Current Issues in Regulation:

Droughts, Renewables, Investments and You

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Director and Gunter Professor

Public Utility Research Center
University of Florida
Question

• How much should each of you pay to other citizens of Brazil for consuming water?
Answer

• Negotiation between Sao Paulo and Rio de Janeiro implied a price for water
  – One city paid another to consume water

• Problems
  – Represented political value, not value to consumers, businesses, hospitals, schools...
  – Future customers omitted
Outline

• Water regulation under severe droughts
• Renewable energy incentives
• Balancing cost of capital and service expansion
• Moving “forward”
• About PURC
Water Regulation in Drought Conditions

- U.S. experiences

- Policy options
U.S. Experiences

- Resolved with lawsuits and/or command and control
- Decreased supply treated as engineering and political problems
  - Rationing
  - Name and shame
- Water markets in California
  - But crises leads to political control
- Lesson from 1973 oil embargo
Policy options

• Prices reflecting economic value
  – Create mechanism for free trade
    • Property rights
    • Distribution
    • Prices
  – Assist the economically vulnerable
  – Minimum price for future generations
  – Resist political interference
    • Prices rise!
    • Favoritism in supply

Droughts
Question

• What is ARSESP learning from the current situation?
Energy Triangle

Economic Growth And Development

Does this represent:
• Tradeoffs?
• Aspirations?

Energy Access & Security

Environmental Sustainability

Where is Brazil?
Energy Triangle

Another view...

How can we fill the triangle?

The power of “and”

Energy Access & Security

Environmental Sustainability

Economic Growth And Development

From World Economic Forum

“Leadership in Infrastructure Policy”
Question

• What should Brazil try next regarding renewable energy?
Energy Triangle and Energy Architecture

What levers can we use?
- Institutions
- Resources
- Markets

From World Economic Forum
Renewable Energy

Marginal Cost of Abatement

From Ted Kury (2014)
Implications

- Low and levels of abatement have increasing returns to scale
- Mid levels of abatement add few costs
- High levels of abatement have sharply decreasing returns to scale

- But...
The curve is unstable: Effects of higher natural gas prices...

From Ted Kury (2014)
...or of drought

From Ted Kury (2014)
And it responds to customers

From Ted Kury (2014)
Challenges with Renewables

• Technology
  – How to maintain grid stability?

• Institutional
  – Who is responsible for supply and for stability?
  – How to align authority and accountability?

• Economic
  – What are the incentives?
Grid Output

• Metaphor
  – Multiple suppliers of diverse kwhs
  – Must blend in a way that gives kwhs of a particular stability

• Who decides what is blended and how?
Mechanisms

• Command and control
  – Renewable Portfolio Standards
    • Visible and explainable
    • Manageable grid
    • Few economics
  – Targets (EPA)
    • Visible and explainable, but complex
    • Manageable grid (depends on implementation)
    • Economics unclear, but appear weak
Mechanisms (2)

• Customer control
  – Feed-in tariffs
    • Customers supply when they want
    • Manageable grid if small
    • Economics depend upon prices and responsibilities

• Supply competition
  – Complex and possibly costly
  – Who is responsible for “blend”? 
  – Economics
    • Who optimizes and on what rules?
    • “Optimum” depends on marginal benefits
Mechanisms (3)

• Pricing emissions
  – Complex and hard to explain
  – Manageable grid
  – Economics
  • Suppliers can optimize
  • “Optimum” depends on marginal benefits
Mechanisms for Renewable Energy

- Value and cost
- Incentives vs. command and control
- Mechanisms
Tradeoffs

Where is Brazil?

A? Opportunities for economical gains

B? Easy work is done. Progress is more expensive

C? Small, costly gains

Costs for Energy

High

Low

Environmental Improvement

Renewable Energy

Public Utility Research Center
Warrington College of Business Administration
UNIVERSITY of FLORIDA

www.purc.ufl.edu
“Leadership in Infrastructure Policy”
Question

• What facts should ARSESP discover and/or communicate to ensure good decisions?
Balancing Capital Cost and Expansion

• Expansion requires investment
• The cost of the investment depends upon...
  – Investment tradeoffs
  – Efficiency
  – Risk
Which is the greatest hurdle?

- Investment tradeoffs
- Inefficient utility
- Investment risk
Utility will spend $700,000 in OPEX.

With $300,000 in CAPEX, the utility claims it can provide

3000 new connections OR

Produce an increase in reliability, OR

Be at another point on the Frontier (A, B, or C).

