Price Control in the Power Sector

UNECE Committee

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Contents

1. Area of Regulation
2. Pricing in Unbundled Industry
3. Types of Price Regulation
4. Determinants of Price Control
5. Benchmarking
6. International Experience
7. Price Control Issues in CEE
8. Setting Up of Regulatory Control
9. Summary
1. Areas of Regulation

- Power generation
- System Dispatching
- Ancillary System Services
- Power Transmission
- Wholesale Supply
- Power Distribution
- Retail Supply
- Metering and Billing

Services subject to regulatory control

Competitive services

Services where competitive potentials exist
2. Pricing in Unbundled Industry (1)

Separate pricing models for the various functions of power sector are required after industry unbundling.
2. Pricing in Unbundled Industry (2)

Pricing process includes three major steps: (1) establishment of revenue requirements; (2) tariff design and (3) definition of payment liability.

- **Which cost categories are covered?**
- **Revenue Requirements**

- **What are the tariff components and what are the cost allocation rules?**
- **Tariff Design**

- **Who should pay and how?**
- **Liability and Usage Definition**
2. Pricing in Unbundled Industry (3)

- Pricing Method
  - Using External Reference Value (Marginal Costs)
  - Fully Distributed Cost Method
- Capital Cost Related Issues
  - Asset Valuation Concept
  - Asset Life Concept
  - Determination of Return on Assets
- Cost Allocation Concept
  - Time Differentiation
  - Locational Differentiation
- Establishment of Rate Structure (Tariff Setting)
2. Pricing in Unbundled Industry / Cost Allocation Issues (1)

Integrated electricity business can use its status as a monopoly service provider to obtain an unfair advantage in the competitive parts of its business: Result - increased costs and higher prices in regulated sectors.

Issues that will need careful regulatory consideration include:

- Treatment of joint and common costs
- Cross-subsidying
- Price discrimination and allocative efficiency
- Interlinks between cost allocation/tariff setting and establishment of regulatory price control
- Establishment of Regulatory Ring-fencing Guidelines
2. Pricing in Unbundled Industry / Cross Subsiding

• Regulator aims to prevent cross-subsiding between regulated and non-regulated services
• Regulator aims to prevent creation of wrong incentives for the network

1. Allocated cost should not be less than “avoidable” costs.
2. Allocated cost should not be higher than stand-alone costs.
2. Pricing in Unbundled Industry / Transmission (1)

Transmission Pricing Elements

- System Supporting Services
- Transmission Constraints
- Transmission Losses
- Use of Network
  - Connection

Transmission Pricing Principles

Transmission Pricing Design

Cost Concept Criteria
- Average Cost
- Marginal Cost

Cost Allocation Criteria
- Time Dependent Pricing
- Locational Pricing
- Flat Rate

Network Service
- Point to Point Service

Transmission Pricing Elements

KEMA Consulting

November 2002
## 2. Pricing in Unbundled Industry / Transmission (2)

<table>
<thead>
<tr>
<th>Cost Allocation Criteria</th>
<th>Cost Concept Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Path Model</td>
<td>Average</td>
</tr>
<tr>
<td>Post Stamp Model</td>
<td>Marginal</td>
</tr>
<tr>
<td>MW - Miles Model</td>
<td>- Long Run</td>
</tr>
<tr>
<td>Locational Pricing</td>
<td>- Short Run</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>– UK (Investment Cost Related Pricing)</td>
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<tr>
<td>– Australia (Cost Reflective Network Pricing)</td>
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<tr>
<td>– Germany, the Netherlands</td>
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<tr>
<td>– Norway</td>
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<tr>
<td>– USA</td>
<td></td>
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<tr>
<td>– USA, Germany (the old Network Pricing Regime)</td>
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</tbody>
</table>
2. Pricing in Unbundled Industry / Distribution and Retail

Cost Categories
- Depreciation
- Return on Assets
- Operation and Maintenance
- Electricity Purchase
  - Capacity
  - Energy

