Theory, principles and institutions in energy regulation

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Energy Regulators Regional Association
The Energy Regulators Regional Association (ERRA) is a voluntary organization comprising of independent energy regulatory bodies primarily from Europe, Asia, Africa, Middle East, South and North America.

**Purpose & Objectives**

✓ To improve national energy regulation in member countries;
✓ To foster development of stable energy regulators with autonomy and authority;
✓ To improve cooperation among energy regulators;
✓ To facilitate the exchange of information, research, training and experience among members and other regulators around the world.
ERRA Members

33 Full Members:

Albanian Energy Regulator Authority
Public Services Regulatory Commission of Armenia
E-Control, Austria
Tariff (Price) Council of Azerbaijan
Bhutan Electricity Authority
State Electricity Regulatory Commission of Bosnia and Herzegovina
Energy and Water Regulatory Commission of Bulgaria
Electricity Sector Regulatory Agency of Cameron

Croatian Energy Regulatory Agency
Energy Regulatory Office of the Czech Republic
Estonian Competition Authority
Georgian National Energy and Water Supply Regulatory Commission
Hungarian Energy and Public Utility Regulatory Authority
Committee on Regulation of Natural Monopolies, Protection of Competition and Consumer Rights of Kazakhstan

State Agency for Fuel and Energy Complex Regulation of Kyrgyzstan
Public Utilities Commission of Latvia

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National Commission for Energy Control and Prices of Lithuania
Energy Regulatory Commission of Macedonia
National Energy Regulatory Agency of Moldova
Energy Regulatory Commission of Mongolia
Nigerian Electricity Regulatory Commission
Authority for Electricity Regulation of Oman

Energy Regulatory Office of Poland
Romanian Energy Regulatory Authority
Federal Antimonopoly Service of the Russian Federation
Electricity and Co-Generation Regulatory Authority of Saudi Arabia
Energy Agency of Serbia
Regulatory Office for Network Industries of Slovakia
Energy Market Regulatory Authority of Turkey

National Electric Power Regulatory Authority of Pakistan
Palestinian Electricity Regulatory Council

Regulatory and Supervisory Bureau for Electricity and Water of Dubai, UAE

10 Associate Members:

Azerbaijan Energy Regulatory Agency
Regulatory Commission for Energy in Federation of Bosnia and Herzegovina
Regulatory Commission for Energy of Republika Srpska, Bosnia and Herzegovina
ERERA: ECOWAS Regional Electricity Regulatory Authority
Gas Regulatory Authority of Egypt

Public Utilities Regulatory Commission of Ghana
Energy and Mineral Regulatory Commission of Jordan
Energy Regulatory Office of Kosovo*
Peru’s Regulatory Agency for Investment in Energy and Mining
National Association of Regulatory Utility Commissioners, USA

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.
ERRA Main Activities (1)

- **Standing Committees** with detailed work plan and deliverables (case studies, issue papers, etc.):
  - Licensing/Competition Committee
  - Tariff/Pricing Committee
  - Customers and Retail Markets Working Group
  - Chairmen Meetings

- **Topical Workshops** (Water, Gas)

- **Energy Investment & Regulation Conference** (since 2001)
  - Next: September 23-24, 2019 in Riga, Latvia

- **Website** – [https://erranet.org](https://erranet.org) (Library, Podcasts)
## ERRA Training Modules

### Electricity and gas markets
- EU energy policy fundamentals and Regulatory implications
- From regulated to liberalized markets in electricity
- Economics of competitive markets
- Regulation of electricity networks – access rules and pricing
- Regulatory tools for reviewing and assessing capex submissions
- Ancillary services and balancing markets and procurement procedures

### Market Monitoring and integration
- Concepts and Implementation Stages of the EU target model, Framework Guidelines and Network Codes
- Market power in electricity generation and supply
- Gas supply and restructuring of Gas markets in Europe
- REMIT Regulation
- Cross-border arrangements and market integration
- CACM Regulation

### Renewables
- Economics of Renewable Support Schemes
- Global and European Trends in RES deployment – RES investments from a financing perspective
- RES support auctions – International best practice
- Distributed generation – regulatory perspective and impacts on network pricing
- TSO Roles in RES Integration: System-Wide Impacts of RES-E
Energy sector reform

• Most countries started reforming their sectors in the 90s
• Most reforms motivated by the poor performance of the public model, where State=policy maker, regulator, investor, service provider.
• Reforms were characterized by:
  • Unbundling vertically-integrated utilities, introducing competition
  • Privatizing segments of the supply chain to increase private sector participation
  • Introducing independent regulators
Objectives of regulation

• Why do regulators exist:
  • Economic efficiency – prevention of inefficient market outcomes?
  • Customer “protection”? – varying interpretations protection
  • Reasonable prices and fair returns?
  • Increased investor confidence, stability of regulatory framework?
  • Other reasons (environmental compliance, technical and safety standards...)?
Main regulatory models

Advisory model

Ministry department

Independent

Regulator

Ministry

Regulated sector

TSO/ MO

DSO

IPPs?

Regulator

Ministry

Regulated sector

TSO/ MO

DSO

IPPs?

Regulator

Ministry

Regulated sector

TSO/ MO

DSO

IPPs?
Independence from whom?

