Power Sector Regulation
Purpose, Authority, and Practice:
Financial Regulation

for the State Electricity Regulatory Commission of China
Changsha University of Science and Technology,
Changsha China
28 September 2005

The Regulatory Assistance Project
50 State Street, Suite 3
Montpelier, Vermont USA 05602
Tel: 802.223.8199
Fax: 802.223.8172

177 Water St.
Gardiner, Maine USA 04345
Tel: 207.582.1135
Fax: 207.582.1176

Website:
http://www.raponline.org
Outline

- Purpose of Regulation
  - Functions, authority
- Jurisdiction
  - Statutes and rule
- Institutional Organization
- Practices and Methods
  - Financial regulation
- Competitive Markets
- Priorities for SERC
- Appendix: Regulation in the US
Part I

Purpose of Regulation
Purpose of Regulation*

- Substitute for competition where none exists
- Create and design markets where possible
- Police markets where they exist
- To adopt regulatory practices that align incentives with public interest objectives
Reasons to Regulate

- The product is essential
- The product is most efficiently provided by a single supplier
  - "Natural" monopoly
  - To protect against market power abuses
- Other market failures
  - External (environmental) costs not fully reflected in price
  - Consumer protection
- Economic efficiency
- Other policy and public interest considerations
Objectives of Regulation*

- In US original purpose was to protect utilities from competition and local regulation
- Now, main purposes,
  - Economic efficiency
  - Fair prices, to both consumers and producers
  - Reasonable, non-discriminatory service
  - Adequate quality and reliability
  - Other policy considerations e.g. low income or rural consumers, economic development, hydro system benefits
Part II

Jurisdiction
Jurisdiction*

- Commission authority must be broad enough to cover all regulatory purposes and objectives
  - e.g. “Such jurisdiction shall be exercised by the commission so far as may be necessary to enable it to perform the duties and exercise the powers conferred upon it by law.”

- Divided jurisdiction leads to serious conflicts and problems

- SERC’s authority is still evolving
Jurisdiction*

- Prices and revenues
- Terms and conditions of service
- Technical/engineering matters
- Financial matters
- Planning and investment
  - Generation, including purchased power
  - Transmission and distribution
- Market design and monitoring
- Siting and environmental performance
- All information relating to the provision of service
- Penalties for failure of companies to comply
Jurisdiction: Financial Matters*

- Accounting and reporting requirements
- All cost-of-service information for setting prices and revenues
- Profitability
  - Return on investment
  - Capital structure
- Issuance of debt and equity
  - Is investment part of plan
  - Market power issues
  - Undue risk to consumers
- Mergers and acquisitions
- Purchases and sales of assets, etc.
  - Planning
- Audits – are costs reasonable
Part III

Institutional Organization
An institution’s organizational structure is determined by its mission.

Regardless of structure, most cases are assigned to multi-disciplinary teams.
Typical Structure: Organization By Expertise

Commissioners

- Legal (Advisory)
- Executive Director
- Law Judges

- Accounting
- Economics
- Engineering
- Consumer Protection
- Enforcement & Compliance
- Legal (Advocacy)
- Administration
- Environmental
Alternative Structure: Organization by Function*

Commission

Executive Director

Secretary/Clerk

Electricity

Gas

Telecommunications

Legal

Pricing

Markets

Engineering/Safety

Planning
Part IV

Practices and Methods of Financial Regulation
The Regulatory “Rules of Thumb”*

- When developing regulatory rules and practices, always ask: What incentives are being created?
- Basic test is whether least-cost action by utility is the most profitable options it has
More Regulatory “Rules of Thumb”*

– Always identify who bears what risks?
– Will this requirement advance our primary objectives?
  • Reliable service
  • Economic efficiency
  • Environmental protection
  • Economic development
Examples of Weak Incentives in China*

- On-peak-off peak prices make sense at the consumer level but due to accounting practices Grid company makes large profit on on-peak sales and losses on off-peak sales.
- Power cost adjustment mechanism makes sense in one context but it removes Grid Company incentives to control cost or market power in generation markets.
- Lack of accounting and financial rules for DSM and energy efficiency investment means Grid company may recover cost of 40 fen/kWh power supply but not the cost of 10 fen/kWh energy efficiency.
Foundation of Effective Regulation

- Accurate, reliable information—especially financial information—is critical to effective regulation.
- All aspects of regulation depend on it:
  - Pricing
  - Investment
  - Planning
- Utilities must be required to provide all necessary information.
Accounting and Regulation

- Constant interaction between accounting and regulation
  - Lawful regulatory policy can modify accounting
  - Example: “Regulatory assets” are unique to regulated firms and allow recovery of costs and accurate reporting to investors. DSM costs can be a regulatory asset.

- In some cases there may be differences in accounting for regulatory purposes, financial (SEC type) purposes, and tax purposes.

