (five experts plus three ministers)	Five (no more than three from the same political party).
Term of office	Five years (not renewable).	Five years (renewable).	Four years.	Five years (renewable).
Approved salary of decisionmaker(s)	Equal or greater to salaries of specified state government officials.	£ 94,280 (1994).	Comparable to salaries of high government officials (about US\$60,000)	Established by presidential order for classes of executive employees. Chairman—\$123,100. Members—\$115,700.
Requirements for appointment	One commissioner who is an electrical engineer; one commissioner with a background in law, economics, accounting, administration, or finance	No specific requirements.	At least six years of energy sector experience plus degree in engineering, economics, business administration. Excludes lawyers	None.
Appointment	State government based on recommendations of a selection committee	Appointed by Secretary of State for Trade and Industry	Appointed by President	Appointed by President, subject to Senate approval
Grounds for removal	High standard (high court judge must issue a written opinion on allegations). However, state government can ignore the judge's opinion.	High standard (incapacity or misbehavior).	High standard.	Removal by president for inefficiency, neglect of duty, or malfeasance in office.
Source of funding	Fees paid by regulated entities to the state government. Actual annual appropriations determined by state legislature assembly.	Fees and levies subject to Parliamentary oversight.	Fees paid by regulated entities subject to a ceiling of 1% of the sector's operating costs.	Fees paid by regulated entities but with annual appropriations determined by the Congress.
Organizational structure	Unknown at this time.	Director-General's office. Administration. Consumer Affairs. Legal. Public Affairs. Supply Competition. Technical. Metering. Regional offices.	Five experts responsible for supervision of a technical staff of 20. Executive directorship rotated among experts. Offices of economics, law, and engineering. Extensive use of external consultants.	Professional staff appointed by Chairman. Offices of accounting, external affairs, executive director, economic policy, electric power regulation, secretary, general counsel, hydro-power licensing, administrative law and pipeline regulation.
Sectors regulated	Electricity.	Electricity.	Electricity and gas.	Electricity, gas, and oil transportation (limited to wholesale markets and transportation). Hydroelectric licensing.

	India (Orissa)	England and Wales	Colombia	United States (Federal)
Entities regulated	Public and private transmission and distribution companies. Bulk supplier (e.g., single buyer-single seller). No direct regulation of generation.	All private companies engaged in electricity generation, transmission, and distribution	Public and private transmission and distribution companies and the generation pool.	Mostly private entities engaged in generation, transmission, distribution.
Principal responsibilities	Set tariffs. Promote competition and commercialization. Issue licenses. Enforce standards.	Ensure demand is met. Promote competition in operation and supply. Ensure licensees can finance functions (some responsibilities shared with secretary of state).	Promote competition. Set tariffs. Guarantee transmission access (enforcement is performed by a separate government entity).	Set tariffs Oversee corporate structure, issuances of securities. Enforcement.
Decisionmaking process	Being developed for review by the state legislature. Law requires transparency.	No specific requirements Consultations papers usually produced. Workshops and conferences on specific topics are sometimes convened	Commission issues resolutions. Informal consultations with industry. Informal notice to advisors to ministers before formal submission to Colombia. Process is not specified in the law.	Highly formalized. High degree of public participation. Written decisions with full explanation.
Appeals	Internal appeals and appeals to state high court.	Appeals to monopolies and mergers. Commission (antitrust authority).	Internal appeals and appeals to State Council (an administrative court with jurisdiction over government entities). Appeals limited to review of compliance with process.	Internal appeals and appeals to court.
Price control mechanisms	Market-based for generation. Cost of service combined with performance incentives (to be decided).	Indexed price caps for distribution and transmission. Competition in generation (subject to a temporary price cap). Competition in supply to all customers by 1998.	For transmission, indexed price caps based on expected cost of expansion. For distribution, indexed price caps based on hypothetical efficient expansion plan. Deregulated for competitive generation markets. Competition in supply to customers greater than 2 MW.	Cost of service. Price caps. Market-based for competitive power markets.

Source: Study Team.

## MEANING OF REGULATION

Regulation simply means government control of an enterprise's activities. When a government regulates, it imposes direct and indirect controls on the actions of state-owned and nonstate-owned enterprises in a particular sector. Regulation is typically conducted through rules. The rules are found in laws, decrees, and guidelines. As important as the actual rules are the procedures used to interpret, apply, monitor, and enforce them.

In the electricity sector, the rules of regulation could be applied to any of the following activities: generation, transmission, dispatch, pooling, and retailing. The fact that each of these activities could be regulated does not mean that they should be regulated. Perhaps the single most common mistake in new regulatory systems is to regulate too much. Countries that are moving away from a centrally planned economy are especially susceptible to this tendency. It has been suggested that the fundamental requirement for successful regulatory reform is to break away from the “overregulation habit.”

Regulation can be economic, technical, or environmental. The focus of this appendix is on economic and technical regulation. Economic regulation is primarily concerned with the pricing of power (both level and structure), the financial condition of power enterprises, their operating and investment decisions and the necessary conditions for competitive competition. Technical regulation focuses on operational and engineering aspects of an enterprise or grid operation. It is concerned with the reliability and quality of the electricity supplied. In this report, the term *technical regulation* is also used to include quality of customer service, which encompasses the accuracy of meter reading and billing, responsiveness to customer complaints, and so forth.

### THE “INDEPENDENCE” QUESTION<sup>3</sup>

In creating a new regulatory system, the question that always generates the most controversy is: Should the regulatory entity be independent of the government? In many countries, when this question is first raised, most high-level government officials react to the notion of an independent regulatory entity with dismay and disbelief. The negative reaction is the result, in part, of three misunderstandings.

The first comes from the fact that the word *independence* is confusing. No regulatory entity can be truly independent. Even if regulatory entity is a nonministerial commission or office, it is still a creature of government because it was created by government. What is really meant is that the regulatory entity does not have to get the approval of the premier or other high-level political authorities to raise (or lower) tariffs or to make other major decisions. A conscious political decision has been made to give the regulator autonomy in tariff changes and other decisions. Independence does **not** mean the absence of accountability. There is still accountability, but it is to the tariff standards in the law, not to the minister.

A second misunderstanding is the belief that the regulatory entity must be given complete authority over all policy decisions that affect the power sector. This is a

---

<sup>3</sup> This discussion is drawn from Bernard Tenenbaum, “Regulation: What the Prime Minister Needs to Know,” *The Electricity Journal*, March 1996, pp. 28–35.

---

mistaken presumption. In countries with independent regulatory entities, executive departments or ministries retain control over many fundamental policy decisions affecting the sector. The basic division is between policy development by the ministry and policy implementation by the regulatory entity (see Box 3.1, Responsibilities Not Assigned to Regulatory Institutions).

The third and perhaps most important misunderstanding arises from confusion about the reason for independence. Independence is not an end in itself, but a means to an end. What ultimately matters is not whether the regulatory entity is independent, but whether the government can give a credible commitment to investors and consumers. Investors, both domestic and foreign, need assurances that their investment will not disappear through direct expropriation or through many small regulatory actions that add up to de facto expropriation. In other words, they need to be convinced that they will recover reasonable costs and earn a profit commensurate with the risk that they take (Article 36 of the Electric Power Law). Consumers need to be convinced that the government will not leave them unprotected from monopoly prices charged by entities that have been given a legal monopoly by the government.

If a government can give credible commitments without an independent regulatory entity, there is no real need for independence. But in most countries, high-level government officials will try to keep tariffs low when they have direct or hidden, indirect control over tariffs. Thus, the basic rationale for creating an independent regulatory entity is that such an entity may be better able to give a commitment that domestic and foreign investors can count on.

### **SECTOR STRUCTURE AND REGULATION**

While this appendix (and the main report) focus on regulation, there is also a brief discussion of sector structure in each case study. This is done for several reasons. First, sector structure is the single most important determinant of what should and should not be regulated. Second, some sector structures are easier to regulate than others. Therefore, when the government is considering possible new sector structures, it is important to recognize that certain structures are more susceptible to economic abuses than others. Third, if the power sector is evolving from one structure to another, regulatory actions can help or hinder the transition.

---

## CASE STUDY No. 1—THE STATE OF ORISSA IN INDIA

### Background

#### Sector Structure and Reforms

Orissa is a poor state in south central India with 39 million people. Until recently, electricity service to about 1.3 million customers was provided by the Orissa State Electricity Board (OSEB), a vertically integrated power enterprise that was owned and controlled by the state government.<sup>4</sup> In 1993, the state government decided to initiate a radical reform program involving a combination of restructuring, privatization, and independent regulation.

This decision was motivated by the poor technical and economic performance of OSEB. OSEB was experiencing losses of 40 to 50 percent, which means, in effect, that it was billing 1 kWh for every 2 kWh that it was generating or purchasing. The losses were caused by poor operation and theft. Blackouts were commonplace. The quality of the electricity was poor with significant fluctuations in frequency and voltage. The tariffs were too low to produce revenues that would allow OSEB to recover its operating and capital costs. In addition, the managers of OSEB complained that they couldn't properly manage because political authorities interfered in many operating and investment decisions. OSEB's poor financial performance meant that the state government had to provide significant subsidies to OSEB. The decision to undertake a radical reform was triggered in part by the realization that the state government simply did not have the financial capability to finance the construction of new generating plants by OSEB.

Orissa has chosen to restructure its power sector along the lines of the single buyer-single seller model that is recommended for China (see Chapter 2). The Grid Corporation of Orissa (GRIDCO), a state-owned corporation, was established in 1995. All of OSEB's transmission and distribution assets were transferred to the Grid Corporation on April 1, 1996. The Grid Corporation will initially own and operate the transmission and distribution systems and perform the dispatch function. It will act as the single wholesale buyer of power from existing and new generating facilities.

*Observations: Orissa has chosen to combine transmission ownership, dispatch, and the purchasing agency or single buyer in one company.*

*Variations of the purchasing agency model have been adopted or are seriously being considered for adoption in Northern Ireland, Portugal,*

---

<sup>4</sup> The state electricity boards (SEBs) in India are somewhat similar to the provincial bureaus in China. However, one very important difference is that an SEB's assets are totally owned by the state government, which is roughly at the same administrative level as a provincial government in China. Thus, the current problem in China of determining which level of government owns power sector assets is not a problem in India.

*Poland, Thailand, and Indonesia. The movement from a single buyer-single seller to multiple buyers-multiple sellers can be facilitated in the following ways:*

- *Two-part (kW and kWh) tariffs should be introduced for sales by generators to the single buyer. Payment of the kW component should be keyed to the availability of the unit for production, not its actual production.*
- *The single buyer should charge affiliated and nonaffiliated distribution entities separately for the following services: generation, transmission use of system, and grid support services.*
- *Affiliated and nonaffiliated distribution entities should charge separately for distribution use of system services.*
- *Investments need to be made in transmission and distribution. If the transmission and distribution grids are weak and segmented, then it will not be feasible to create a more advanced market that allows multiple buyers and sellers to enter into transactions with each other.*
- *The creation of power pools to facilitate buying and selling of power among single buyers (see Chapter 3). These pools can later be expanded to allow for more buyers and sellers.*

*If a particular region of China succeeds in creating a single buyer structure, one way to move beyond this structure would be to allow distribution entities to purchase a certain percentage of their power needs directly from generators. Similarly, larger industrial customers could be given permission to buy directly from generators if they give their current single seller some specified advance notice or monetary compensation for early termination of their purchase obligation. Most countries that allow distributors and industrial customers to buy directly from generators do not regulate this price. It is freely negotiated as a market-determined price.*

The government's reform strategy is to privatize existing generation with the possible exception of some hydroelectric facilities. All new generating plants will be built by private IPPs on a build, own, and operate basis. The acquisition of all new

generation supplies will be through competitive bidding.<sup>5</sup> It is anticipated that most of the investment funds in these new generating plants will come from foreign companies. Indian law allows foreign companies to have a majority interest.

