Mechanics & Application of Decoupling: An Overview for Pennsylvania PUC Working Group

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The Regulatory Assistance Project

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Website: *http://www.raponline.org*

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

The Fundamentals Matter

- Treatment of production costs (i.e. variable costs)
  - Typically flowed through
  - No profit margin for utility
- Treatment of non-production costs (i.e. generally return, O&M and short-run fixed costs)
  - Recovery tied to rate case pricing and sales volume
  - This is where the utility profits are

Utility Financial Structures Enhance Power of Incentives

- Few non-production costs vary with sales in the short run
  - So, increased sales go to bottom line
  - Conversely, decreased sales come out of bottom line
- Customers exposed to 100% of deviation from assumed sales
- Company's risk/opportunity mitigated by income taxes
- High leverage means that utility profits represent relatively small share of total cost of capital
  - Revenue changes on the margin only affect profit
  - This makes profits highly sensitive to changes in revenues
- <u>The effect may be quite powerful…</u>

Assumptions for a Sample Distribution Utility

Assumptions	
Operating Expenses	$160,000,000
Rate Base	$200,000,000
Tax Rate	35.00%

Cost of Capital	% of Total	Cost Rate	Weighted Cost Rate		Dollar Amount	
			Pre-Tax	After-Tax	Pre-Tax	After-Tax
Debt	55.00%	8.00%	4.40%	2.86%	$8,800,000	$5,720,000
Equity	45.00%	11.00%	4.95%	7.62%	**$9,900,000**	$15,230,769
Total	100.00%			10.48%		

Revenue Requirement	
Operating Expenses	$160,000,000
Debt	$5,720,000
Equity	$15,230,769
Total	$180,950,769
Allowed Return on Equity	**$9,900,000**

How Changes in Sales Affect Earnings

	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%

Addressing the Throughput Incentive

- Lost Margin Recovery
  - Attempts to track effect of utility efficiency programs
  - Data and judgment intensive
  - Tends to induce litigation
- Straight-fixed Variable Rate Design
  - Decouples utility from sales
  - But also decouples customer from efficiency
    - Undermines the value of efficiency to customers
  - Fails to send a price signal for long-run cost of system
  - Disproportionately affects low use customers
- Decoupling

Revenue-Profit Decoupling: What is it?

- Breaks the mathematical link between sales volumes and profits
- Objective is to make profit levels immune to changes in sales volumes
  - This is a revenue issue more than a pricing issue
  - Volumetric pricing and other rate design (e.g. TOU) may be "tweaked" in presence of decoupling, but essentials of pricing structures need not be changed because of decoupling
- Not intended to decouple customers' bills from their individual consumption

Full Decoupling

- Insulates a utility's revenue collections from any deviation of actual sales from expected sales.
- The cause of the deviation—e.g., increased investment in energy efficiency, weather variations, changes in economic activity—does not matter.
- Full decoupling renders a utility indifferent to changes in sales, regardless of cause. It eliminates the profit-related "throughput" incentive. The utility's revenues are no longer a function of sales, and its profits cannot be harmed or enhanced by changes in sales. Only changes in expenses will then affect profits.

Partial Decoupling

- Insulates only a portion of the utility's revenue collections from deviations of actual from expected sales.
- Any variation in sales results in a partial true-up of utility revenues (e.g., 90% of the revenue shortfall is recovered).
- This approach is fundamentally the same as full decoupling, but the amount of revenue that can be collected or refunded through the decoupling adjustment is simply constrained by the allowed percentage

Limited Decoupling

- Accounts for the revenue impacts only from specified *causes* of variations in sales, such as energy efficiency or weather
- Alternatively, may allow for revenue adjustments for all causes *except particular* ones. For example, variations due to some or all other factors (e.g., economy, end-use efficiency) *except* weather are included in the true-up. In this instance, the utility and, necessarily, the customers still bear the revenue and bill risks associated with changes in weather
- Can be some combination of the above
- Requires the application of more complex mathematical calculations than either full or partial decoupling, and these calculations depend in part on data whose reliability are sometimes vigorously debated