- Accounting and financial practices determine profits, losses, and incentives.
Accounting and Reporting*

- Uniform system of accounts
  - Should apply to all participants
    - Monopoly T&D companies
    - Competitive generators
    - Competitive retail companies

- Uniform and detailed accounting
  - Breaks costs down to understandable parts
  - Allows for comparisons between utilities and time trends
Standard Accounts

- Assets
  - Utility plant
  - Financial assets

- Liabilities
  - Debt, equity, etc.
  - Contractual obligations

- Income and Revenue

- Expenses
Accounts subdivided by type

- Assets
  - Plant: G, T, D
  - Other facilities
  - Financial

- Expenses
  - Fuel, production, contracts
  - Labor, administration, etc.
FERC Uniform System of Accounts

- The FERC Uniform System of Accounts (USOA)
  - 18 CFR 101
  - First adopted 1/1/1937, two years after the Federal Power Commission (later FERC) was established.
    - Regularly updated and amended
  - Applies to all public utilities subject to the Federal Power Act
    - Used by state public utility commissions
Reporting*

- Periodic reporting requirements
  - Annual
  - Quarterly, monthly

- Monopoly companies
  - Public information

- Competitive companies
  - Proprietary information, Not made public
FERC Annual Reports

- Electric companies must file annual financial reports
  - FERC Form 1: For large investor-owned utilities
  - FERC requires that an independent public accountant verify that the annual reports are in compliance with accounting and reporting requirements.
Reporting format should be consistent with “Generally Accepted Accounting Principles” (GAAP), the USOA, and other rules prescribed by FERC.

Financial statements published for investors and creditors must be consistent with reports prepared for FERC.
States and provinces (Canada, Australia) also require utilities to file reports. Example:

- Every public utility shall keep and render to the commission, in the manner and form prescribed by the commission, uniform accounts of all business transacted. In formulating a system of accounting for any class of public utilities, the commission shall consider any system of accounting established by any federal law, commission or department and any system authorized by a national association of such utilities.

  - Indiana Statute IC 8-1-2-10
  Accounting systems
Audit:

- A formal examination of a firm’s financial, managerial, or operational status.

Purpose:

- To remedy the imbalance in information that always exists between a company on the one hand and the public and the regulator on the other.
Four kinds of audits

- Annual corporate audits
- Routine regulatory audits
- Management audits
- Operational audits
Annual Corporate Audits

- Independent review of accounts for investors
  - To give lenders and stockholders an accurate picture of the firm’s financial condition
  - Procedures and requirements for these audits set by banking and securities regulators, not utility regulators
  - Paid for by the company being audited
Routine Regulatory Audits

- To assure accuracy of records used for price-setting and other regulatory purposes
- Performed by regulators (or by auditor under contract to the regulators)
- Often paid for by utility
  - Regulator has authority to charge utility for the costs of the audit
Management Audits

- To evaluate utility management practices
  - Efficiency
  - Organization
  - Decision-making processes
  - Salaries, benefits

- Audit controlled by regulator, performed by special experts, paid for by utility
Operational Audit

- Targeted at a specific element of utility operations, for example:
  - Customer service
  - Fuel purchasing practices
  - Hiring and wages
  - Paid for by utility
    - Controlled by regulator
    - Performed by regulator or specialist
Prerequisites for an Effective Audit Program

- Legal authority to conduct audits
- Adequate record-keeping within the utility
- Adequate financial resources to conduct audits
- Trained, capable, and independent auditing personnel
- Legal authority to implement the recommendations of the audits
Cost-of-Service Regulation*

- COS is the foundation of traditional and most approaches to Performance-Based Regulation
- COS is utility total “revenue requirement” or total annual reasonable, or prudent cost of providing service
Reasonable and Prudent*

- Reasonable or prudent cost is a key concept that guides all financial regulation.
- COS is not the actual utility cost but the cost a reasonable and efficient utility would have incurred.
Cost-of-Service Pricing

- Traditional method of setting prices
- Revenue requirement = cost of service
- Test year
  - Period in which expenses are compared to revenues
Test Year*

- Key concept, a test year is a 12 month period in which all costs, investment, and revenues are matched.
- Can be historic, future, or a blend.
- Unusual and non recurring costs/revenue is adjusted.
- In theory (unit cost theory), historic and future yields same result.
  - $\frac{2004 \text{ costs}}{2004 \text{ sales}} = \text{price} = \frac{2006 \text{ costs}}{2006 \text{ sales}}$
The Revenue Requirement for Investor-Owned Utility

\[
RR = E + d + T + r(V-D)
\]

- \(E\) = Operations & Maintenance Expense
- \(d\) = Annual Depreciation Expense
- \(T\) = Taxes
- \(V\) = Original Book Value of Plant
- \(D\) = Accumulated Depreciation
- \((V-D = "net rate base")\)
- \(r\) = Weighted Average Cost of Capital
Revenue Requirement for Government-Owned Utility

\[ RR = E + d + T + I + c \]