The Orissa reform also places great emphasis on privatizing the distribution function. The state has been divided into four geographic areas. The state government has announced that its goal is for private companies to own or lease each of these four areas by 2001. At the time of this writing, the state government is expecting to sign a multiyear management contract with BSES, the privately owned company that provides electricity service to Bombay. This management contract is expected to be converted into a full ownership or a long-term lease after several years. For the foreseeable future, any new distribution entity in the state will be required to buy its entire electricity supply from the Grid Corporation.

### **Regulatory Reform**

On April 1, 1996, the Orissa Electricity Regulatory Commission was established under requirements specified in the Orissa Electricity Reform Act. The three commissioners have been selected. This is the first independent electricity regulatory authority in India. It is **not** a division or office within an existing ministry. The law sets forth the commission's responsibilities and obligations in considerable detail. The new commissioners and their senior staff are receiving training and technical assistance through funding from the World Bank and the British Overseas Development Agency.

Under the Indian constitution, electricity is a "concurrent" subject. This means that regulatory responsibility for the power sector is divided between the national and state governments. This is different from China where all political authority is initially vested in the central government and then may be delegated to lower levels of government by the State Council. Since two levels of government are jointly responsible for regulating the sector in India, the Indian constitution required Orissa to receive the approval of the central government for its new law. The fact that Orissa has received central government approval to establish a particular type of regulatory system does **not** mean that other Indian states are now required to adopt the Orissa regulatory system. Other Indian states have the right to create different regulatory systems if they can get the approval of the Indian central government.

---

<sup>5</sup> Until mid-1995, long-term purchases from IPPs were generally acquired through a noncompetitive procurement process. India's experience with private power has been similar to China's—many memoranda of understandings have been signed, but few projects have come to fruition.

---

## Issues and Problems

Since the Orissa reform is still in its early stages, it is premature to make an assessment. However, there are certain issues relating to the design of the regulatory system and the general reform process that should be highlighted because they could arise in China.

### Conflict of Interest Standards for the Commission

In writing the new law, an important objective of the Orissa government was that the general public should have confidence that the regulatory commission will make fair and objective decisions. If the public believes that a regulatory commissioner is favoring the interests of a power enterprise, the commission will soon lose its political legitimacy. The new law in Orissa imposes very strict restrictions on the commissioners. Article 5 of the law prohibits a commissioner or any relative from having employment and financial interests in any company that the commission regulates, as well as in companies that provide goods and services to the regulated companies.

*Observations: Many countries impose restrictions on commissioners and senior commission staff to reduce the likelihood of favoritism and corruption. Typically, these restrictions take the form of prohibitions on financial and employment ties to companies that the commission is responsible for regulating. These restrictions usually apply to the person who is working for the commission, as well as to his or her immediate family. The restrictions are in effect while the person is working for the commission and for some specified period after leaving the commission.*

*What is unusual is about the Orissa law is that the restrictions are absolute and permanent. This means, in effect, that anyone who serves as a commissioner in Orissa will be not be allowed to work in the electricity sector anywhere in India after he or she leaves the commission. This is much stricter than the conflict of interest provisions found in other countries. For example, in the United States commissioners and senior staff are typically prohibited from having any financial interests in the companies that they regulate. Also, they are usually not allowed to work or consult for these companies for several years after leaving the commission. In contrast, the Orissa law imposes a lifetime prohibition.*

*The danger of the Orissa approach is that it may greatly reduce the pool of people who would be interested in working for the commission. For example, a young Indian electrical engineer will understandably be reluctant to work for the commission because of the total prohibition on working in the entire Orissa power sector once he leaves the commission. The likely effect of the Orissa law is that it will limit the pool of people*

*who want to work for the commission to older people at the end of their careers, to individuals who have no background in the power sector, or to persons who plan to stay with the commission for their entire working careers. These are undesirable outcomes because it will be difficult to attract knowledgeable and energetic individuals to the commission. In general, it is better to have a “cooling-off period” of several years rather than a lifetime prohibition on future employment or financial interests in the sector.*

### **Openness of the Decisionmaking Process**

The Orissa law places a great deal of emphasis on the transparency of the decisionmaking process. Article 9 of the law requires that the new commission develop written decisionmaking procedures to ensure an open process. The law requires openness in the decisionmaking process as a way to ensure that the commission will be perceived as a legitimate and impartial institution.

The first set of rules and procedures are currently being developed by the new commissioners and outside consultants. They will become a public document when they are given to the Orissa legislature. They will set forth specific requirements, procedures, rights, and obligations for each of the commission's principal areas of regulatory responsibility: licensing, the setting and monitoring of transfers, the monitoring of transfers involving utility assets, ensuring quality of service, and setting the standards for the provision of and abandonment of service by licensees.

The rules are intended to satisfy three (sometimes conflicting) goals:

- To ensure that sufficient information is available so that the commission can make high-quality decisions.
- To ensure sufficient transparency in the commission's decisionmaking processes to guarantee the fairness of the processes.
- To avoid a burdensome and slow decisionmaking process.

*Observations: This last goal is particularly important. Delays in regulatory decisions impose unnecessary costs on the sector. Ultimately, electricity consumers pay for the costs of a slow regulatory process in higher electricity prices. The drafters have tried to create a decisionmaking process that will produce good decisions as quickly as possible. It appears that the new system will take elements and processes from different foreign regulatory systems and adapt them to the unique Indian circumstances. Thus, Orissa's decisionmaking process may*

*provide an alternative to the US system for countries that want transparency in their regulatory system.*

### **Subsidies**

Subsidies are widespread in the Indian electricity sector. Agricultural users generally receive the greatest subsidies. The new law confronts the subsidy issue in a very direct way. Article 12 says that: "The State Government shall be entitled to issue policy directives concerning the subsidies to be allowed for supply of electricity to any class or classes of persons...." The article goes on to state that if the state government wishes to provide a subsidy to a particular class of customers, it must provide the money to pay for the subsidy.

There are two important implications to Article 12. First, it is the state government, not the regulator, that makes the decision about subsidies. This is reasonable because such subsidies represent social policy, and it is not the job of the regulator to make social policy. This is the same approach that is being recommended for China. In Chapter 3, it is recommended that the government have exclusive authority in establishing social policy subject to the limits established in various laws. The regulator does not make social policies, but instead implements them. Second, if the government decides as a matter of social policy that certain groups should be subsidized, the Orissa law requires the government to provide the money to support the subsidies.

This is a very ambitious policy. It remains to be seen whether the Orissa government will be successful in implementing this new subsidy policy.

### **The Vertical Split of Regulatory Authority**

The new law in Orissa specifies certain functions for the new state regulatory entity. However, it does not clearly delineate the division of responsibilities between the new regulatory entity in Orissa and the existing Central Electricity Authority in the national government. Stated differently, the law does not attempt to delineate the division of regulatory responsibilities in a way similar to the recommended division of responsibilities that is presented in this report (see Chapter 3, especially Table 3.1).

In effect, the division of responsibility is done implicitly. Since central government approval was required for the Orissa law, and the law sets forth responsibilities for the new state regulatory authority, the implication is that the central government has agreed to this division of responsibility at least for this one state. The central government could, however, approve a different division of responsibility for other states.

Since the Orissa government needed central government approval for the law, there was an advantage in leaving some vagueness in the division of responsibility.

However, this could create intergovernmental conflicts in the future. This is most likely to happen in two areas: the pricing of power and transmission service for interstate transactions and the review and approval process for new generation supplies. Based on the experience in other large countries, some or all of the following issues may arise:

- Should the Orissa regulatory entity have the right to require that local power companies charge more for power sold to out of state buyers?
- Should the national regulator have responsibility for setting transmission rates for both inter- and intrastate transmission service?
- What should be the nature of the Central Electricity Agency (CEA) (a quasi-regulatory entity in the central government) review of power purchases made by the Grid Corporation of Orissa if the competitive acquisition process has been approved by the Orissa regulatory authority?

---

## CASE STUDY NO. 2—ENGLAND AND WALES

### Background

#### Sector Structure and Reforms

Power sector reform in England and Wales has combined restructuring and privatization. Prior to 1990, England and Wales were served by a vertically integrated state enterprise known as the Central Electricity Generating Board (CEGB). On March 31, 1990, the CEGB went out of existence and was replaced by three generation companies (two fossil fuel and one nuclear), a single grid company, a power pool, and 12 distribution companies (known as regional electricity companies or RECs).

The new power sector is now vertically deintegrated.<sup>6</sup> Electricity is generated from a variety of sources with unrestricted entry into generation if the new generating unit can be financed and can meet environmental standards. There is competition in generation though it is not as competitive as was intended. The competition takes place in several markets: a daily half-hourly spot market (the pool), a long-term market in which buyers and sellers use financial hedging instruments to reduce the risk of price fluctuations in the spot market, and a growing market to serve final consumers. A widely recognized problem is that the spot market has been dominated by the two large generators, PowerGen and National Power. As a consequence, the regulator, who is called the Director-General of Electricity Supply, has encountered problems with collusion in a market that was supposed to be highly competitive. Under a 1994 agreement with the Director-General, these two generating companies agreed to sell 6,000 MW of generating capacity to other nonaffiliated companies. They also agreed to accept a temporary price cap on the prices that they can charge in the pool. It is hoped that the situation will improve over time with the entry of new generators into the market.

Another important feature of the UK system is that a growing number of final customers are able to purchase electricity supply from entities other than their local distribution company. This is known as retail or supply competition. The local distribution company has a monopoly on the transmission of electricity to all customers in its franchised service area, but it does not have the monopoly on the supply or sale of electricity that it transmits. By 1998, every electricity consumer in England and Wales will have the legal right to choose its own electricity supplier. This means that every electricity consumer in England should have the potential to buy from several competing suppliers. Whether this actually happens will depend on the development of a cost-effective metering and settlement system.

---

<sup>6</sup> At the time of this writing, other countries that have similar vertically deintegrated structures are Chile, Argentina, and the State of Victoria in Australia.

**Observations:** The sector structure that was chosen in England and Wales and the sector structure that is recommended for China (see Chapter 2) are very similar. Both would rely on a vertically deintegrated structure with separate entities for generation, transmission, dispatch, and pooling and distribution. However, the fact that the structures are similar does not mean that the trading arrangements will necessarily be the same. The key determinant for trading arrangements are the regulations that determine who can buy from whom in a particular market. In England and Wales, the market in which distribution companies acquire long-term supplies is a market with multiple sellers. In China, the near-term recommendation of this report for the same market is that distribution entities initially be served by a single seller with a possible later transition to multiple sellers. A similar difference exists in the market to serve final customers. In England and Wales, there are many sellers to serve the final customers who are eligible to buy in this market. In China, unless there is a change in recently issued regulations (*Regulations on Supply and Use of Electricity, Article 8, April 17, 1996*), these customers must be served by their local power enterprise.

## Regulatory Reform

Of the four case studies, England and Wales is the only one where there is a single regulator. The Director-General of Electricity Supply runs the Office of Electricity Regulation (OFFER), which was established by the Electricity Act in 1989. The Director-General shares some responsibilities with the Secretary of State for Trade and Industry. For example, they have some degree of joint responsibility over the licenses issued to different power enterprises. The present Director-General, Professor Stephen Littlechild, was reappointed for a second five-year term on May 16, 1994.