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<th>Change in Reliability</th>
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<td>Number Of New Connections</td>
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Authority Issues Facing Regulators

Who decides where to expand networks?
Who funds network expansion?
Who determines when prices are financially sustainable?
Who monitors quality & enforces rules?
Who sets quality standards?
Who decides environmental requirements?

Change in Reliability

Investment and Cost

Number Of New Connections

5000
4000
3000
2000
1000

From Sanford Berg
www.purc.ufl.edu
"Leadership in Infrastructure Policy"
Cognitive Conflicts

✓ “Cognitive” conflicts are disputes over factual matters: “What is?”

✓ For example, How many new connections can be made with $300,000?

✓ Technical disagreements reflect cognitive conflicts. Such conflicts can be reduced through comprehensive data collection and analysis.
Factual Issues Facing Regulators

With $300,000 in CAPEX, NGO claims the utility can provide

5000 new connections
OR
Improve reliability even more,
OR
Be at another point on the Frontier (D, E or F).

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From Sanford Berg
Investment and Cost

Regulator: Conflict Resolution--Facts

✓ Benchmarking Studies:
  – Input Data (physical and monetary)
  – Output Data (connections, kwhs delivered, continuity, quality)

✓ Financial Sustainability Studies
  – Income Statements
  – Balance Sheets
  – Cash Flow Statements

Examine Incentives and Estimate time to reach “the” frontier
Efficiency Issues Facing Regulators

The issue might be framed as: Which Target: A? B? C?

Trade-off between service and environment

Customers Served

Environmental Improvement

5m

4m

3m

2m

1m

A

B

C

From Sanford Berg

www.purc.ufl.edu

“Leadership in Infrastructure Policy”
Efficiency Issues Facing Regulators

The issue might be framed as:
Which Target:  A? B? C?

But what if the utility is inefficient?
For the same money, it could be at D, E or F!
Impact of Efficiency

- Utility has annual costs of $100 million

- 1% improvement in efficiency gives $1 million in new cash flow
  - Get more for same cost
  - Less need for external financing
How to impact efficiency

• Incentives that reward utility ...
  – ...for using private information...
    • What it knows that the regulator does not know
  – ...to improve outcomes for consumers.

• Methods
  – Price or revenue caps, benchmarking, targets, etc.

• All methods increase the cost of capital
Cost of capital

• The opportunity costs of those that provide capital for the utility
  – Private investors
    • risk-adjusted global cost of money
  – Taxpayers
    • Investment and consumption alternatives
    • Political consequences
  – Multilateral institutions
    • Alternative “investments”
    • Political and donor consequences
Estimating cost of capital

- Benchmark: Risk-adjusted global cost
- WACC (weighted average cost of capital)
  - Debt plus equity
- CAPM (capital asset pricing model)
  - Risk-free cost of money + risk cost
- DCF (discounted cash flow)
  - Returns of comparable companies
What affects cost of capital?

• Risk – probability of loss...
  – Systemic risk – common to all similar firms
  – Business risk – specific to this firm
  – Political risk – due to political instability and/or institutional weakness

• Examples
  – Political interference
  – Regulatory discretion (unpredictable “principals”)

Investment and Cost
Bottom line...

• Provide sufficient cash flow for desired investment
  – How much investment?
    • Tradeoffs and efficiency
  – Where can it come from?
    • Efficiency and risk (capital markets)
  – How does policy affect risk?
    • Incentive regulation increases risk
    • Unstable policy increases risk
Why are these problems so difficult?

• The engineering, economics, finance, etc. are complex, but well known
## Technical vs. Adaptive Challenges

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<th>What’s the work?</th>
<th>Who Does the Work?</th>
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<td>Technical</td>
<td>Apply current know-how</td>
<td>Authorities</td>
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<tr>
<td>Adaptive</td>
<td>Learn new ways</td>
<td>The people with the problem</td>
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From Heifetz and Linsky, 2002 [website]
Adaptive Regulation

Developing fresh perspectives and knowledge about the future, while holding in trust the wisdom of the past.

Three juxtapositions

• Not *Best* practice, but *Next* practice
• Not *What*, but *Why*
• Not *Leading*, but *Leadership*
Not *Best* practices, but *Next* practices

- Best practice is imitation, or “borrowing knowledge”
- Best practice has a *backward look* connotation
- Next practice is needed when we are going into areas where no one has gone before
- What are our next practices going to be, and how are we going to learn from them?

— What will you try next?

