Principles and Mechanics of Decoupling: A Brief Overview

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The Regulatory Assistance Project

China ♦ India ♦ European Union ♦ Latin America ♦ United States

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Essential Questions

- How do regulated monopolies make money?
- How can regulation be reformed so as to better align a utility's financial incentives with the public interest?

> "A utility's least-cost plan [should be] its most profitable course of action."
> --National Association of Regulated Utility Commissioners, 1989

Incentive Ratemaking

- "All ratemaking is incentive ratemaking. It rewards some patterns of behavior and deters others."
  - Peter Bradford, Chair, New York Public Service Commission, 1992
- The key is to understand what incentives a particular regulatory approach gives.

Utility Financial Structures Enhance Power of Incentives

- Production costs (fuel and contract power) vary with sales and, typically, are passed through to customers in one of several ways
  - Integrated utilities: fuel adjustment clauses
  - Competitive retail suppliers
  - Generally, as sales rise or fall, utilities don't make or lose money on these cost items
- But. . . non-production costs ("fixed" plant, some O&M, debt service) do not vary with sales in the short run
  - So, increased sales go right to the bottom line
  - Conversely, decreased sales come out of the bottom line
- *The effect may be quite powerful…*

Traditional Regulation

- In most jurisdictions, regulators only set *prices* for utility services
- Consequently, the *actual revenue* that a company collects depends on sales:
  - Revenue = Price * Units Sold
  - Utility makes money in two ways: cutting costs and increasing sales
    - Marginal cost is almost always less than marginal revenue
    - This is called the “throughput incentive”
- This means that changes in sales can have a powerful effect on profits

How Changes in Sales Affect Earnings: Distribution-Only Utility

	Revenue Change		Impact on Earnings		
% Change in Sales	Pre-tax	After-tax	Net Earnings	% Change	Actual ROE
5.00%	$9,047,538	$5,880,900	$15,780,900	**59.40%**	17.53%
4.00%	$7,238,031	$4,704,720	$14,604,720	**47.52%**	16.23%
3.00%	$5,428,523	$3,528,540	$13,428,540	**35.64%**	14.92%
2.00%	$3,619,015	$2,352,360	$12,252,360	**23.76%**	13.61%
1.00%	$1,809,508	$1,176,180	$11,076,180	**11.88%**	12.31%
0.00%	$0	$0	$9,900,000	**0.00%**	11.00%
-1.00%	-$1,809,508	-$1,176,180	$8,723,820	**-11.88%**	9.69%
-2.00%	-$3,619,015	-$2,352,360	$7,547,640	**-23.76%**	8.39%
-3.00%	-$5,428,523	-$3,528,540	$6,371,460	**-35.64%**	7.08%
-4.00%	-$7,238,031	-$4,704,720	$5,195,280	**-47.52%**	5.77%
-5.00%	-$9,047,538	-$5,880,900	$4,019,100	**-59.40%**	4.47%

Least-Cost Service Should be the Most Profitable

- The "throughput" incentive is at odds with public policy to supply electric power services at the lowest total cost:
  - inhibits a company from supporting investment in and use of least-cost energy resources, when they are most efficient,
  - encourages the company to promote incremental sales, even when they are wasteful
- Ratemaking policy should align utilities' profit motives with public policy goals: acquiring all cost-effective resources, whether supply or demand
- The utilities' throughput incentive promotes inefficient outcomes, even where:
  - there is no programmatic energy efficiency; and
  - even with third-party administration of energy efficiency programs.

Revenue-Sales Decoupling: What is it?

- Breaks the mathematical link between sales volumes and revenues
- Objective is to make revenue levels immune to changes in sales volumes
  - This is a revenue issue, not a pricing issue
  - Volumetric pricing and other progressive rate designs should not be changed because of decoupling
- Decoupling is not intended to decouple customers' bills from their individual consumption
  - They still pay unit-based prices
  - Their bills are higher when they use more, and their bills are lower when they use less
  - They retain the incentive to manage their usage cost-effectively

Purpose of Decoupling

- Utility profits no longer linked to sales, but to operational efficiency
- A key barrier to least-cost energy service – the threat to utility revenues from distributed resources (energy efficiency and combined heat and power) – is removed
  - It eliminates the throughput incentive and makes utility indifferent to energy efficiency and other distributed resources
- Decoupling allows for, and should be accompanied by, a strong commitment to investment in end-use energy efficiency
  - Energy efficiency is the cheapest, most abundant, and least environmentally harmful energy resource available
- Currently, decoupling is in place for electric and natural gas utilities in 28 US states