Source: ERRA study on regulatory independence (2008)
Independent regulation

- The independent regulation model limits political interference in business decisions and minimizes regulatory risk (long-term capex investments require stable policy and regulations)
- What kind of independence (ERRA, 2008)
  - Political/functional independence
    - Appointment of knowledgeable and expert board members, unrelated to political parties or government
  - Legal independence
    - Regulator has sufficient discretion and is independent of laws governing the regulatory process
  - Financial independence
    - Regulator does not depend on a governmental budget approval, has a separate budget based on fees charged to market players
  - Social independence
    - Regulatory credibility in the eyes of the public. Consideration of social concerns
Regulation in practice (ERRA study 2015)

Political/functional independence
Q: Is the regulator distinct and functionally independent from any other public or private entity?

- Yes: 92.3%
- No: 7.7%

Independence from the sector
Q: Are there any rules which prohibit the regulator to have formal employment relationships with the sector while holding their position?

- Yes: 92.3%
- No: 7.7%
Regulation in practice (ERRA study 2015)

Political/functional independence

Q: *Who appoints the head of the regulator?*

![Bar chart showing the percentage of responses to the question. The chart indicates the following:
- 30% of respondents selected “The parliament.”
- 10% of respondents selected “The president of the country.”
- 20% of respondents selected “The government collectively.”
- 10% of respondents selected “One or two ministers.”
- 5% of respondents selected “A complex mix of the parliament and gov’t.”
- 5% of respondents selected “The members of the management board.”
- 0% of respondents selected “Other.”]
Political/functional independence

Q: What are the formal obligations of the regulator vis-à-vis the gov’t?

- There are no formal obligations (0%)
- Presentation of an annual report (10%)
- Presentation of an annual report for approval (5%)
- Regulator assists implementation of energy policy (25%)
- Regulator fully accountable to the government (15%)
- Other (5%)
Regulation in practice (ERRA study 2015)

Financial Independence

Q: Does the NRA have a separate budget?

Financial Independence

Q: What are the sources of finance of the regulator?
EU policy on energy regulators

Directive 2003/54/EC

- Requires that Member States designate at least one regulatory authority
- NRAs must be independent from the interests of the electricity industry
- NRAs with at least the following competences:
  - Transparent and fair calculation and allocation of cross-border capacity
  - Ensuring non-discriminatory access to infrastructure, promote efficient markets
  - Ensuring unbundling of accounts, eliminating cross-subsidies
  - Setting connection and use of system tariffs

Directive 2009/72/EC

- NRAs shall be legally distinct and functionally independent from any other public or private entity
- Regulatory staff act independently and do not seek or take direct guidance from any government or other public or private entity
- NRAs must have separate annual budget allocations and independence in execution.
- Board members cannot be relieved of duty unless in breach of Directive or due to misconduct under national law
One of main tasks: Tariff regulation

Rate-of-return regulation

- Regulator reviews utility assets to determined their usefulness
- Regulator reviews utility expenses to determine they’re necessary and prudent
- After completing the first two steps regulator determines rate of return the utility should be allowed to earn on the capital invested
- Low incentives for efficiency savings

Cap regulation

- Regulator sets a maximum level of revenues that a company is allowed to collect over a “regulatory period”
- Companies allowed to make profits if actual costs for providing regulated service below approved revenues
- Higher incentives for efficiency gains/reduces asymmetry of information
- Requires more monitoring for quality of supply/service
Where and when to Regulate

Pre-transition
Vertical Integration
Full regulation
Monopoly

Transmission
unbundling
TPA
Competition

Wholesale
competition
IPPs entering the market

Wholesale and retail competition
High number of IPPs and suppliers

G G G

TSO/MO

DSO

Supplier

G G G

TSO/MO

DSO

Supplier

G G G

TSO/MO

DSO

Supplier

G G G

TSO/MO

DSO

Supplier

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DSO

Supplier

Wholesale and retail competition
High number of IPPs and suppliers
What prices to set? MC vs ATC pricing

- The socially-optimal level of production would be where the Marginal Benefit (represented by Demand-curve) is equal to marginal costs.
- If price is set to equal MC then Consumer Surplus increases.
- But, at that level of production, ATC are higher than the price, meaning the firm experiences a loss;
- No firms will sustain production in this market
- Subsidies would be required to offset the loss
What prices to set? MC vs ATC pricing

- Price set at ATC covers fixed costs
- $q_{ac}$ reduces compared to the socially-optimal level of output
- Deadweight loss is generated – inefficient pricing
Inefficient but still better off

Unregulated monopoly

ATC-pricing

Economic profit

DWL

ATC

MC

MR

D

q

p

q_m

q_{so}

p_m

p_{so}

p_{ATC}

q_{ATC}

CS

ERA Tailor-made Training Course: Principles of Tariff Regulation
December 2-4, 2018 • Muscat, Oman
Regulatory challenges in pricing

Main challenge for regulators: The appropriate level of capex to be recovered from regulated tariffs

– Asymmetry of information (regulated entity is better informed about the level of capex and the associated cost)
– Incentive to inflate costs (so as to gain on the difference between the approved and actual cost)
– Incentive to increase total investments (also referred to as “gilding” – occurs when there are differences between allowed and actual cost of capital - WACC)
THANK YOU
FOR YOUR ATTENTION!

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