Cost Centres
- Common Service (Intermediate)
- Distribution Voltage MV
- Distribution Voltage LV
- Capacity Purchase
- Energy Purchase
- Retail Service
- Connection

Functional Cost Aggregation
- Demand Dependent Cost
- Energy Dependent Cost
- Customer Dependent Cost

Allocation to Electricity Customer Groups
- MV Industrial
- LV Industrial
- LV Domestic
- Connection Fee
3. Types of Price Control/ Overview

A number of models for regulatory price control exists

- rate or return regulation
- price cap regulation
- revenue cap regulation
- performance based regulation

Incentive regulation
3. Types of Price Control / Comparison (1)

Rate of Return and Cap Regulation provide different types of incentives and treatment of profit

**Rate of Return Regulation**

- Revenue/price follows strictly costs
- Frequent regulatory reviews avoid any substantial deviation between actual cost and actual revenue

**Cap Regulation**

- Decouple cost from revenue / price
- Allow the companies to retain intermediate profits

- How to design the efficiency carry over and reestablishment of price control?
- How to set up the productivity improvement targets?
3. Types of Price Control / Comparison (2)

Incentive regulation mimics the competitive market behaviors and provide better incentives for cost reduction. Additional arrangements regarding quality of service necessary.

<table>
<thead>
<tr>
<th>Rate of Return</th>
<th>Incentive Based Regulation</th>
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</thead>
<tbody>
<tr>
<td>• Guaranteed returns</td>
<td>• Incentive to cut costs</td>
</tr>
<tr>
<td>• Predictable</td>
<td>• Greater customer protection</td>
</tr>
<tr>
<td>• Transparent</td>
<td>• Risk of windfall profits</td>
</tr>
<tr>
<td>But</td>
<td>But</td>
</tr>
<tr>
<td>• No incentives to cut costs</td>
<td>• Quality of Service could be diminished</td>
</tr>
<tr>
<td>• Gold plating</td>
<td>• Less transparent</td>
</tr>
<tr>
<td>• Intrusive</td>
<td></td>
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</tbody>
</table>

Supplementary regulatory control over the quality of service necessary.
4. Determinants of Price Control (1)

The price controls covers the establishment of initial price and the price adjustment in time

\[ P_t = P_0 \times \text{Adjustment Coefficient} \]

**Initial pricing options**
- Lenient cost plus
- Strict cost plus
- Standard costs
- Standard efficient costs
- Competition

**Price adjustment options**
- Annual review
- Performance based rate-making
- Indexation
4. Determinants of Price Control (2)

Establishment of price control based on incentives requires regulatory discretion on a number of elements

- Initial Price Establishment
  - Assets Valuation
  - Return on Assets
  - Operation and Maintenance Cost
- Choice of Regulatory Lag
- Choice of Inflation Indicator
- Determination of X Factors (productivity improvement)
- Volume Adjustment Factor
- Benefit Sharing
- Network Losses / System Service

Price Adjustment
5. Benchmarking / Role

Initial Price Setting

<table>
<thead>
<tr>
<th>Lenient Cost Plus</th>
<th>Strict Cost Plus</th>
<th>Standard Costs</th>
<th>Standard Efficient Costs</th>
<th>Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>„Gentlemen’s Agreement“ to keep low costs</td>
<td>Regulatory Cost Validation</td>
<td>Benchmarking to identify average of standard costs</td>
<td>Benchmarking against efficient model to optimise costs</td>
<td>Competitive pressure for cost reductions</td>
</tr>
</tbody>
</table>

Benchmarking is crucial for establishment of Incentive Regulation and Efficiency Measurement
5. Benchmarking / Methods

A number of different benchmarking methods exists. The regulators prefer total frontier methods.
5. Benchmarking / DEA Plus Sliding Scale

Norway applies revenue cap with profit sharing and benchmarking for network regulation (DEA for distributors and direct comparison for Statnett with Svenska Kraftnät)

**Cap and Collars on Return on Capital**

- **Clawback from Companies to Customers**
- **Clawback from Customers to Companies**
- **Allowed Return**
- **Actual returns can fluctuate within the band without clawbacks**

**Efficiency Improvement Factor X**

- General no-utility specific component
- Weighted average utility specific component

- X min = 1.5%
- X max = 4.5%

**Time**

- 97
- 98
- 99
- 00
- 01
6. International Experience

International comparisons show a number of different regulatory approaches. UK, Norway, the Netherlands, Spain apply incentive regulation.