Revenue Decoupling: The Basic Concept

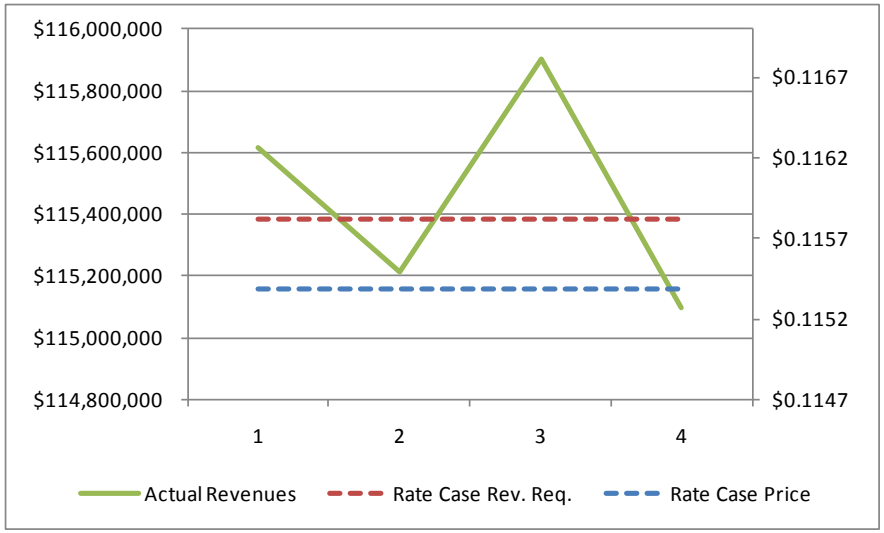
- Basic Revenue-Sales Decoupling has three primary components:
  1. Determine a "target revenue" to be collected in a given period
  2. Set a price that will collect that target revenue
     - This is the same as the last step in a traditional rate case – i.e. *Price = Target Revenues ÷ Sales*
  3. Adjust the price if actual revenues collected is greater or lesser than the target revenue

Incentives: Traditional Regulation v. Decoupling

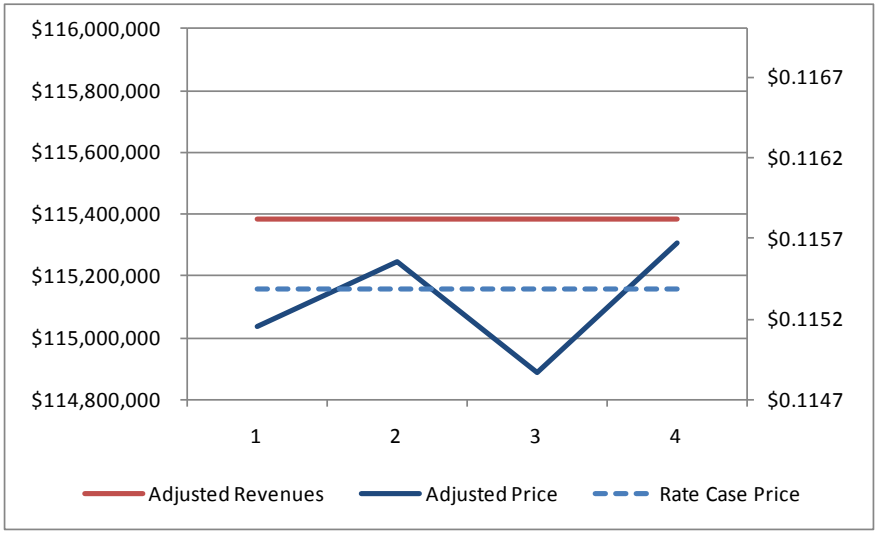
- Traditional:
  - Revenue = Price * Units Sold
  - Utility makes money in two ways: cutting costs and increasing sales
    - Marginal cost is almost always less than marginal revenue
- Decoupling
  - Revenue = Allowed (or Target) Revenue
    - Adjusted, possibly, for factors other than sales (e.g., changes in number of customers, inflation, productivity, etc.
  - Utility makes money one way: by cutting costs

The Essential Characteristic of Decoupling

Traditional Regulation: Constant Price = Fluctuating Revenues



Decoupling: Precise Revenue Recovery = Fluctuating Prices



Revenues = Price * Sales

Price = Target Revenues ÷ Sales

The Decoupling Calculation

- Utility Target Revenue Requirement determined with traditional rate case
  - By class & by month (or other period coinciding with how often decoupling adjustment is made)
- Each future period *will have* different *actual* unit sales than Test Year
- The difference (positive or negative) is flowed through to customers by adjusting Price for that period (see Post Rate Case Calculation)

Periodic Decoupling Calculation		
From the Rate Case		
Target Revenues		$10,000,000
Test Year Unit Sales		100,000,000
Price	$	0.10000
Post Rate Case Calculation		
Actual Unit Sales		99,500,000
Required Total Price	$	0.1005025
Decoupling Price	$	0.0005025

A Particular Approach: RPC Decoupling

- Recognizes that, between rate cases, a utility's costs change in a way that is generally linear to the number of customers served
- For each volumetric price, an "average revenue per customer" can be calculated from the rate case data.
  - The average RPC is then used to calculate the total target revenue that the utility will be allowed to collect
  - If the usage characteristics and costs of serving "new" customers are significantly different from those of "existing" customers, a different RPC can be used when new customers are added to the system.