**Observations:** The English regulatory system uses lengthy and detailed licenses for power enterprises. The licenses establish the rights and obligations of the enterprise. Most importantly, they specify the tariff regime that will be operative for four or more years. The Director-General can modify license provisions only with the concurrence of the regulated company. If the company disagrees with a modification proposed by the Director-General, he has the option of referring the proposed change to the Monopolies and Mergers Commission (MMC). Sometimes the threat of a possible referral to the MMC will lead to a compromise between the Director-General and the company on a license modification.

Argentina and Peru also use detailed licenses. In one Asian country, it has been recommended that licenses be backstopped by a contract

*containing most of the license provisions that would be signed by a government ministry and the private company that will hold the license. If the private company believes that the government has failed to honor the provisions of the contract (and indirectly the provisions of the license), it will have the right to take the dispute to international arbitration. It is thought that this contract will provide additional assurances that the government will honor its commitments.*

*The US regulatory system generally does not use detailed licenses. However, in the United States private companies can appeal to the courts if they believe that a regulatory decision was arbitrary, unreasonable, and inconsistent with the law.*

In England and Wales, there are also separate individual regulators for gas, telecommunications, and water. This system of separate regulatory entities for each subsector headed by one individual has received considerable public criticism. Some have argued that the present system leads to inconsistent regulatory decisions, fails to take account of the linkages between related sectors, such as electricity and gas, and results in regulatory "styles" that are too closely tied to the personality of the person who is the Director-General any given time. One proposed reform that has received considerable attention would be to combine electricity and gas regulation into a single national energy regulatory entity, which would be organized as a multimember commission. [If adopted, it would resemble the Federal Energy Regulatory Commission (FERC) in the United States and the National Energy Regulatory Commission in Colombia.] A decision on this change will probably not be taken until after the next general election.

***Observations:** This report recommends national and provincial economic regulatory entities for China whose responsibility is limited just to electricity. Since this would be a "new style" regulatory system (see Chapters 3 and 5), it seems reasonable to begin with a regulatory system that is initially limited to electricity. If natural gas becomes more important to the Chinese economy, it would be relatively easy to expand the jurisdiction of the national and provincial electricity regulatory entities to include natural gas.*

OFFER has about 220 employees. Many of these employees monitor the "quality of service" (metering, billing, reliability of supply, responsiveness to customer service requests) for the 12 distribution companies. The distribution companies are required to meet "Guaranteed Standards of Performance" that were established by the Director-General. If they fail to meet these standards, they are required to make payments directly to the affected consumer. Most of this quality of service regulation is performed by

OFFER's regional offices with assistance from consumer committees that exist in each of the regions.

*Observations: The improvement of service quality is a major concern in the Chinese power sector. The new Electric Power Law devotes several sections to quality of service principles (see Articles 29–34). An effective and efficient system to implement these standards is still under consideration in China. One option would be to create a system similar to the English system. The dissatisfied customer must first go to the company. If the customer is still dissatisfied with the company's response, he has the right to go to provincial regulatory entities and consumer councils. Another option would be to adopt an approach that has been developed in the State of Victoria in Australia. Under this system, the regulator establishes quality of service standards for regulated enterprises. If a consumer believes that a company has failed to meet the specified standard, he must first try to get the problem resolved with the company. However, if, after having done this, the consumer is still dissatisfied, he has the right to go to an ombudsman for either mediation or arbitration. The ombudsman's office is funded by the power enterprises, but its procedures and standards are supervised by the state regulator. In a sense, the Australian approach represents a contracting-out of regulation. In this respect, it bears some resemblance to the Bridge of Trust Infrastructure Consulting Company that was established by several Chinese government ministries to facilitate the review and approval process for private investment in new infrastructure projects.*

### **Issues and Problems**

#### **Two Structural Problems**

The UK power sector reform faces two structural problems. One problem is horizontal, and the other is vertical. The horizontal problem is that the government created two large generating companies in the course of privatization. The regulator found that the two companies were able to maintain prices above competitive levels at certain times. The vertical problem is the tendency to try to reintegrate.<sup>7</sup> The generation companies have sought approval to purchase distribution companies. These acquisitions were opposed by the regulator and recently denied by the Secretary of State for Industry and Trade.

---

<sup>7</sup> This is a "problem" only if the government has decided that the likely efficiency benefits of competition in a vertically deintegrated structure outweigh the possible costs of coordinating the operation of separate entities on an interconnected grid. See Chapter 2 for a discussion of the benefits of a deintegrated structure for China.

*Observations:* In the United Kingdom, as in many other countries, the prime minister and parliament make the basic structural and privatization decisions. It is then the job of the regulator to try to promote efficiency and control monopoly power, given the structure that was intentionally or unintentionally created by the government. A similar division of responsibility is recommended in this report (see Chapter 3 and Box 3.1). Nevertheless, it must be recognized that regulation cannot correct for a flawed structure. When the sector structure is flawed (that is, does not support the desired competition), the regulator will often find himself ordering or prohibiting specific pricing or investment actions. The problem is that the regulator can prohibit certain actions, but if the prohibition goes against the player's basic economic incentives, the regulated firm will often pursue a slightly different variant of the behavior until that variant is discovered and prohibited by the regulator. When the regulator finds himself "chasing after conduct," this is usually a sign that there is a problem in the structure.

There seem to be two important lessons that can be derived from the UK experience. The first is that if a government wants competition in generation on an ongoing basis, it must create a sufficient number of competitors when it is selling state assets. If this does not occur, the regulator will waste a lot of time chasing after anticompetitive behavior. The second is that it is better for the buyers of power not to be affiliated with the sellers of power. Similarly, the owner and operator of the transmission grid and pool should not be affiliated with buyers and sellers of power. Some have argued that affiliate abuses can be controlled by requiring that the two affiliates write detailed contracts designed to ensure "arms length" transactions. The problem with this solution is that it presumes that the contract provisions will be diligently enforced by the two affiliated companies. The better approach is to impose cross-ownership restrictions in law or regulations. This has been done in Argentina, Peru, and Colombia.

### The Information Problem

Another difficult area for the UK regulator has been tariff regulation of the 12 distribution companies. Since the companies still have a monopoly over the transmission of electricity at distribution voltages, the prices that they can charge for this service are still regulated. The particular tariff-setting mechanism used by the regulator is called price cap regulation. Every four years the regulator sets an allowed price, which is automatically adjusted according to an indexing formula. The index formula is tied to a measure of inflation combined with the regulator's estimate of the ability of the company to make efficiency improvements. When the UK regulator announced new values for the

price cap formula in 1994, the share prices of the distribution companies rose by significant amounts. As a consequence, the Director-General decided he had been too generous to the companies and that it was necessary to readjust the formula values to produce lower annual values. His decision to impose a larger one-time downward adjustment and lower annual index values produced a major controversy.

**Observations:** *The problem for regulators everywhere is that the companies they regulate always know more than the regulators about the companies' costs, demands, and the potential for efficiency improvements. This is known as the "information asymmetry" problem. Even though the price cap mechanism used by the UK regulator creates strong incentives for companies to operate efficiently, it can lead to high profits and high salaries for company officials if the companies are able to mislead the regulator about their potential for improving productivity.*

*If China were to decide to use price caps to regulate distribution enterprises, it may be wiser to use a hybrid form of price caps that is being recommended by some observers in England and Wales. The hybrid price cap would establish explicit profit sharing between the company and its customers beyond some ceiling profit level. Since this hybrid price cap functions like a tax on profits, it will inevitably reduce the enterprise's incentives to be efficient. However, the advantage of using it, at least for several years, is that it allows the new regulator to become more knowledgeable about the enterprise's costs before moving to a pure (that is, no profit-sharing) price cap.*

*Finally, it should be noted that most regulatory entities find it helpful to use different price control mechanisms in different situations (see Table A4.1, Key Characteristics of Regulatory Entities, Price Control Mechanisms). The US FERC faced some difficulties in its early efforts to introduce competition in generation because of uncertainty about whether the law would allow FERC to approve market-based prices. Therefore, a good strategy is to write the law or regulations that give the regulatory entity flexibility in choosing the price control mechanism that is appropriate to a particular situation. It is, of course, equally important that the terms of the tariff-setting mechanism are honored once they have been established.*

---

## CASE STUDY NO. 3—COLOMBIA

### Sector Structure and Reforms

The Colombian electric power sector currently has sufficient generation to meet demand, although periodic shortages occur due to drought. About 78 percent of Colombia's 10,000 MW of installed capacity is hydroelectric. To reduce its dependence on hydroelectric facilities, the government is encouraging the development of new power plants using established coal and a newly discovered gas reserve. Like many countries, Colombia's electricity rates have been kept low for political reasons. As a consequence, many state enterprises have not been able to recover their costs. The tariff structure also supports cross-subsidies. Before the sector reform was implemented, it was estimated that some industrial customers paid two times their long-run marginal cost in order to provide subsidies to residential customers. Losses are on the order of 20 percent.

Until fairly recently, government enterprises have completely dominated the sector. Large municipal companies operate in Bogotá, Cali, and Medellín. The government and national government institutions, such as CORELCA, own and control generation and distribution assets through their ownership interests in more than 20 regional companies. Another state-owned company, ISA, owns and operates about 70 percent of the national interconnected grid. A former government official described the basic problems of the sector in the following way:

There were no markets, prices were fixed and did not reflect cost, production and investment decisions were centrally planned, and the relationships between firms and customers were not market or contractually oriented.<sup>8</sup>

Colombia has undertaken significant structural reforms in the last several years. An important goal of the 1994 Public Service Law and the 1994 Electricity Law was to achieve an open, unbundled, and competitive electricity sector. The Electricity Law promotes competition in generation and third-party access in transmission. It allows customers with demands above 2 MW to buy directly from generators. The law also prohibits new distribution companies from owning generation, although it appears that the Minister of Mines and Energy has given at least one exception to this prohibition.

Unlike England, Argentina, and Chile, the Colombian power reform is a more gradual process. However, the final reform goal is similar in all these countries—a deintegrated, competitive, and largely privately owned power sector. To facilitate the move toward private ownership, the Public Service Law encourages commercialization and corporatization of publicly owned power enterprises. For example, the law contains

---

<sup>8</sup> Evamaria Uribe, "Regulation in Electricity and Gas: The Experience in Colombia," unpublished paper, 1996.

provisions that create a new corporate form for public enterprises that allows them to issue shares, impose restrictions on political control of the Board of Directors of local public utilities, and establish private contracting and commercial procurement practices for public and private utilities.

To date, there has been very little privatization of existing government-owned assets. At present, about 3 percent of Colombia's installed generating capacity is privately owned. Colombia, like many countries, initially limited private sector involvement to the construction and operation of new generating plants. The Colombian government has offered guarantees for two private power projects. Under these guarantees, the government has agreed to pay for the contracted energy and capacity if the buyer, which is a government-owned company, fails to meet its purchase obligation. The government has stated that it will not offer any further guarantees because of the fiscal risks that they create for the government. Recently, it was reported that the government will attempt to privatize seven existing generating plants. There are also reports that the municipal utility serving Bogotá, a vertically integrated enterprise, may sell its generating plants to private investors and unbundle its remaining system.

### **Regulation**

Colombia's structural reform effort has been accompanied by regulatory reform. Regulatory reform has involved primarily the establishment of the National Energy Regulatory Commission, which was created by decree in 1992 and by law in 1994. The commission has responsibility for the electricity and natural gas sectors. Similar regulatory commissions were also established in telecommunication and water and sewage.

The National Energy Regulatory Commission has jurisdiction over both public and private power enterprises. It has the power to stop anticompetitive practices, establish tariffs for regulated services, develop rules for a national pool, and set requirements for gaining access to the national grid.