Your cases

• In groups of 2-3...
  – What would you like your organization to try that has not been done before?

• Reports
Not What? but Why?

• Next steps need foundation, basic principles, and values
• Ask “Why have certain practices or experiments been successful or unsuccessful?”
  – Analyze underlying priorities and context*
  – Learn, keep what is important, and discard what holds us back*
• This reasoning will give us something to hold on to as we move towards the future
• And help us design those next steps

*Collins, 2009. How the Mighty Fall and Why Some Companies Never Give in
Your cases

• In groups of 2-3...
  – What is your organization from what it is doing?
  – How could learning be improved?

• Reports
Not *Leading*, but *Leadership* 1/2

- A traditional concept of authority/leader is based on someone who offers:
  - Direction (where)
  - Order (how)
  - Protection (to get the work done)

- There is no “follow me” in an unknown/changing environment
Not *Leading*, but *Leadership* 2/2

- Leadership mobilizes people to tackle difficult and often ambiguous problems and circumstances
  

- Leadership in a changing environment is about helping people understand that we don’t have the answers to our questions... in fact, we may not even know what questions to ask...

- Stirring and Steering
Your cases

• In groups of 2-3...
  – How can you stir and steer?
  – Mobilize people?

• Reports
About You

Framework

What is important?

How can we do it?

What is possible?

• Politics
• Negotiation
• Facilitation

• Leading
• Management
• Administration

“Sweet Spot”
• Does one exist?
• Can we find it?

• Engineering
• Economics
• Finance
• Law
Conclusion

“The good leader is he who the people revere. The great leader is he who the people say, ‘We did it ourselves.’”

Lao-Tzu

This is what you have done!!!
✓ PURC is an internationally recognized academic center dedicated to industry research and to providing training for industry and regulatory professionals

✓ PURC was founded in 1972 and is located in the Warrington College of Business Administration at the University of Florida

✓ Our aim: to enhance the understanding of issues confronting public utilities and regulatory agencies through:
  ✓ Conferences, seminars, training programs, research and other services covering the energy, telecommunications and water sectors, as well as the development of leadership in infrastructure policy
  ✓ Preparing professionals for successful careers in infrastructure industries
PURC Mission:

✓ *Expand the body of knowledge* in public utility industry structure and practices, regulation, market reform, and infrastructure operations

✓ *Teach the principles and practices* that support effective utility policy, operations, and regulation

✓ *Provide ongoing professional development* for industry and regulatory professionals shaping emerging regulatory and industry business and value paradigms
PURC Vision:
Expanded deployment and efficient delivery of utility services in all countries. We realize this vision by providing innovative and balanced research, by teaching the core principles and best practices of utility regulation and management and by offering a forum for the free exchange of ideas.

Research: e.g. carbon emissions, utility benchmarking and broadband

Education: e.g. PURC/World Bank International Training Program on Utility Regulation and Strategy

Service: e.g. training abroad and university collaborations
PURC Training Services (1)

✓ Standing Programs:

✓ **PURC/World Bank International Training Program on Utility Regulation and Strategy**, Gainesville, Florida every January and June
  ✓ Over 3500 professionals from 152 countries

✓ **Advanced International Practices Program** comprised of three different courses, Gainesville, Florida, late every July – early August:
  ✓ Energy Pricing Course
  ✓ Benchmarking Infrastructure Operations Course
  ✓ Next Generation Networks Course

✓ Leadership Workshops

✓ Online Courses
PURC Training Services (2)

✓ Customized Services:

✓ Customized trainings tailored to your specific needs. These services can be delivered in-country or in the US. The topics include, but are not limited to:

✓ Energy Pricing
✓ Renewable energy
✓ Benchmarking
✓ Next generation networks
✓ Etc.

✓ Leadership development programs
PURC Research Power

- 10 Faculty and Faculty Affiliates
- 11 Senior Research Associates
- 10 Research Associates
- 14 Senior Fellows
- 25+ Visiting Scholars
- 50+ International Research Partners

(e.g., World Bank, USAID, NARUC, London Business School, Inter-American Development Bank, Center for International Business Education and Research, Cambridge Leadership Associates, and more)
The Body of Knowledge on Infrastructure Regulation

NEW

LEADERSHIP IN REGULATION

NEW

TRANSLATED GLOSSARIES

NEW

RENEWABLE ENERGY AND ENERGY EFFICIENCY

RECENT ADDITION

REGULATION OF STATE-OWNED ENTERPRISES