Gas and Electric Decoupling in the US

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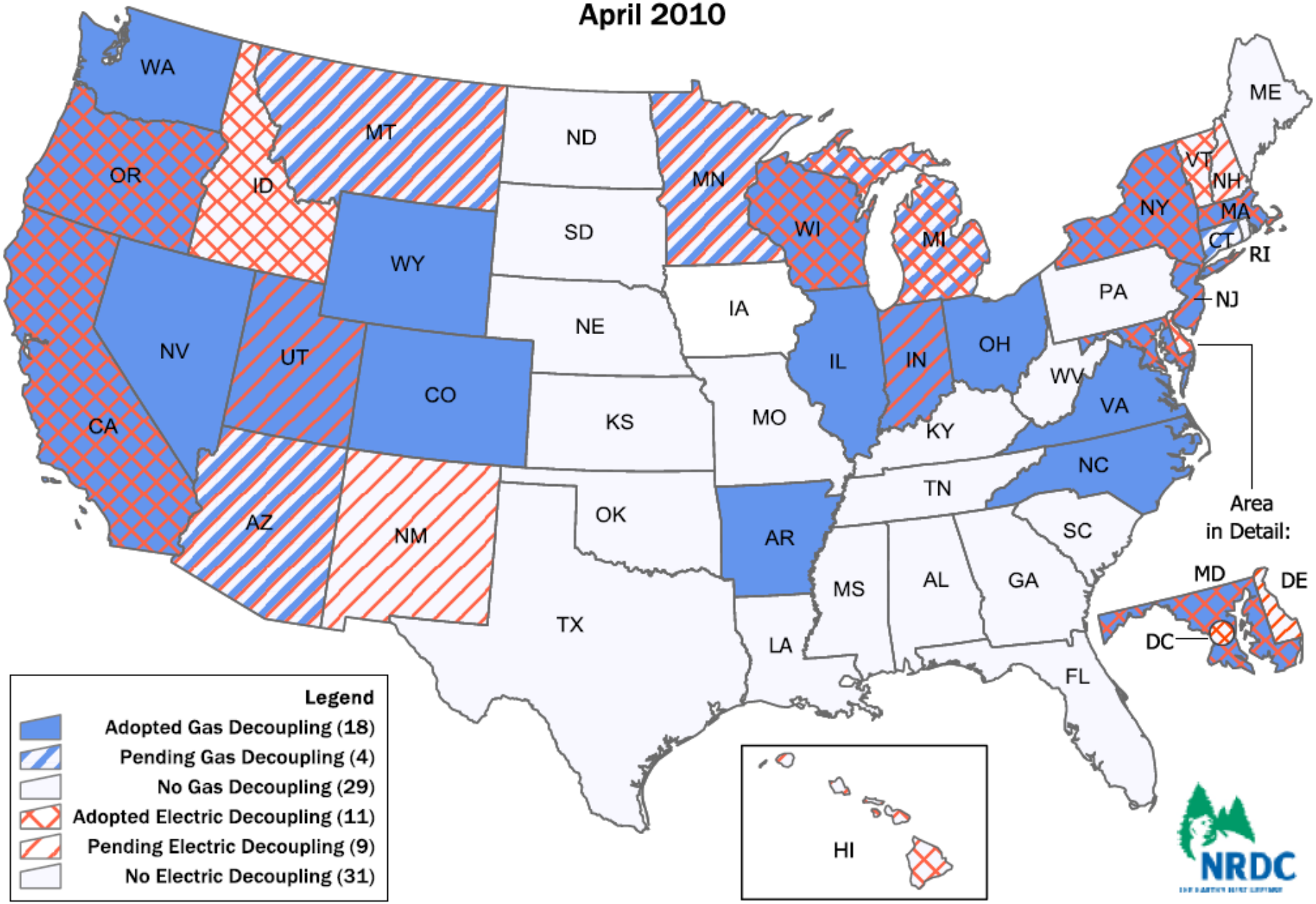


Revenue Decoupling: The Basic Concept

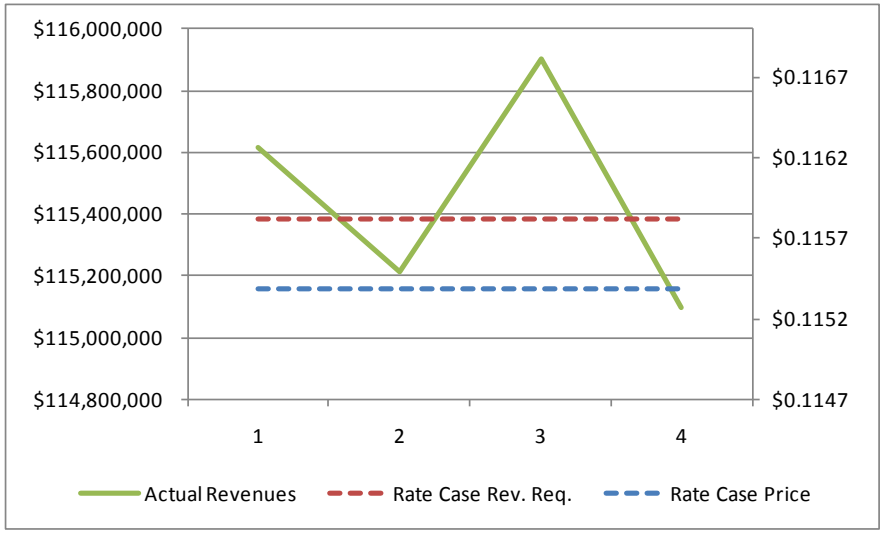
- Basic Revenue-Profit Decoupling has two primary components:
  1. Determine a "target revenue" to be collected in a given period
     - In the simplest form of revenue decoupling (sometimes called "revenue cap" regulation), Target Revenues are always equal to Test Year Revenue Requirements
     - Other approaches have formulas to adjust Target Revenue over time
  2. Set a price which will collect that target revenue
     - This is the same as the last step in a traditional rate case – i.e. *Price = Target Revenues ÷ Sales*