### **Composition, Voting, and Staffing**

The National Energy Regulatory Commission is composed of eight members. Five members are full-time regulators who are described as "experts." The remaining three members are the Ministers of Finance, Planning, and Mines and Energy. The President of the National Energy Regulatory Commission is also the Minister of Mines and Energy. The Minister and the Executive Director certify the decisions of the commission. Under Colombian law, the Minister is legally not allowed to withhold his signature from a commission decision even if he disagrees with it. The Executive Director of the commission is responsible for developing the agenda of commission meetings and determining the issues that will be dealt with. That position is rotated among the five full-time members. It has been suggested that the Executive Director

should be required to share his agenda and planning responsibilities with the other four experts who form a committee that is specified in the law.

**Observations:** *The Colombian regulatory system is unusual in that government ministers are formally members of the National Energy Regulatory Commission. The composition of the commission represents a political compromise. The ministers' presence, however, presents a significant risk to effective regulation. For example, as a result of the ministers' voting rights, the National Energy Regulatory Commission delayed the implementation of a significant tariff increase that seemed to be required by the new law.*

*In another instance, however, the ministers accelerated the introduction of direct competition for industrial customers. This had the effect of reducing the cross-subsidies available to residential customers. While the ministers may have political concerns, their required participation on the commission may educate them as to the economic consequences of their political concerns. In this respect, the Colombian approach is probably superior to the alternative of a commission reporting to a minister who does not need to hear the discussions that led to a particular decision.*

Other than the ministers who serve as members, the other five members are appointed by the President for four-year, staggered terms, and they earn salaries that are comparable to salaries of high-level government officials. In practice, the Minister of Mines and Energy makes suggestions to the President on whom should be selected. Similarly, although commissioners' terms are theoretically fixed, the ministers influence changes in the commission's composition. The expert members must have at least six years of experience in the electric sector plus a degree in engineering, economics, business administration, or related fields. Lawyers are excluded from membership on the commission. This is an unusual approach. Most other regulatory commissions around the world encourage or require that at least one commissioner be a lawyer.

**Observations:** *A former Colombian regulator has observed that a good engineer or a trained macroeconomist does not necessarily make a good regulator. In addition to having professional qualifications, the regulator must be able to make controversial and often politically unpopular decisions. A professional degree is no guarantee that a commissioner will have the temperament or courage to make such decisions.*

*For the National Energy Regulatory Commission to take action, at least six members must be present to vote. Action is based on majority rule. At present, an amendment is being considered that would give the Minister of Mines and Energy formal veto power with respect to the commission's*

*decisions. If the Mines and Energy Minister gets such power, it is likely that the two remaining ministers will be less interested in continuing to serve on the commission.*

During its start-up period, the National Energy Regulatory Commission has relied heavily on outside consultants. Their services have been financed by the World Bank and the Inter-American Development Bank. Commentators have suggested that the National Energy Regulatory Commission be expressly exempted from public procurement rules with respect to the hiring of consultants to give the commission flexibility. However, it has also been suggested that procedures be developed that would limit the subsequent employment of consultants for a period of one year, so that Colombia is not in the position of training consultants who then use their “inside knowledge” for the benefit of the regulated entities. A one-year prohibition on employment by regulated entities already exists for the commissioners.

### Degree of Independence

The National Energy Regulatory Commission is not an independent commission because of the ministers’ presence on the commission. Furthermore, according to the Colombian constitution, the commission’s authority to regulate must be established by a Presidential decree. If a future Colombian President is displeased with the commission’s actions, the President can eliminate the commission’s powers with another decree.

*Observations: The National Energy Regulatory Commission’s lack of independence has already been felt in the commission’s delay in implementing decisions that are politically unpopular, such as decisions regarding rate increases for government enterprises and rationalizing Colombia’s subsidy program. Regulatory independence is stronger in the United States, Orissa, and England because the regulatory entities derive their authority from laws rather than decrees, and ministers are not members of the regulatory entity. Independent regulatory commissions are not in the Latin American legal and political tradition. The norm throughout Latin America is for the sectoral minister to have full responsibility for issuing and enforcing all regulations that affect the sector.*

Another unusual feature of the Colombian system is that the commission does **not** enforce its own decisions. The Colombian constitution provides for the supervision and control function to be delegated to the Superintendent of Public Services, who reports directly to the President. In effect, the Superintendent’s role is to ensure compliance with laws and regulations.

*Observations: The superintendent’s supervisory role provides a potentially significant check on the National Energy Regulatory*

*Commission. Because the Superintendent must ensure compliance with regulations, the Superintendent has an opportunity to minimize or eliminate a regulation's impact if the Superintendent disagrees with the commission's decisions. In the United States, England, and Orissa, the regulatory entities have direct control over the enforcement of their regulatory decisions. In general, it is not recommended that the regulatory function be separated from the monitoring and enforcement function, since such separation limits the regulator's independence and ultimately might limit the effectiveness of regulation. In the Colombian context, the creation of a separate superintendent seems to have been influenced by earlier abuses of a banking regulator who had both regulatory and enforcement powers.*

The National Energy Regulatory Commission's funds are to be paid by regulated entities, subject to a ceiling of 1 percent of the sector's operating costs. However, the commission's budget of request must be reviewed and approved by the Minister of Mines and Energy and the Finance Minister. In addition, actual disbursement of funds is done through the Ministry of Mines and Energy, so the commission is potentially vulnerable to a minister who might be opposed to its policies.

### **Regulation of Government-Owned Enterprises**

The National Energy Regulatory Commission is authorized to regulate monopolies, whether government-owned or privately owned. Some commentators suggest that Colombia will not achieve competition until full privatization because, even as reformed under the Public Service Law, government-owned enterprises are reluctant to compete against other government-owned enterprises for customers. They are also still vulnerable to "capture" by local political officials. A former Colombian regulator has argued that the commercialization and corporatization of state-owned enterprises is unlikely to be sustainable unless the enterprises are privatized:

Despite the legal reform to favor commercial [state-owned enterprises], their managerial and commercial policies remain unstable and heavily dependent on the short term political realities of the national and local governments and elected officials.<sup>9</sup>

**Observations:** *Effective regulation of government enterprises is much more difficult than regulation of private enterprises. The key is to require the government enterprise to act on a commercial basis while structuring the enterprise's internal organization so that management decisions are*

---

<sup>9</sup> Evamaria Uribe, "Regulation in Electricity and Gas: The Experience in Colombia," unpublished paper, 1996, p. 12.

*made independently from political influence. For example, managers could be selected from the industry and be given incentives that reflect the commercial performance of the enterprise. At a minimum, sector ministers and local political authorities should not be responsible for directing the enterprise's decisions or board. This issue is important to China because China will continue to have significant government ownership of electric power facilities.*

### **Process, Decisions, and Appeals**

Although not required by law, Colombia has introduced an informal consultative process that involves an opportunity for comment by the industry, consumers, and other interested parties. The consultation takes place through private meetings between the commissioners and different enterprises. These private consultations are viewed as having enhanced the effectiveness of regulation, both by improving the quality of regulatory decisions and therefore by adding to the acceptability of regulatory decisions. However, this practice is susceptible to the criticism that it can serve as a mechanism for giving "special deals."

It has been recommended that Colombia expressly adopt a consultative process that would include a written proposal of regulatory action, written comments, and an opportunity for the regulator to meet separately with different parties. However, it has also been recommended that this consultative process not be employed for tariff decisions because, given the politically charged nature of those decisions, the consultative process might be overwhelming and interfere with the regulator's ability to reach a decision.

The National Energy Regulatory Commission's decisions are issued in writing, with references to the laws, decrees, and regulations that provide the basis for regulatory action. The decisions are published in the official diary, which provides notice of regulatory action.

Regulatory decisions may be appealed to the commission after filing a notice of intent to appeal. The commission then rules on the appeal. On legal matters, regulatory decisions can be appealed to the State Council, which is an administrative court. On a day-to-day basis, the Executive Director may issue clarifications of existing policies.

### **Pricing Mechanism**

The National Energy Regulatory Commission regulates prices only in "regulated markets." For example, the commission does not regulate prices for consumers with loads of 2 MW or more. Those customers are allowed to purchase directly from any supplier at nonregulated prices. When this was first implemented, the financial condition of distribution companies deteriorated because they had previously used the industrial customers as a source of subsidies for other retail customers. A similar system exists in England, Chile, and Argentina. For regulated markets, distribution companies are

allowed to recover their purchase power costs, transmission costs, and an incremental charge for distribution. The incremental cost of distribution is set using an estimate of the cost of operations of an optimally configured system.

The National Energy Regulatory Commission does not regulate the prices charged by independent power producers (IPPs). To date, most of the sales made by IPPs are sales to existing generation enterprises. These enterprises, in turn, resell the power that they purchase from IPPs in a national pool. If the buyer pays too much, it runs the risk of being unable to resell the power in the pool. Thus, competition in the pool imposes a strong discipline on generators that buy from IPPs.

This discipline is missing when the buyer is a distributor who supplies captive customers. The Colombian commission, like its English counterpart, has legal responsibility to review major power purchases of distribution companies to ensure that there is “economic” purchasing. This can be done by looking at the procurement process, the prices paid, or both. In Argentina, for example, the distribution utilities serving Buenos Aires are allowed to pass through the power prices observed in the spot market. Another alternative would be to establish a benchmark using prices paid in long-term contracts. The Colombian commission has not yet made a decision on the method(s) it will use.

## **CASE STUDY No. 4—UNITED STATES**

### **Sector Structure and Reforms**

#### **Background**

The US electric power industry is characterized by extensive interconnections among utilities and regions and by a diverse generation mix within and between regions. Both of these characteristics enhance overall reliability. With rare exceptions, generation is sufficient to meet demand, and wire services are available to bring power to every customer seeking service. Outages are usually associated with weather-related damage to distribution systems. Enhancing economic efficiency while maintaining reliability is the key concern.

Electric service in the United States is provided by numerous types of enterprises. Many privately owned enterprises are vertically integrated, that is, engaged in generation, transmission and distribution. Other enterprises are engaged in generation and transmission. Still others are engaged only in distribution. A growing number of enterprises, IPPs, are engaged only in generation. Finally, a small but growing number of enterprises act as marketers or brokers.

About 75 percent of the US electricity sector is privately owned. Power purchases and other investments by privately owned enterprises are neither publicly financed nor guaranteed by the government. Power sector enterprises are allowed to go bankrupt if they are unable to finance their activities, for example, due to inefficient management or bad investment decisions.

The remaining power sector enterprises are publicly owned or publicly funded. Public ownership and public funding occur at both the federal and local levels. Many publicly owned enterprises are small distribution companies owned by municipalities. Many publicly funded enterprises are customer-owned cooperatives that serve rural areas.

#### **Increased Competition and Reform**

At present, the US electric utility industry is characterized by little or no direct competition to serve consumers, that is, retail customers. Most utilities that serve retail customers, including both private and public enterprises, hold exclusive franchises to serve retail customers within stated service territories.

With respect to interutility, that is, wholesale services, competition has been constrained even though no laws or regulations prohibit competition. For example, unlike the situation with retail customers, there are no exclusive franchises to serve at the wholesale level. Rather, wholesale competition has been constrained by the following:

- Power supply contracts that require wholesale customers to purchase from only one supplier (“full requirements contracts”).
- Wholesale customers’ limited ability to obtain transmission services to reach alternative suppliers.

These indications of monopoly power have been tolerated because the rates for monopoly services have been regulated. In addition, many utilities are members of power pools, which provide for the coordination of interutility services and thus can enhance economic efficiency much like an open, competitive market.