How RPC Decoupling Changes Allowed Revenues

- In any post-rate case period, the Target Revenue for any given volumetric price (i.e., demand charge or energy rate) is derived by multiplying the RPC value from the rate case by the then-current number of customers

Periodic Decoupling Calculation		
From the Rate Case		
Target Revenues		$10,000,000
Test Year Unit Sales		100,000,000
Price	$	0.10000
Number of Customers		200,000
Avg. Revenue Per Customer (RPC)		$50.00
Post Rate Case Calculation		
Number of Customers		200,500
Target Revenues ($50 X 200,500)		10,025,000
Actual Unit Sales		99,750,000
Required Total Price	$	0.1005013
Decoupling Price “Adjustment”	$	0.0005013

Changes To The RPC To Reflect Utility-Specific Conditions

- Inflation and Productivity Adjustments
  - Allowed RPC changes over time to reflect inflation (increase) and industry productivity (decreases)
- Exogenous factors
  - Costs that are not captured immediately by inflation or productivity (e.g., first year of tax changes)

Decoupling Reduces Risks for Customers and Utility

- Weather fluctuations
- Changes in the economy
- Regulatory lag
  - Under traditional regulation, revenue uncertainty caused by interval between rate cases
- Financial & business risk of utility
  - Cost of capital implications

Thank You

- Questions?
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Additional Information

Comparison of Traditional Regulation and Decoupling

Issue/Topic	Traditional Regulation	Decoupling
Revenue Requirement	Cost of service	Same, but may allow a "revenue path" between rate cases
Likelihood allowed revenue requirement will be over- or under-collected	High	Low – revenue collected equals "target" revenue
Weather risk	Customers and company bear weather risk with opposite "signs"; Results in wealth transfers based on weather	Customers and company shielded from weather risk; no wealth transfers due to weather; Earnings stability means lower equity ratio required
Economic cycle risk	Company primarily bears economic cycle risk	Company shielded from risk; results in lower cost of capital
Need for rate cases	Likely need more often when growth or other factors are changing	Reduced to 3-5 year periodicity at commission's discretion
Rate Design	See company's current rate design	Essentially undisturbed; may need some harmonizing with fuel clause

Rate Design and Decoupling

- Utilities tend to be resistant to progressive rate design, because it increases their revenue volatility if the incremental usage price greatly exceeds short-run marginal cost.
- Economic efficiency considerations dictate that end-block rates should reflect long-run marginal cost (including all "fixed" capacity costs)
- Decoupling allows the Commission to achieve economic efficiency without impairing earnings stability.
- For simplicity, this discussion addresses only Residential rate design. Commercial / Industrial rates also lend themselves to creative approaches, but they are complex.

What Costs Are Really "Fixed" and "Variable"?

- **Truly "Fixed" Costs in the short-run**
  - Interest expense
  - Depreciation expense
- **Costs that tend not to vary much in the short run, but are not really "fixed":**
  - Labor
  - Maintenance
  - Return and taxes on rate base
  - Pipeline contract demand
- **Costs that clearly vary in the short run**
  - Fuel / Gas supply
  - Some purchased power costs
  - Line losses

- In the long-run, all costs are variable
  - Production investment
  - Transmission investment
  - Distribution investment
  - Labor
  - Fuel
  - Purchased Power
  - Environmental

Volumetric Pricing is “Normal” for Competitive Industies

- **Utilities have costs that do not vary with sales volume that are normally recovered volumetrically**.

So do nearly all other industries:

Hotels: sell their product by the room-night
Retail Stores: sell their products at the cash register
Oil Refineries: sell their products by the gallon

Perhaps most important, so do the "competitors" of utilities:

Energy efficiency installers
Efficient appliance manufacturers
Propane and heating oil vendors

Decoupling Can Align Short-Run and Long-Run Objectives

- Utilities seek rates reflecting short-run variable costs for incremental usage to protect earnings stability.
- The public interest is served by rates reflecting long-run marginal costs, to achieve economic efficiency.
- Decoupling provides the utility earnings stability, while allowing rates based on long-run incremental costs.

Need To Have A Demonstrated Commitment to Energy Efficiency

- Decoupling, while justified on broader economic efficiency grounds, does not by itself give a utility an incentive to invest in customer-sited resources (energy efficiency, distributed generation)
  - It only removes the financial disincentive that behind-the-meter resources create for the utility
- If increased investment in energy efficiency is a policy goal, then decoupling must be accompanied by performance requirements, including, possibly, rewards for superior performance and penalties for poor

Regulatory Assistance Project

- Nonprofit organization founded in 1992 by experienced energy regulators
- Advises policymakers on economically and environmentally sustainable policies in the regulated energy sectors
- Funded by U.S. DOE & EPA, the Energy Foundation, ClimateWorks and other foundations
- We have worked in 40+ states and 16 nations
- Rick Weston was an economist and administrative law judge with the Vermont Public Service Board from 1989 to 2000.