Non-Traditional Regulation: A Survey

Vermont Public Utility Commission

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Stage-Setting: The Challenge

Aligning the private interest with the public interest
“All regulation is incentive regulation.”*

• The trick is to understand how the incentives work

A rate case produces a “revenue requirement”, which is then divided by sales (billing determinants) to determine prices.

The actual revenue a utility receives is a function of sales:
- Revenue = Sales * price

Two powerful incentives:
- To reduce costs
- To increase sales, even when societally uneconomic (because marginal cost is almost always less than average cost, esp. for network delivery service)
  - This is the “throughput” incentive
Tackling the Throughput Incentive: Revenue Regulation

• Revenue regulation (or “decoupling”):
  • Breaks the link between sales and revenues
    • This is about revenues, not earnings
      • An important program design distinction
  • One incentive now: reduce costs
    • Lower costs = higher net income
  • Indifference to sales levels, lower or higher
    • Whatever the cause: weather, economic factors, programmatic EE, other DER, etc.
Driving Preferred Outcomes: Performance Incentive Mechanisms

• Financial rewards and penalties (PIMs) associated with the achievement of specified outputs and outcomes
  • Generally agnostic to means of achievement
• Typically overlaid on revenue-based regulatory regimes
  • The rewards and penalties affect total “allowed” (or “target” or “authorized”) revenues
Some Performance Metrics

- Reliability
- Customer service
- Power plant performance
- Safety
- Energy efficiency
- Environmental achievements
- Other?
Revenue Regulation and PIMs: the Structural Elements of PBR

• How is the utility business model changing?
  • Drivers?
  • Disruptive technology?
  • Empowered customers?
• Can PBR be structured to harness disruption while providing utilities with flexibility to achieve the measurable performance criteria?

How can the private interest be best aligned with the public?
Examples of Performance-Based Regulatory Regimes

Domestic and International
United Kingdom: RIIO

- October 2010: Ofgem (UK regulator) introduced new regulatory framework for energy network companies: gas, electric distribution, & electric transmission
- RIIO: Revenues = Incentives + Innovation + Outputs
  - Implemented in 2013
  - Replaced 23 years of RPI-X revenue-based regulation
- RIIO is also a revenue-based regulatory model
- Overlaid with an incentive-based framework for achievement of specified outcomes
  - Performance in creating a sustainable energy sector and delivering long-term value for money network services
  - Those that deliver outputs, innovation, and associated lower costs have the potential to earn above normal returns and those that don’t deliver earn below normal returns.
UK: RIIO

- RIIO is intended to remove any bias favoring capital expenditures (CAPEX) over operational expenditures (OPEX)
  - Referred to as “TOTEX” (total expenditures)
- Focus is on outputs rather than simply new infrastructure
- Extension of revenue-control term from 5 years to 8
  - Recognition of the long-term nature of the investments necessary for a low-carbon transition.
• Outputs relate to:
  • customer satisfaction;
  • network safety;
  • network reliability;
  • new connections;
  • environmental impacts; and
  • social obligations
UK: RIIO

Constraint set up front to ensure:
- Timely and efficient delivery
- Network companies are financeable
- Transparency and predictability
- Balance between costs faced by current and future consumers

Deliver outputs efficiently over time with:
- 8 yr control
- Rewards/penalties for delivery
- Upfront efficiency rate

Technical and commercial innovation encouraged through:
- Core price control incentives
- Option to give third parties a greater role in delivery
- Innovation stimulus package

Outputs set out in clear ‘contract’, reflecting expectations of current and future consumers
# RIIO: Metrics

## Electricity Distribution Networks Operators

### Customer

#### Safety

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*No formal targets were set for environmental outputs. The performance score reflects the change from the previous year.

† Target score should be below 8.00.
Thirty-six states have adopted regulatory approaches to promote utility investment in energy efficiency: decoupling, lost-revenue adjust mechanisms ("LRAM"), or performance incentives.
California: Pacific Gas & Electric

- Revenue regulation of network services:
  - Non–weather-adjusted actual revenues compared with authorized (“target”) revenues plus annual attrition (and exogenous, e.g., tax) adjustments
    - Over- or under-collections trued-up annually
  - Authorized revenues, based on future test year, established through a general rate case every 3 years
    - Authorized revenues are also established for the two years following the future test year.
  - Annual “attrition case” measures changes in costs and adjusts authorized revenue
California: Pacific Gas & Electric