*Observations: The foregoing arrangements have supported the extensive growth of the electric utility industry over the last century, which in turn has supported extensive economic development in the United States. These arrangements may not, however, be appropriate to address the challenges of the next century, such as the need for energy costs that support the competitiveness of US industries in international markets.*

*For China, which needs substantial new investment in the power sector, the challenge is to attain electric services that are sufficient to support economic growth while, at the same time, maximizing economic efficiency. To meet both of these challenges, the recommendations for China’s industry structure for the intermediate term focus on a single buyer-single seller model, which incorporates elements of both competition and exclusivity (see Chapter 2).*

In the last 20 years, competitive pressure in the US electric industry has increased tremendously. Two factors have contributed to this increase. First, an overall decrease in load growth has left many utilities with excess capacity, encouraging those utilities to look for market opportunities to sell that capacity. Second, the number of privately owned IPPs has increased as a result of technological advances and federal legislation, enacted in 1978, that entitles IPPs to sell their output. These IPPs compete with traditional utilities in wholesale markets. Existing laws, such as state laws granting exclusive franchises, have stemmed, but not stopped, the tide of competitive pressure.

Lawmakers and regulators have played a critical role in the development of competition in the US electric power sector. As suggested above, the number of IPPs has increased in part as a result of federal legislation that required traditional utilities to buy the output of certain types of IPPs at specified prices. Other critical federal legislation was enacted in 1992, to the effect that competing suppliers may obtain access to transmission services.

Changes in US laws and regulations have focused on rights and obligations to provide service rather than on industry restructuring per se (for example, they have not

compelled disaggregation of vertically integrated utilities or sales of government-owned facilities). The government's ability to mandate restructuring is limited by the fact that 75 percent of the US electricity sector is privately owned. The divestiture of assets held by private enterprises cannot be ordered simply to accomplish a desired industry structure. For example, in the 1980s, the US government ordered the divestiture of assets held by privately owned telecommunications companies only after extensive findings of anticompetitive activities. Another factor is that the government often must compensate private investors for government actions that reduce the value of their property.

Lawmakers and regulators are currently undertaking or considering further legal and regulatory changes designed to maximize the benefits of competition while maintaining quality of service. For example, several of the 50 states are experimenting with or exploring the possibility of retail competition, which would separate the provision of wire services from power supply to retail customers. As another example, federal regulators, within the last few months, have required transmitting utilities to provide nondiscriminatory transmission services to all wholesale customers requesting service.

*Observations: One of the great challenges of the US reform effort is how to achieve increased competition while not penalizing utilities for expectations that were legitimately held under the existing legal and regulatory regime. It is estimated that utilities have undertaken billions of dollars in investments with the expectation of providing service under exclusive franchises or requirements contracts—investments that are at risk in a competitive environment. This is referred to as the “stranded cost” issue.*

*China is faced with a different set of transition problems, such as the problems posed by rate guarantees to existing generators. To provide stability during the reform process, legal rights, once created, should be respected in the reform process.*

## Regulation

### Who Is Regulated

Most private power sector enterprises are regulated, although the nature and degree of regulation varies depending on the enterprise's activities. For example, vertically integrated utilities tend to be subject to comprehensive regulation of their rates, mergers, and acquisitions of facilities. IPPs tend to be subject to much less onerous regulation.

Some public power sector enterprises are regulated; some are not. Unregulated public enterprises tend to be either public enterprises that provide direct service to

---

consumers, such as municipal distribution utilities, or public enterprises that provide service to other public enterprises, such as generation and transmission cooperatives.

In the case of regulated public enterprises, the extent and nature of regulation differ significantly from regulation of private enterprises. For example, regulated public enterprises tend to have broad discretion in developing their rates, subject to limited review of whether the rates are consistent with standards established by law. Publicly owned and publicly funded utilities also enjoy other preferential treatment, such as subsidies and tax exemptions that arguably give publicly owned utilities a competitive advantage over privately owned, tax-paying utilities.

*Observations: The fact that public and private utilities are subject to different regulatory treatment has become subject to increased scrutiny as the legal reform effort has gained momentum. Different regulatory treatment is inconsistent with the level playing field that is necessary for a competitive market. For China, where the government has been directly involved in the management of sector enterprises, the need for uniform regulatory treatment of both public and private enterprises is even more profound.*

### **Division of Federal and State Authority**

Both the federal and state governments participate in regulation of privately owned utilities. Federal and state regulatory authority is divided according to the nature of the activity being regulated. As a result, a single utility may be subject to both federal and state regulation.

Until recently, it has been generally true that the states have regulated services to consumers, while the federal government has regulated interutility transactions. This division reflects the division of authority within the US legal system at large, which leaves local matters to state jurisdiction and interstate matters to federal jurisdiction.

This division of federal and state regulatory authority may be changing. The federal regulator, FERC, recently asserted authority to regulate the rates, terms, and conditions of service for transmission services to retail customers, on the grounds that the rates, terms, and conditions for using the nation's transmission systems affect federal interests regardless of whether the recipient of the power is a wholesale customer or retail consumer. That assertion of authority is now being appealed.

A very important issue for the courts, one that regularly arises, is whether an activity is subject to federal regulation, state regulation, or both. For example, even though it is clear that FERC may regulate "transmission" and that the states may regulate "distribution," numerous court decisions over the years have attempted to determine whether a particular activity constitutes "transmission" or "distribution." As this example

suggests, the lack of specificity in the laws distinguishing between federal and state jurisdiction contributes to the need to regularly address jurisdictional questions.

*Observations:* A different type of dual regulatory scheme has been proposed for China. As with the US model, the goal is to have the central regulator oversee activities that would affect more than one province, while having the provincial regulators oversee activities that affect only that province. For China, however, very specific proposals have been made on which entities and activities would be subject to central versus provincial regulation (see Table 3.1). As a result of this specificity, the dual regulatory scheme proposed for China is far less likely than the US model to result in confusion over the appropriate role of central and provincial regulators.

State regulators' commissions are autonomous institutions, operating independently from federal control. State regulators derive their authority from state laws and state constitutions, not federal laws or the federal constitution. The federal congress may decide that a particular matter should be left to federal regulation, in which case state laws that conflict with federal regulation may be invalidated by the courts. Otherwise, state laws and state regulatory schemes are not subject to review or approval by any part of the federal government. Similarly, with rare exceptions, the states are not required to implement federal standards in making regulatory decisions.

*Observations:* For China, the relationship between state and federal regulators would be quite different. The provincial regulators would be created by national laws, approved by the National People's Congress, and by regulations issued by the State Council. Moreover, the provincial regulators would be required to implement standards and policies established by the central regulator. Such an approach would be inconsistent with the US constitutional scheme, but may be entirely appropriate in China. In the United States, the federal government can neither create a state regulator nor, in most cases, require state regulators to follow standards and policies established by the federal government. When a matter justifies uniform standards, the federal government directly oversees that matter.

*It is frequently asked why the US constitution leaves significant authority to the states. In the US political system, government institutions that answer more directly to a particular constituency are viewed as having higher legitimacy. A state government is elected by people within that state and therefore answers more directly to that constituency than the federal government might. At the same time, in a federation composed of numerous states, it is viewed as inappropriate for state governments to*

*protect parochial interests at other states' expense, thus requiring that certain decisions be left to the federal government. In the political arena, the emphasis on "states rights" versus "federal interests" swings back and forth over time, enhancing the overall stability of the government.*

### **Scope of Authority**

Both at the federal and state levels, few US regulatory bodies specialize in regulation of the electric utility industry alone. Rather, most regulators are responsible for economic regulation of related industries. For example, FERC regulates both the electric and natural gas industries. State regulators might regulate the electric and natural gas industries, as well as railroads, telecommunications, and water distribution systems.

The bodies that perform rate regulation in the United States tend not to be the same bodies that perform environmental regulation. With respect to rate versus corporate regulation (that is, oversight of ownership structure and securities issuances), the division of authority is not as neat. At the state level, rate regulation is often performed by the same body that performs corporate regulation. At the federal level, FERC performs rate and corporate regulation, while also sharing corporate regulation with the Securities Exchange Commission.

*Observations: The sharing of regulatory responsibility among different regulatory bodies creates the potential for inconsistent results, to the detriment of certainty and stability. At the same time, it may be appropriate to have different regulatory bodies review the same activity if those regulatory bodies have different expertise and are attempting to address different public interest concerns. In the United States, a balance is often struck informally, through the deference of one agency to another.*

*It is recommended that China avoid the problems of shared responsibility by granting economic regulatory authority to only one body at each level of government. This is the rationale for the consolidation of regulatory functions proposed in Stage 2 of the four-stage process recommended in Chapter 6.*

*At the same time, it has been recommended that China's central and provincial regulators focus only on the electric power sector, in light of the high degree of specialization that is required and the sheer magnitude of issues affecting that the electric power that regulators will need to address.*

US regulators usually are assigned very specific tasks, rather than being more generally empowered to promote competition, encourage efficient operation, or the like.

At the same time, the legal standards that regulators are required to follow in performing those tasks may be quite broad, as discussed below.

*Observations: It has been recommended that regulatory bodies in China be assigned specific tasks, rather than general oversight of the industry. Assigning specific tasks to the regulator helps ensure that the regulator does not become directly involved in managing sector activities—a central goal in China. Further, assigning the regulator specific tasks provides greater certainty for regulated entities and investors. (See Chapter 2 and Table 2.1 for a description of specific tasks that would be regulated under the single buyer-single seller model. The tasks that need to be regulated vary with industry structure.)*

State regulators typically are assigned numerous tasks, such as defining service territories, approving the siting of generation and transmission facilities, determining the need for a project, and determining rates. In contrast, except with respect to the licensing of certain hydroelectric facilities, FERC is authorized to carry out only a few regulatory tasks:

- Approve rates for transactions subject to its jurisdiction.
- Oversee sales and mergers of utility facilities.
- Compel interconnections and transmission service, within defined circumstances.

### **Institutional Independence**

US regulators, both at the federal and state levels, have a high degree of independence. As discussed in the body of the report, independence means that the institutional arrangements affecting the regulator (for example, the degree to which the regulator's decisions are subject to review by other government institutions, and degree of control that the regulator has over its budget and staffing) are such that the regulator can reach decisions without review or other influence by political institutions. For the sake of simplicity, this discussion provides details only about the federal regulator, FERC, and those factors that enhance FERC's independence.

FERC is organized under the Department of Energy (DOE), which is comparable to a ministry. Nevertheless, by law, FERC is an independent regulatory commission. In accordance with its status as an independent regulatory commission, FERC's decisions are expressly protected from review by DOE. (As discussed below, FERC's decisions are subject to appeal only to the independent US judiciary.) Further, DOE is required to provide facilities and support to FERC as FERC deems necessary. Part of FERC's role is to offer advice to DOE.

---

FERC is created by and derives its authority from federal legislation, that is, an act of Congress. Due to the nature of the legislative process, FERC's enabling legislation is not changed frequently. This insulates the regulatory process from political influence. Further, FERC may be subjected to congressional inquiries regarding the general direction of FERC's views, but not regarding the outcome of specific proceedings.

FERC is a five-member commission (four members and a chairman). The commission structure reduces the likelihood of capture by political interests.

- The commissioners are appointed by the President, subject to Senate confirmation, for staggered five-year, renewable terms. No more than three commissioners may be from the same political party. By convention, although not by law, the commissioners have some experience in the natural gas or electric industries. A majority of the commissioners tend to be lawyers.<sup>10</sup> Regional representation on the commission is not required by law, although it is common to have at least one member from natural gas-producing states.
- The commissioners may be removed during their terms only by the President for inefficiency, neglect of duty, or malfeasance in office.