<table>
<thead>
<tr>
<th>Competition</th>
<th>Standard Efficient Cost</th>
<th>Standard Costs</th>
<th>Strict Cost Plus</th>
<th>Lenient Cost Plus</th>
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<tr>
<th>Price Adjustment Mechanism</th>
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<tr>
<td>Annual Review</td>
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<tr>
<td>Performance Based Ratemaking</td>
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<tr>
<td>RPI-X</td>
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<tr>
<td>Competition</td>
</tr>
</tbody>
</table>

- UK
- Spain
- Netherlands
- Norway
- USA
- Belgium
- Germany
- Luxemburg
7. Price Control Issues in CEE (1)

- Vulnerability to political and industrial influence (independence of regulator? Life line tariffs? Cross Subsidizing?)
- Regulator price control and reconciliation of sector revenue requirements
- Requirements for Uniform Final Consumer Prices
- Managing transition process from Single Buyer to Open Access (PPA and stranded cost issues?)
- Establishment of price control and incentive regulation (Price/Revenue cap? / Profit Sharing Regulation? How to do that?)
- Establishment of allowed return (Weighted Average Cost of Capital? Decoupling the cost from revenue / prices?, Treatment of intermediate profits? Sliding scale and clawbacks?)
Usually the allowed regulatory profit is determined as Weighted Average Cost of Capital (Application in UK, the Netherlands, Bulgaria, Slovenia etc.)

Cost of Equity

Equity Share

Cost of Debt

Debt Share

Taxes

WACC

- How to measure cost of equity and debt?
- What is the optimal level of capital structure?
7. Price Control Issues in CEE (3)

Final Consumer Price = Cg + Cpp + Css + Ct + Cso + Cd + Cs

Single Buyer ➔ Regulatory Control

Cg – Generation Cost
Css – System Service Cost
Ct – Transmission Network Service Cost
Cpp – Market Operation Cost
Cso – System Operation Cost
Cd – Distribution Network Service Cost
Cs – Retail Service Cost

Final Consumer Price = Cg + Cpp + Css + Ct + Cso + Cd + Cs

Open Access ➔ Regulatory Control

• What if the final consumer prices are “politically” controlled?
• What if generation cost are above market level?
Integration of incentive price control and price increase requirements. Possible gradual convergence path to reconcile the introduction of the new price control and the exiting price levels.

- Cost Reflective Revenue
- Cost Reflective Revenue + CPI
- Cost Reflective Revenue + CPI - X
- Current Allowed Revenue
- Convergence Path
8. Setting Up of Regulatory Process

The energy regulators will face a number of challenges in its work. Plan for establishment of regulatory framework and regulatory strategy necessary.

1. Identification of regulatory issues (separate for regulated service business)
2. Decision ranking based on regulatory burden
3. Data requirements derived from issue analysis
4. Design decision making process
5. Sequence analysis
6. Work load analysis (time scales and resources required)
7. Develop time path and derive action plan
9. Summary

- Incentive forms of price control encourage companies to reduce cost and increase efficiencies
- Price design for each functional level in the system necessary
- The application of incentive regulation for price control should be balanced with parallel measures for guarantee quality of supply
- Proper measures for managing transition issues – important to bridge “status quo” and “new world” (revenue requirements, stranded cost etc.)
- Regulatory strategy and plan for establishment of regulatory control - crucial prerequisite for successful regulation
THANK YOU FOR LISTENING AND DISCUSSION

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