- Revenue regulation of network services (cont’d):
  - Collected revenue tracked through five balancing accounts:
    - Distribution Revenue Adjustment Mechanism
    - Public Purpose Program Revenue Adjustment
    - Nuclear Decommissioning Adjustment Mechanism
    - Utility Generation Balancing Account
    - Regulatory Asset Revenue Adjustment Mechanism
  - Surpluses/deficits amortized and refunded/collected in the next year
  - Applies collectively to all customer classes
    - Not reconciled by individual class or balancing account
- Energy procurement and FERC-regulated transmission service treated separately
- PIMs for EE
  - Rewards (or penalties) for achievement (or not) of savings targets
Idaho: Idaho Power Company

- IPC’s Fixed Cost Adjustment (FCA) mechanism compares authorized network revenue with weather-normalized sales
  - Annual reconciliation
  - Applies to residential and small business customers only
  - Company retains weather risk
    - Which means that customers retain the risk too
  - Authorized revenue adjusted by number of customers
    - I.e., rate case revenue requirement divided by # customers = RPC (average “revenue per customer)
    - RPC * actual # customers = authorized revenue$_{t+1}$
Idaho: Idaho Power Company

- FCA (cont’d):
  - Annual adjustments shared proportionately by residential and small commercial customers
- Energy costs recovered through fuel adjustment clause
- IPC is required to acquire all cost-effective EE
  - However, no performance incentives/penalties
- No other PIMs
Maryland: Baltimore Gas & Electric

- Revenue regulation mechanism compares actual distribution revenue to the authorized revenue, adjusted for the number of customers (revenue-per-customer, or RPC, approach), for each applicable rate schedule
  - Authorized revenue based on test year requirements and sales levels
  - Over- or under-collections are reconciled monthly
    - Adder/discount to base rates
    - No deferred true-ups
Maryland: Baltimore Gas & Electric

- Multi-year plan but no formulaic adjustments (other than RPC) in authorized revenues
- Changes in base rates through rate cases
- Power costs dealt with through fuel adjustment clause
- No PIMs for EE or other public policy objectives (yet)
Wisconsin: Wisconsin Public Service Company

- WPS Revenue Stabilization Mechanism (RSM) reconciles target marginal revenue per customer with actual marginal revenue per customer
- Authorized revenues established in rate case (future test year)
  - No annual adjustments for inflation, productivity, Z (exogenous), or K (special) factors
- Applies to all tariffs except large commercial and industrial
- Fuel costs recovered separately through an FAC
Wisconsin: Wisconsin Public Service Company

- RSM = total revenue for each tariff, excluding fuel costs, surcharges, credits, taxes, etc.
  - Forecasted rate year for authorized revenue
  - Described as “margin” because the recovery mechanism is a surcharge/credit on energy prices
    - Surcharges subject to hearing before going into effect
    - $14 million cap on total revenue change (+/-) from year to year. Overages borne by WPS.
- No EE PIMs for WPS (but there are for other WI utilities)
Massachusetts: National Grid

- Revenue regulation mechanism for National Grid compares authorized distribution revenue to actual distribution revenue
  - Annual adjustments in prices to collect authorized revenue
  - Adjustments made by customer class
  - Adjusted also for changes in distribution capital expenditures
    - Adjusted each year to account for actual capital expenditures in the previous year, net of depreciation expense in base rates
    - This “K” factor adjustment intended to reduce bias favoring CapEx over cost-effective OpEx
    - Capital expenditures subject to prudence review and capped at $170 million/year
Massachusetts: National Grid

- Energy costs for basic service customers, transmission costs, EE costs, and low-income assistance treated separately
- Authorized revenue also adjusted for 50% sharing of earnings in excess of allowed ROE
- Increases in allowed revenue capped at 3%/yr
  - Interim adjustments possible if deviation looks to exceed 10%
- PIMs for
  - Meeting EE savings targets (up to 5% of program costs)
  - Meeting service quality standards
Hawaii: Hawaiian Electric Co.

- Revenue regulation mechanism that compares actual distribution revenue to target revenue in each year
  - Target revenue is the authorized revenue for the last test year, adjusted for changes in O&M and rate base (i.e., annual attrition adjustments, à la PG&E)
    - Labor O&M adjusted for productivity
    - Non-Labor O&M adjusted according to cost index
    - Rate base adjusted for changes in plant-in-service, accumulated depreciation, contributions in aid of construction, & accumulated deferred income taxes
- Separate mechanisms for power and EE costs
Hawaii: Hawaiian Electric Co.