Appropriations for FERC are determined annually by Congress as part of the overall congressional budget review process. Although appropriations for FERC are included within appropriations for DOE, DOE's budget proposal to Congress must separately show the amount requested by FERC.

FERC is authorized to impose charges on regulated entities sufficient to meet FERC's operating costs, without regard for appropriations set by Congress. The funds are paid to the US Treasury rather than to FERC.

FERC's chairman is authorized to appoint, determine the organization of, and determine the salaries of FERC's staff. Members of FERC's staff are expressly insulated from DOE's direction in the performance of their functions. FERC may delegate certain decisions to its staff, with opportunity for review by the commission.

FERC is authorized to assess forfeitures and civil penalties (such as fines, but not including imprisonment) for violations of FERC's decisions. FERC's assessments are subject to notice and comment procedures and may be appealed, but are not otherwise subject to approval by other government institutions, thus enhancing FERC's

---

<sup>10</sup> This is also true for state commissions. A survey conducted in the early 1990s found that 121 of 210 state utility commissioners were lawyers. See Charles Stalon, "Recent US Electric Power Reforms," unpublished conference paper, note 42 (Beijing, July 1993).

independence. FERC may seek court orders enjoining violations of FERC's decisions. Criminal penalties for violations of FERC's decisions are established by law.

As the foregoing discussion suggests, although FERC is an independent regulatory commission, FERC is subject to a variety of checks and balances:

- FERC is created by and derives its authority from acts of Congress.
- FERC obtains institutional support from DOE, which is an executive agency.
- FERC is structured as a commission, whose members are appointed by the President, subject to Senate confirmation, and who may be removed by the President.
- FERC's decisions are subject to review by an independent judiciary, rather than by the President, Congress, or any executive department. This means that the President cannot reverse a FERC decision even if he dislikes the decision.

These checks and balances, while perhaps detracting from the overall efficiency of the regulatory process, enhance the public interest by separating regulatory decisions from political influence and, indeed, enable the President and Congress to leave politically unattractive decisions to FERC.

### **Process**

Both state and federal regulators employ formal decisionmaking procedures. For example, FERC is required by law to issue notices announcing that regulatory action has been requested or proposed by FERC. FERC must provide an opportunity for interested parties to comment on the proposed regulatory action. In contested proceedings, FERC may not consult in private with only one party to the proceeding. Nor may FERC consult with other agencies or outside parties without the direct involvement of the parties to the proceeding. In most cases, FERC has discretion to accept comments in writing or orally. A trial type proceeding (with oral cross-examination of witnesses) is required only if a material factual dispute has been raised.

With respect to both state regulators and FERC, most regulatory actions, such as rate increases and changes in ownership of utility assets, are initiated through proposals made by regulated entities. Regulators may, however, initiate action on their own. For example, FERC may initiate investigations of regulated entities or make proposals to issue rules of general applicability. Regulators generally have broad authority to issue rules of general applicability, which have the force of law unless they are determined to be inconsistent with existing law.

**Observations:** The emphasis on procedure in the United States reflects the US legal system's emphasis on the rights of private entities. Formal procedures help ensure that regulators, in exercising their authority to protect the public interest, do not act arbitrarily against private interests. In other words, formal procedures help ensure that the lawful rights of private entities, as well as the public interest, are protected in the regulatory process.

*Arbitrary regulatory action might include the following:*

- *Granting a license to someone who has paid a bribe, thus harming the interests of competing applicants, as well as the public interest.*
- *Deciding upon a low rate of return for a company whose management has political views different from those of the regulator, thus harming that company's interests, as well as the public interest.*

*As these examples suggest, the potential for arbitrary action is especially great when the regulator makes case-by-case decisions affecting individual interests. Thus, US law requires more strict procedural protections when the regulator makes case-by-case decisions, as opposed to when the regulator makes decisions of general applicability.*

*In countries with less emphasis on private interests, there may also be less emphasis on case-by-case decisions in the regulatory process. In these countries, regulation may be viewed primarily as a specialized form of legislation—a vehicle for informed experts to make decisions promoting the public interest. Even under this view of regulation, some procedural protections should be considered to enhance the acceptability and predictability of regulation, particularly if the country wishes to attract private investment.*

## Decisions

In issuing decisions, state and federal regulators must implement standards established by their respective state or federal legislature. At both the state and federal levels, the legislative standards tend to be quite broad. For example, FERC must implement a standard that requires rates to be “just and reasonable.”

**Observations:** Broad legislative standards are usually recommended as a means of enabling the regulator to respond to changing circumstances over time while providing a basis for affected parties to appeal the regulator's decisions. In the United States, the federal standards are so broad, giving FERC such flexibility, that they provide little basis in

*themselves for appealing a decision by FERC. Rather, the basis for appeal is usually an inconsistency in how FERC applies those standards. For example, rather than persuading a court that a particular level of rates is unjust and unreasonable, a utility would be more likely to persuade a court that FERC's means of reaching that rate determination is inconsistent with FERC's past practice.*

*In countries without a strong tradition of following case precedent, such as civil law countries, standards that are more specific than those in the United States (such as a requirement that rates enable investors to recover a return on investment sufficient to support new investment) may be more appropriate, although the need to give the regulator flexibility over time is still very important.*

US regulators generally are required to vote in public on their decisions, except for uncontested proceedings in which decisionmaking authority has been delegated to the regulator's staff. Indeed, regulators generally are not permitted to convene a meeting to discuss the merits of a case without notice to the public. These "sunshine laws," combined with the limitations on private consultations with parties and the notice and comment procedures discussed above, lead to overall transparency in the decisionmaking process.

In most cases, US regulators are required to issue their decisions in writing, with an explanation of the reasons for the decision. The written explanations tend to be quite detailed with respect to both the legal and factual bases for the decision. The courts, on appeal by an interested party, may send a matter back to the regulator for further review if the regulator has provided insufficient justification for its decision.

***Observations:*** *The requirement that regulators issue written explanations of their decisions, like the notice and comment requirements discussed above, reflects the emphasis on "due process" that characterizes the US legal system at large. The resulting transparency enhances the quality and acceptability of regulatory decisions and provides greater certainty to regulated entities.*

*This transparency, combined with the strong tradition of an independent judiciary, makes possible the significant independence of US regulators. Because regulators are not directly elected, it would be difficult in the US context to relieve regulators from any requirement that enhances transparency while maintaining the regulators' independence.*

*For China, it has been recommended that the regulator be required to issue written decisions as a means of enhancing the transparency of the regulatory process (see Chapter 4). The transparency provided by written*

*decisions would increase the comfort of the government, investors, and consumers with respect to regulatory decisions.*

Regulators must notify parties of decisions that affect them and, in FERC's case, must publish a compilation of regulatory decisions. Rules of general applicability are separately published in volumes that are updated periodically to reflect changes.

**Observations:** *In the US legal system, a regulator's decisions must follow applicable laws and regulations and must account for the regulator's previous decisions on similar issues. Publication of the regulator's rules and case-by-case decisions therefore enhances the quality, predictability, and acceptability of regulation by giving interested parties a basis for predicting and evaluating the regulator's decisions.*

*In addition, notification to parties and publication of decisions and regulations enable regulated entities to know what regulatory requirements exist and therefore to comply with those requirements. As noted in Chapter 4, it would be especially helpful in China to have a means of organizing regulatory decisions, so that those decisions are available for review by regulated entities and other interested parties.*

State regulatory decisions are generally subject to appeal to state courts. Consistent with the division of federal and state authority discussed above, state regulatory decisions are not subject to appeal to FERC or other federal regulators.

**Observations:** *In contrast, it has been recommended for China that the decisions of the provincial regulators be subject to appeal to the central regulatory commission. This approach reflects the different division of central and provincial authority in China, as discussed above.*

FERC's decisions are subject to appeal to federal courts of appeal, which are high-level courts within the US independent judiciary. An appeal must be made by an interested party, not a government agency.

At both the state and federal levels, the courts typically may review all types of regulatory decisions, including the following:

- Factual decisions (for example, whether a proposed merger would adversely affect a utility's cost of service).
- Policy decisions (for example, whether a generation facility should be located in a pristine woodland).

- Legal decisions (for example, whether the regulator's statutory authority enables the regulator to require transmission access).

The courts defer to a regulator's decisions to different degrees, depending on the nature of the decision. For example, for factual decisions, the federal courts defer to FERC's determinations unless they are not supported by "substantial evidence" in the record. On policy matters, the federal courts defer to FERC unless they find an "abuse of discretion." On legal matters, the courts generally presume that FERC has no special expertise and therefore revisit the question *de novo*, that is, without any special deference to FERC. The courts may, however, offer some degree of deference on legal matters arising under the laws that FERC is authorized to administer. The appropriate degree of deference (that is, "standard of review") is usually established by statute.

After determining the appropriate degree of deference, a court determines whether there has been a factual, policy, or legal error in the regulator's decision. Legal errors include taking an action that exceeds the scope of the regulator's authority. If the court finds an error, the court either reverses the decision or returns the matter to the regulator for further proceedings. In addition, the courts may reverse or return a regulatory decision based on imperfections in the decisionmaking process, such as failure to follow procedures and failure to provide a coherent written explanation at the time of the decision.

***Observations:** The complexity of the foregoing rules reflects a delicate balance between (a) protecting regulatory decisions from undue interference, that is, protecting the regulator's independence, and (b) protecting affected parties against arbitrary, inappropriate, or unlawful regulatory decisions, that is, ensuring the regulator's accountability.*

*For most countries, adopting detailed rules governing judicial decisions is beyond the scope of sector reform and may be inconsistent with such countries' legal traditions. Nevertheless, it is important to establish certain minimum rules to govern appeals, such as rules defining the type of decisions that the courts may review. These rules should be designed to balance independence and accountability. The establishment of clear rules to govern appeals will enhance the transparency, quality, and predictability of the regulatory process.*

Appeals on a regulator's failure to follow procedural requirements are not a significant preoccupation for US courts. In many cases, the remedy for failure to follow a procedural requirement is built into the requirement. For example, if FERC fails to act on an application within the required length of time, the application is deemed to be granted. In other cases, failure to follow procedural requirements might invalidate FERC's decision or provide a basis for congressional or judicial inquiry.

## Pricing Mechanism

Both state and federal regulators tend to determine rates based on cost of service plus a rate of return (“cost plus”) determined by the regulator. Even within the context of “cost plus” regulation, regulators have experimented with different refinements, such as split-the-savings approaches and incentives for conservation. In addition, as part of its regulation of interutility transactions, FERC has permitted market-based pricing in certain circumstances. The “just and reasonable standard” discussed above arguably gives FERC flexibility to choose different methodologies for regulating rates, such as cost of service, price caps, and other methodologies.

FERC allows market-based pricing (that is, rates negotiated between the parties) for IPPs and for vertically integrated utilities that provide open access transmission service. In each case, FERC allows market-based pricing only upon a showing that the IPP or utility is not a dominant supplier in the relevant market and is not otherwise able to exercise market power.

It remains to be seen whether FERC’s open access rules will lead FERC either to apply market-based pricing for all regulated utilities or to abandon FERC’s present focus on whether a supplier is a dominant supplier in the relevant market. To some commentators, FERC’s focus on dominant suppliers is misguided. They argue that, as long as other suppliers can enter the market, any exercise of market power will be relatively short-lived.