- \( E \) = Operations & Maintenance Expense
- \( d \) = Annual Depreciation Expense
- \( T \) = Taxes
- \( I \) = Interest on debt
- \( c \) = Contingency (calculated as % of I)
Cost Allocation*

- Categorize costs
  - G, T, D

- Functionalize costs
  - Demand, energy, customer-related costs

- Allocation to customer classes
  - According to principles of cost causation
  - Part art. part science
Costs to Prices*
Prices to Revenues*

- Operating costs
- Depreciation
- Taxes
- Return
- Investment

Revenue Requirement
- Customer
- Capacity
- Energy

Residential
- Commercial
- Industrial
- Lighting
- Agricultural

Actual Revenue
Drawbacks of Traditional Ratemaking*

- Revenues grow in proportion to sales **but** costs do not
- Many variable costs subject to adjustment clauses, most other costs are fixed costs in short-run
- Result: company always has incentive to sell more
- Not consistent with environmental and efficiency objectives
Alternative Pricing Methods*

- Performance-based regulation
- Revenues grow in proportion to costs
- Revenues independent of price structure
- Revenue-based regulation aligns utility financial incentives with public policy goals
Licensing

- Licenses for companies to do business
- Licenses for specific activities
  - Investment in new facilities
    - Generation, transmission
    - Long-term purchased power contracts
- Role of licensing in competitive markets?
Part V

Regulation and Competition
Competitive Generation

- Components of the electric industry that are no longer thought to be natural monopoly
  - Generation
  - Retail
- In practice, the results of competitive reform have been mixed, at best
Regulator sets prices by assuring that markets are fully competitive

- Short-term, spot trading
- Long-term, through contracts

Must have authority to take remedial action immediately on determination of market power abuses
Retail Markets*

- Risks may outweigh benefits
- Limited success for large customers
  - small commercial and residential markets need through “default service”
- Tends to increase retail price volatility
- Complicates planning issues
- Undermines price reform efforts
Part VI*

Financial and Accounting Priorities for SERC
Priorities for SERC*

- Fix the incentives - develop methods for pricing and revenue-setting
  - Align financial incentives with public policy goals
- Create markets to meet China’s goals
  - Incorporate demand-side
  - Incorporate environment
- Exercise authority
  - Develop and demonstrate regulatory capabilities
  - Prepare for the time when you have jurisdiction
Priorities for SERC*

- Develop reporting requirements
  - Financial records
  - Production and sales records
- Develop a uniform system of accounts
  - Collaborative process with electric companies, accountants, investment community
  - Analysis and evaluation of companies
  - Finances, accounting
  - Planning, investment
Appendix

Regulation in the US
Regulation in the USA

- The federal government regulates commerce among the states
- Each state regulates commerce within its borders
Regulation in the USA

- Federal Energy Regulatory Commission (FERC) regulates electricity at wholesale
  - Sales of electricity among electric companies
  - Competitive wholesale markets
    - PJM, New York, New England, CA, etc.
  - Transmission pricing (but not siting)

- FERC also regulates natural gas at wholesale
  - It also has siting authority for gas pipelines
Regulation in the USA

- States regulate electricity at retail
  - Prices and terms of service
    - Non-discrimination
    - Fair prices
  - Quality, safety, reliability
    - Technical issues
    - Interconnection of customer-owned generation
    - End-use efficiency
    - Environmental performance
Regulation in the USA

- The division of jurisdiction between the federal government and the states is an artifact of US history and politics
- It is not a model we recommend to others
Mission

- FERC “regulates and oversees energy industries in the economic, environmental, and safety interests of the American public.”
Organizational Structure of FERC

Federal Energy Regulatory Commission

Commissioner

Office of Administrative Law Judges
Office of the Secretary
Office of the Executive Director
Office of the General Counsel

Chairman

Office of External Affairs
Office of Market Oversight and Investigations
Office of Markets, Tariffs and Rates

Commissioner

Office of Administrative Litigation
Office of Energy Projects
California PUC Mission

“The California Public Utilities Commission (PUC) regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. We are responsible for ensuring that customers have safe, reliable utility service at reasonable rates, protecting against fraud, and promoting the health of California's economy.”
California PUC Responsibilities

- Establish service standards and safety rules, and authorize utility rate changes;
- Monitor the safety of utility and transportation operations, and oversee markets to inhibit anti-competitive activity;
- Prosecute unlawful utility marketing and billing activities, govern business relationships between utilities and their affiliates, and resolve complaints by customers against utilities;
- Implement energy efficiency and conservation programs and programs for the low-income and disabled;
- Oversee the merger and restructure of utility corporations, and enforce the California Environmental Quality Act for utility construction;
- Work with other state and federal agencies in promoting water quality, environmental protection, and safety;
- Intervene in Federal proceedings on issues that affect California utility rates or services.