- Earnings Sharing Revenue Credit mechanism
  - To protect against excessive overall revenue collections
  - Sliding scale up to 90% customer share after 300 basis point change (+/-) in ROE
- Provisions for “K” factor adjustments related to capital investment (if beyond expectations) and other mid-course corrections
- EE provided by a third-party administrator, which is compensated according to performance
- No other PIMs, but the PUC is investigating incentives for superior performance in achieving the state’s clean energy objectives while meeting minimum reliability standards
China: T&D Revenue Regulation with PIMs

- State-owned enterprises:
  - T&D ("gridcos") are separate from generation
  - By 2020, generation subject to wholesale competition; some direct access retail competition already in effect
- Central regulator decreed that T&D be regulated on an “allowed revenue” basis, to be rolled out nationally in 2017
  - To increase incentives for gridco operational efficiency
  - Provincial pilots are developing outcome-specific PIMs for the gridcos, as overlays on the revenue regulation framework
China: T&D Revenue Regulation with PIMs

- PIMs:
  - Profitability and environmental performance have long been management performance criteria
  - New PIMs will include capital usage, reliability, service quality, EE/DSM, or other criteria such as “innovation”
  - Cost and investment controls and incentives:
    - Operations and maintenance expenses benchmarked and capped
    - Capital investments reviewed and set separately, to forestall investment that doesn’t serve load growth or reliability
    - Productivity and reduced investment savings accrued during the 3-year regulatory period shared with customers
New York
Reforming the Energy Vision

• Scorecard Metrics
  • On-going task force looking at this
• Earnings Adjustment Mechanisms
  • Peak reduction and system efficiency
  • Energy efficiency
  • Interconnection
  • Customer engagement and information access
  • Affordability (scorecard for now)
• GHG reduction?
Noted

- Revenue regulatory schemes are invariably applied only to the network portion of a utility’s business (or network and other specified capital investment)
  - That is, that component whose costs are largely fixed in the short run and don’t vary with changes in usage
- Power costs (if a utility is also a provider of power) are typically handled separately, often with a system of rewards and penalties that create strong incentives to manage those costs wisely
PBR: Some Design Considerations

- Timing of revenue adjustments
- Cost of money: rates applied to deferred accounts
  - Short-term debt rate, WACC, other?
- Caps on revenue/price impacts?
- Test Year: adjusted historic or future?
- Length of plan before full rate investigation
- Revenue adjustment mechanisms
  - Inflation, productivity, # customers, separate treatment of specified costs
- Allocation of deficits/surpluses
  - System-wide, by tariff or customer class, or. . .?
- Performance metrics?
  - What is the public interest and how is it advanced?
Some New Challenges

PBR and Beneficial Electrification
Beneficial Electrification

• Electrification: applying electricity to end-uses that would otherwise be powered by fossil fuels
• Beneficial electrification:
  • Reduces costs in the long term
  • Reduces environmental impacts
  • Enables better grid management

New York’s Reforming the Energy Vision (REV) process looks at these questions.
Opportunity Knocks for Beneficial Electrification

“Fewer Joules, More kWh”

Source: Vermont Comprehensive Energy Plan 2016
Measuring Beneficial Electrification: A PBR Metric?

• Distinguish from energy efficiency (EE), which is crucial but different
• EE goal: *Use fewer kWh to do a task*
• BE goal: *Use fewer joules – by using more kWh*
• Emissions efficiency (“Emiciency”) = Total CO₂ emitted by a project vs. alternatives

Is this another way to look at the Tier 3 question? How might a PBR plan be structured to advance this and other objectives?
4 Conclusion

A Few Observations
Some Observations

- Revenue regulation is shown in multiple jurisdictions to provide cost containment incentives to utilities
  - PIMs, esp. when overlaid on revenue regulation, can drive achievement specified outcomes
- Beware consequences of features intended to limit downside risks to consumers, as they also can limit the upside by diluting incentives for operational efficiency, cost containment, and innovation, e.g.:
  - Earnings sharing mechanisms
  - Separate cost/investment trackers
- Revenue regulation reduces/eliminates revenue risks associated with more economically efficient rate structures
- Public education and design processes are elements of successful non-traditional regulatory regimes
- LRAMs don’t solve the “throughput” problem
A plea
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org