*Observations: The approach that has been recommended for China bears similarities to the US approach in the sense that the regulator would have an opportunity to determine, on a case-by-case basis, whether market-based rates are appropriate. The most important consideration is that once a tariff has been approved, whether on a cost of service or market basis, the tariff should not be subject to later regulatory revision.*

## Issues and Problems

### Due Process

The US regulatory model is often criticized as being too legalistic and cumbersome. It is certainly true that there are inefficiencies and therefore hidden economic costs associated with requirements, such as notice and comment procedures and written decisions. (These and other requirements are referred to in the United States as “due process” requirements. The term “due process” derives from the principle that the government cannot make decisions affecting citizens’ rights without going through procedures that are appropriate, that is, “due,” based on the nature and importance of the rights being affected.) Of all US regulatory bodies, FERC has been particularly

vulnerable to such criticism. FERC conducted one of the longest regulatory proceedings ever; when the evidentiary record was complete, the issue was several years outdated.

Inefficiencies result, not only from notice and comment procedures, but also from other procedural protections, such as limitations on communications with one party, and from the active role that the courts play in reviewing regulatory decisions. Perhaps responding to the many layers of due process protections, frustrated commentators have advocated swift and sure decisions over legally precise decisions. As suggested above, legal precision may be very important to private enterprises whose rights are being affected. At the same time, if the transactional costs caused by an inefficient regulatory process are too great, even the regulated entity might choose less legal precision.

The US model need not be replicated in detail to achieve effective regulation. For example, it can be readily concluded that the opportunity for interested parties to cross-examine witnesses leads to undue inefficiency and therefore should not be replicated elsewhere. Indeed, detailed replication of the US model would be impossible and inappropriate in different cultural and legal contexts.

It is nevertheless important to consider those aspects of the US model that enhance the effectiveness of regulation, even while creating some inefficiencies. For example, while written decisions are time-consuming, they add significantly to the quality and acceptability of regulatory decisions.

The US model also incorporates the flexibility to respond to changes over time, as demonstrated by FERC's recent open access requirements. If FERC succeeds in establishing open access, FERC will have accomplished what Congress, perhaps due to political pressure from transmitting utilities, could not. This result will derive, in part, from the formal procedures that FERC employed, which enabled affected entities to participate without subjecting the decisionmaking process to direct political pressure. If FERC's effort to establish open access is overturned on appeal, FERC will have been prevented from moving too far beyond Congress, in part because FERC's decisions are subject to review by an independent judiciary. In effect, the US regulatory framework accommodates different outcomes on issues that could not have been contemplated when the regulatory framework was developed.

## **Dual Regulation**

The dual regulatory scheme in the United States (that is, the scheme under which state and federal regulators oversee different aspects of utility activities) is frequently a source of confusion and, perhaps as frequently, an object of criticism. Three examples of possible federal-state conflict would include the following: First, IPPs must obtain FERC's approval of their power sales rates and yet may be subject to state review of whether the project is justified. The state review results from the state's authority over the "prudence" of actions taken by the purchaser. Second, dual regulation of rates creates

the potential for legitimate costs not to be recovered in rates in either state or federal jurisdiction. Third, FERC can order a utility to provide transmission service, but if the FERC-ordered service requires the construction or expansion of transmission facilities, approval for this investment is solely within the discretion of a state regulatory entity.

Dual regulation also invites “forum shopping,” that is, attempts to restructure transactions to fall within state or federal jurisdiction, depending on where the preferred result is likely to be obtained. Forum shopping can undermine regulatory effectiveness, as well as being unfair to other regulated entities that remain subject to the more stringent regulatory requirements.

Aside from the impact on regulated entities and on the effectiveness of regulation, dual regulation creates the potential for tension between state and federal regulators. Because a legitimate assertion of federal authority invalidates or replaces state authority, the states are regularly attempting to protect their jurisdiction from federal encroachment. FERC’s recent assertion of jurisdiction over transmission to retail customers is a case in point.

Despite these problems, dual regulation is indispensable in the US system of government. Federal regulation of primarily local concerns is repugnant to constitutional principles—and an increasing source of frustration for the voting public. At the same time, state regulation may result in decisions that promote parochial interests at the expense of regional or national interests. Drawing the line between local and interstate concerns has never been easy, and the line may shift from time to time, but dual regulation seems to derive necessarily from a federal-state system of government.

Finally, dual regulation leads to a higher quality of regulatory decisions, by enabling regulators to develop more specialized expertise on matters within their jurisdiction. For example, a state regulator can become much more familiar with reasonable plans to extend distribution services, based on local conditions, than can a federal regulator. The ability to respond to local circumstances is particularly important in a large country such as the United States, where conditions may vary dramatically from region to region.

***Observations:*** *For China, it may be particularly important to introduce both central and provincial regulation, based on the underlying system of government and the higher quality of regulation that may result. The problems associated with dual regulation can be largely addressed by an appropriate and carefully specified division of authority between central and provincial regulators. Table 3.1 recommends a vertical split of authority between central and provincial regulators that was developed to reflect China’s unique circumstances*

# Distributors of World Bank Publications

*Prices and credit terms vary  
from country to country.  
Consult your local distributor  
before placing an order.*

## ARGENTINA

Oficina del Libro Internacional  
Av Cordoba 1877  
1120 Buenos Aires  
Tel (54 1) 815-8354  
Fax (54 1) 815-8156

**AUSTRALIA, FIJI, PAPUA NEW GUINEA,  
SOLOMON ISLANDS, VANUATU, AND  
WESTERN SAMOA**  
D A Information Services  
648 Whitehorse Road  
Mitcham 3132  
Victoria  
Tel (61 3) 9210 7777  
Fax (61 3) 9210 7788  
E-mail service@dadirect.com.au  
URL http://www.dadirect.com.au

## AUSTRIA

Gerold und Co  
Weihburggasse 26  
A-1011 Wien  
Tel (43 1) 512-47-31-0  
Fax (43 1) 512-47-31-29  
URL http://www.gerold.co.at/online

## BANGLADESH

Micro Industries Development  
Assistance Society (MIDAS)  
House 5, Road 16  
Dharmondi R/Area  
Dhaka 1209  
Tel (880 2) 326427  
Fax (880 2) 811188

## BELGIUM

Jean De Lannoy  
Av du Roi 202  
1060 Brussels  
Tel (32 2) 538-5169  
Fax (32 2) 538-0841

## BRAZIL

Publicações Técnicas Internacionais  
Ltda  
Rua Pernoto Gomide, 209  
01409 São Paulo, SP  
Tel (55 11) 259-6644  
Fax (55 11) 258-6930  
E-mail postmaster@pti.uol.br  
URL http://www.uol.br

## CANADA

Renouf Publishing Co Ltd  
5369 Canopak Road  
Ottawa, Ontario K1J 9J3

Tel (613) 745-2665  
Fax (613) 745-7660  
E-mail renouf@fox.nstr.ca  
URL http://www.fox.nstr.ca/~renouf

**CHINA**  
China Financial & Economic  
Publishing House  
8, Da Fo Si Dong Jie  
Beijing  
Tel (86 10) 6333-8257  
Fax (86 10) 6401 7365

## COLOMBIA

Infoenlace Ltda  
Carrera 6 No 51-21  
Apartado Aereo 34720  
Santa Fe de Bogotá, D.C.  
Tel (57 1) 285-2798  
Fax (57 1) 285-2798

## CYPRUS

Center for Applied Research  
Cyprus College  
6, Diogenes Street, Engomi  
PO Box 2006  
Nicosia  
Tel (357 2) 44-1730  
Fax (357 2) 46-2051

## CZECH REPUBLIC

National Information Center  
predjena, Konviktka 5  
CS - 113 57 Prague 1  
Tel (42 2) 2422-9433  
Fax (42 2) 2422-1484  
URL http://www.nis.cz/

## DENMARK

Samfunds litteratur  
Roseneoenes Allé 11  
DK-1970 Frederiksberg C  
Tel (45 31) 351942  
Fax (45 31) 357822

## EGYPT, ARAB REPUBLIC OF

Al Ahram Distribution Agency  
Al Galaa Street  
Cairo  
Tel (20 2) 578-6083  
Fax (20 2) 578-6833

## The Middle East Observer

41, Sherif Street  
Cairo  
Tel (20 2) 393-9732  
Fax (20 2) 393-9732

## FINLAND

Akateeminen Kirjakauppa  
PO Box 128  
FIN-00101 Helsinki  
Tel (358 0) 12141  
Fax (358 0) 121-4441  
URL http://booknet.cultnet.fi/aka/

## FRANCE

World Bank Publications  
66, avenue d'Iéna  
75116 Paris  
Tel (33 1) 40-69-30-56/57  
Fax (33 1) 40-69-30-68

## GERMANY

UNO-Verlag  
Poppelsdorfer Allee 55  
53115 Bonn  
Tel (49 228) 212940  
Fax (49 228) 217492

## GREECE

Papasotiriou S.A.  
35, Stourmara Str  
106 82 Athens  
Tel (30 1) 364-1826  
Fax (30 1) 364-8254

## HAITI

Culture Diffusion  
5, Rue Capois  
C.P. 257  
Port-au-Prince  
Tel (509 1) 3 9260

## HONG KONG, MACAO

Asia 2000 Ltd  
Sales & Circulation Department  
Seabird House, unit 1101-02  
22-28 Wyndham Street, Central  
Hong Kong  
Tel (852) 2530-1409  
Fax (852) 2526-1107

## INDIA

Allied Publishers Ltd  
751 Mount Road  
Madras - 600 002  
Tel (91 44) 852-3938  
Fax (91 44) 852-0649

## INDONESIA

PI Indra Limited  
Jalan Borobudur 20  
PO Box 181  
Jakarta 10320  
Tel (62 21) 390-4290  
Fax (62 21) 421-4289

## IRAN

Ketab Sara Co Publishers  
Khaled Eslamboli Ave ,  
6th Street  
Kushesh Delafrrooz No 8  
PO Box 15745-733  
Tehran  
Tel (98 21) 8717819, 8716104  
Fax (98 21) 8712479  
E-mail ketab-sara@neda.net.ir

## IRELAND

Government Supplies Agency  
Oficin an tSoláthair  
4-5 Harcourt Road  
Dublin 2  
Tel (353 1) 661-3111  
Fax (353 1) 475-2670

## ISRAEL

Yozmnot Literature Ltd  
PO Box 56055  
3 Yohanan Hasanbar Street  
Tel Aviv 61560  
Tel (972 3) 5285-397  
Fax (972 3) 5285-397

## ITALY

R O Y International  
PO Box 13056  
Tel Aviv 61130  
Tel (972 3) 5461423  
Fax (972 3) 5461442  
E-mail royl@telvision.net.il

Palestinian Authority/Middle East  
Index Information Services  
PO Box 19502 Jerusalem  
Tel (972 2) 6271219  
Fax (972 2) 6271634

## JAMAICA

Ian Randle Publishers Ltd  
206 Old Hope Road  
Kingston 6  
Tel 809-927-2085  
Fax 809-977-0243  
E-mail irp@cols.com

## JAPAN

Eastern Book Service  
3-13 Hongo 3-chome, Bunkyo-ku  
Tokyo 113  
Tel (81 3) 3818-0861  
Fax. (81 3) 3818-0864  
E-mail svb-ebs@ppp.bekkoame.or.jp  
URL http://www.bekkoame.or.jp/~svt-ebs

## KENYA

Africa Book Service (E A) Ltd  
Quaran House, Mfangano Street  
PO Box 45245  
Nairobi  
Tel (254 2) 223 641  
Fax (254 2) 330 272

## KOREA, REPUBLIC OF

Daejon Trading Co Ltd  
PO Box 34, Youda  
706 Seoun Bldg  
44-6 Youdo-Dong, Yeongchonpo-Ku  
Seoul  
Tel (82 2) 785-1631/4  
Fax (82 2) 784-0315

## MALAYSIA

University of Malaya Cooperative  
Bookshop, Limited  
PO Box 1127  
Jalan Pantai Baru  
59700 Kuala Lumpur  
Tel (60 3) 758-5000  
Fax (60 3) 755-4424

## MEXICO

INFOTEC  
Av San Fernando No. 37  
Col. Torrello Guerra  
14050 Mexico, D.F

Tel (52 5) 624-2800  
Fax (52 5) 624-2822  
E-mail infotec@rtn.net.mx  
URL http://rtn.net.mx

## NEPAL

Everest Media International  
Services (P) Ltd  
GPO Box 5443  
Kathmandu

Tel (977 1) 472 152  
Fax (977 1) 224 431

## NETHERLANDS

De Lindeboom/nOr-Publikaties  
PO Box 202  
7480 AE Haaksbergen

Tel (31 53) 574-0004  
Fax (31 53) 572-9296  
E-mail lindeboo@worldonline.nl  
URL http://www.worldonline.nl/lindeboo

## NEW ZEALAND

EBSCO NZ Ltd  
Private Mail Bag 99914  
New Market

Auckland  
Tel (64 9) 524-8119  
Fax (64 9) 524-8067

## ITALY

Licos Commissionaria Sansoni SPA  
Via Duca di Calabria, 1/1  
Casella Postale 552  
50125 Firenze

Tel (55) 645-415  
Fax (55) 641-257

E-mail licosa@fbcc.it  
URL http://www.fbcc.it/licosa

1

## NIGERIA

University Press Limited  
Three Crowns Building Jencho  
Private Mail Bag 5095  
Ibadan  
Tel (234 22) 41-1356  
Fax (234 22) 41-2056

## NORWAY

NIC Info AS  
Book Department  
PO Box 6125 Etterstad  
N-0602 Oslo 6  
Tel (47 22) 57-3300  
Fax (47 22) 68-1901

## PAKISTAN

Mirza Book Agency  
65, Shahrah-e-Quaid-e-Azam  
Lahore 54000  
Tel (92 42) 735 3601

Fax (92 42) 758 5283

Oxford University Press

5 Bangalore Town  
Sharare Faisal  
PO Box 13033  
Karachi-75350  
Tel (92 21) 446307  
Fax (92 21) 4547640  
E-mail oup@oup.kh.erum.com.pk

Pak Book Corporation

Azz Chambers 21  
Queen's Road  
Lahore  
Tel (92 42) 636 3222, 636 0885

Fax (92 42) 636 2328  
E-mail pbc@brain.net.pk

## PERU

Editorial Desarrollo SA  
Apartado 3824  
Lima 1  
Tel (51 14) 285380  
Fax (51 14) 286628

## PHILIPPINES

International Booksource Inc  
1127-A Antipolo St  
Barangay, Venezuela  
Makati City  
Tel (63 2) 896 6501, 6505, 6507

Fax (63 2) 896 1741

## NETHERLANDS

International Publishing Service  
Ul Pienna 31/37  
00-677 Warsaw  
Tel (48 2) 628-6089  
Fax (48 2) 621-7255

## NETHERLANDS

E-mail books@ips@atm.com.pl  
URL http://www.ipscg.waw.pl/ips/export/

## PORTUGAL

Livraria Portugal  
Apartado 2681  
Rua Do Carmo 70-74  
1200 Lisbon  
Tel (1) 347-4982  
Fax (1) 347-0264

## ROMANIA

Companie De Librarii Bucuresti S.A.  
Str Lipsiei no. 26, sector 3  
Bucharest  
Tel (40 1) 613 9645  
Fax (40 1) 312 4000

## RUSSIAN FEDERATION

Isdatelstvo <Ves Mir>  
9a, Lopachny Pereulok  
Moscow 101831  
Tel (7 095) 917 87 49  
Fax (7 095) 917 92 59

## SINGAPORE, TAIWAN, MYANMAR, BRUNEI

Asahgate Publishing Asia  
Pacific Pte Ltd.  
41 Kallang Pudding Road #04-03  
Golden Wheel Building  
Singapore 349316  
Tel (65) 741-5166  
Fax (65) 742-9356  
E-mail ashgate@asianconnect.com

## SLOVENIA

Gospodarski Vestnik Publishing Group  
Dunajska cesta 5  
1000 Ljubljana  
Tel (386 61) 133 83 47, 132 12 30  
Fax (386 61) 133 80 30  
E-mail belc@gv.si

## SOUTH AFRICA, BOTSWANA

For single titles  
Oxford University Press  
Southern Africa  
PO Box 1141  
Cape Town 8000  
Tel (21 21) 45-7266  
Fax (21 21) 45-7265

## TRINIDAD & TOBAGO, AND THE CARRIBBEAN

Systematics Studies Unit  
9 Watts Street  
Curepe  
Trinidad, West Indies  
Tel (809) 662-5654  
Fax (809) 662-5654  
E-mail tobe@trinidad.net

## UGANDA

Gusto Ltd  
PO Box 3997  
Madhvani Building  
Plot 16/4 Jinja Rd  
Kampala  
Tel (256 41) 254 763  
Fax (256 41) 251 468

## UNITED KINGDOM

Microinfo Ltd  
PO Box 3  
Alton, Hampshire GU34 2PG  
England  
Tel (44 1420) 86848  
Fax (44 1420) 89889  
E-mail wbank@ukmicro.demon.co.uk  
URL http://www.microinfo.co.uk

## VENEZUELA

Tecni-Ciencia Libros, S.A  
Centro Cuidad Comercial Tamancio  
Nivel C2  
Caracas  
Tel (58 2) 959 5547, 5035, 0016  
Fax (58 2) 959 5636

## ZAMBIA

University Bookshop  
University of Zambia  
Great East Road Campus  
PO Box 32379  
Lusaka  
Tel (260 1) 252 576  
Fax (260 1) 253 952

## ZIMBABWE

Longman Zimbabwe (Pte) Ltd  
Tourie Road, Ardenne  
PO Box ST125  
Southerton  
Harare  
Tel (263 4) 6216617  
Fax (263 4) 621670  
Tel (40 1) 341-3229  
Fax (40 1) 341-3235



## Recent World Bank Discussion Papers (*continued*)

- No. 327 *Agricultural Reform in Russia: A View from the Farm Level* Karen Brooks, Elmira Krylatykh, Zvi Lerman, Aleksandr Petrikov, and Vasilii Uzun
- No. 328 *Insuring Sovereign Debt Against Default*. David F. Babbel
- No. 329 *Managing Transboundary Stocks of Small Pelagic Fish. Problems and Options*. Max Aguero and Exequiel Gonzalez
- No. 330 *China Issues and Options in Greenhouse Gas Emissions Control*. Edited by Todd M. Johnson, Junfeng Li, Zhongxiao Jiang, and Robert P. Taylor
- No. 331 *Case Studies in War-to-Peace Transition: The Demobilization and Reintegration of Ex-Combatants in Ethiopia, Namibia, and Uganda* Nat J. Colletta, Markus Kostner, Ingo Wiederhofer, with the assistance of Emilio Mondo, Taimi Sitari, and Tadesse A. Woldu
- No. 333 *Participation in Practice: The Experience of the World Bank and Other Stakeholders*. Edited by Jennifer Rietbergen-McCracken
- No. 334 *Managing Price Risk in the Pakistan Wheat Market*. Rashid Faruqee and Jonathan R. Coleman
- No. 335 *Policy Options for Reform of Chinese State-Owned Enterprises*. Edited by Harry G. Broadman
- No. 336 *Targeted Credit Programs and Rural Poverty in Bangladesh* Shahidur Khandker and Osman H. Chowdhury
- No. 337 *The Role of Family Planning and Targeted Credit Programs in Demographic Change in Bangladesh*. Shahidur R. Khandker and M. Abdul Latif
- No. 338 *Cost Sharing in the Social Sectors of Sub-Saharan Africa: Impact on the Poor*. Arvil Van Adams and Teresa Hartnett
- No. 339 *Public and Private Roles in Health: Theory and Financing Patterns*. Philip Musgrove
- No. 340 *Developing the Nonfarm Sector in Bangladesh: Lessons from Other Asian Countries*. Shahid Yusuf and Praveen Kumar
- No. 341 *Beyond Privatization: The Second Wave of Telecommunications Reforms in Mexico*. Bjorn Wellenius and Gregory Staple
- No. 342 *Economic Integration and Trade Liberalization in Southern Africa: Is There a Role for South Africa?* Merle Holden
- No. 343 *Financing Private Infrastructure in Developing Countries* David Ferreira and Karman Khatami
- No. 344 *Transport and the Village: Findings from African Village-Level Travel and Transport Surveys and Related Studies* Ian Barwell
- No. 345 *On the Road to EU Accession: Financial Sector Development in Central Europe*. Michael S. Borish, Wei Ding, and Michel Noel
- No. 346 *Structural Aspects of Manufacturing in Sub-Saharan Africa: Findings from a Seven Country Enterprise Survey* Tyler Biggs and Pradeep Srivastava
- No. 347 *Health Reform in Africa: Lessons from Sierra Leone* Bruce Siegel, David Peters, and Sheku Kamara
- No. 348 *Did External Barriers Cause the Marginalization of Sub-Saharan Africa in World Trade?* Azita Amjadi, Ulrich Reincke, and Alexander J. Yeats
- No. 349 *Surveillance of Agricultural Price and Trade Policy in Latin America during Major Policy Reforms*. Alberto Valdés
- No. 350 *Who Benefits from Public Education Spending in Malawi: Results from the Recent Education Reform*. Florencia Castro-Leal
- No. 351 *From Universal Food Subsidies to a Self-Targeted Program: A Case Study in Tunisian Reform*. Laura Tuck and Kathy Lindert
- No. 352 *China's Urban Transport Development Strategy. Proceedings of a Symposium in Beijing, November 8-10, 1995* Edited by Stephen Stares and Liu Zhi
- No. 353 *Telecommunications Policies for Sub-Saharan Africa*. Mohammad A. Mustafa, Bruce Laidlaw, and Mark Brand
- No. 354 *Saving across the World: Puzzles and Policies*. Klaus Schmidt-Hebbel and Luis Servén
- No. 355 *Agriculture and German Reunification*. Ulrich E. Koester and Karen M. Brooks
- No. 356 *Evaluating Health Projects: Lessons from the Literature*. Susan Stout, Alison Evans, Janet Nassim, and Laura Raney, with substantial contributions from Rudolpho Bulatao, Varun Gauri, and Timothy Johnston
- No. 357 *Innovations and Risk Taking: The Engine of Reform in Local Government in Latin America and the Caribbean* Tim Campbell
- No. 358 *China's Non-Bank Financial Institutions: Trust and Investment Companies* Anjali Kumar, Nicholas Lardy, William Albrecht, Terry Chuppe, Susan Selwyn, Paula Perttunen, and Tao Zhang
- No. 359 *The Demand for Oil Products in Developing Countries* Dermot Gately and Shane S. Streifel
- No. 360 *Preventing Banking Sector Distress and Crises in Latin America. Proceedings of a Conference held in Washington, D.C., April 15-16, 1996*. Edited by Suman K. Bery and Valeriano F. Garcia



**THE WORLD BANK**

1818 H Street, N.W.  
Washington, D.C. 20433 USA

Telephone: 202-477-4234

Faxsimile: 202-477-6391

Telex: MCI 64145 WORLD BANK  
MCI 248423 WORLD BANK

Cable Address: INTBAFRAD  
WASHINGTONONDC

World Wide Web: <http://www.worldbank.org/>

E-mail: books@worldbank.org

13913

9 780821339138

**ISBN 0-8213-3913-3**