The Decoupling Transformation

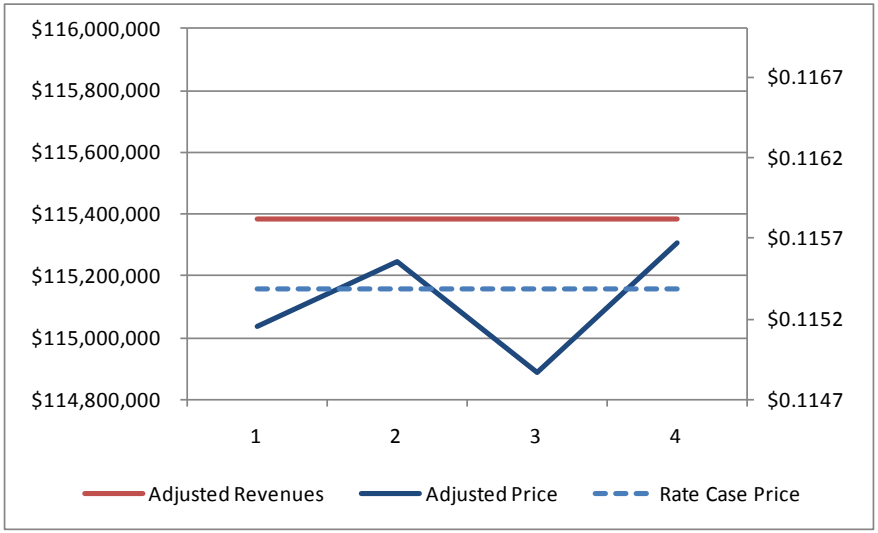
Revenue = ~~Price * Units~~ Sold

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

Approaches Where Target Revenues Are Not Held Constant

- California
  - Embeds decoupling in broader PBR context
  - Allows Target Revenues to change – e.g. for inflation & productivity
- Many now use Revenue Per Customer model, where Target Revenues are recomputed to account for customer growth

RPC Decoupling

- Recognizes that, between rate cases, a utility's costs change in a way generally linear to the number of customers served
- For each volumetric price, a "revenue per customer" average can be calculated from the rate case adjusted test year data.

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
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 Adjustment
  - Allowed RPC changes over time to reflect inflation (increase) and productivity (decreases)
- Separate RPC for Existing and New Customers
  - If new customers have higher or lower usage than existing customers (or a higher or lower cost of service), the RPC can be separately calculated for each cohort

How Decoupling Is Administered

- Some (e.g. California) use an annual accrual of the revenue over- and under-recoveries and then collect or refund that amount over an ensuing 12 mo. Period
  - CA also uses future test years and annual "attrition" proceedings to approve decoupling adjustments
- Annual proceedings are potential opportunity for litigation and challenge

How Decoupling Is Administered

- Others use a “current” system which makes the decoupling adjustment directly on customers’ bills for that month (or, sometimes, with a 30-60 day lag)
  - Decoupling does not necessarily require any “lag” as is customary for fuel clauses
- When all inputs are derived directly from billing information, then process becomes ministerial and not subject to much litigation or challenge

How States Have Approached Decoupling?

Feature	Gas Decoupling	Electric Decoupling
Revenue change between rate cases		
Revenue-per-customer	23	4
Attrition adjustment	3	4
No change	3	1
No separate tariff	3	3
Timing of Rate True-ups		
Annual	19	8
Semi-annual/quarterly	2	1
Monthly	4	3
Weather		
Not weather-adjusted	20	10
Weather-adjusted	8	2
Limit on adjustments and/or dead-band	9	6
Per class calculation and adjustments	25	7
Earnings Test	4	
Pilot/known expiration date	11	4
Surcharges only	3	
Total Utilities Analyzed	**28**	**12**

Source: Lesh, *Rate Impacts And Key Design Elements Of Gas And Electric Utility Decoupling: A Comprehensive Review*, The Electricity Journal (June 2009)

Risks and Other Issues Affected By Decoupling

- Weather
- Economic
- Regulatory Lag
- Financial & business risk of utility
  - Cost of capital implications

What is weather risk?

- Weather risk is the risk that revenues change on account of changes in weather
- Utility and customer both face risk: If you receive more (or less) revenues or pay less (or more) in customer bills, then you face weather risk

Relationship of Utility Profits and Customer Bills to Weather

- Prices are usually determined using weather-normalized billing determinants
- In extreme weather, consumption goes up, along with profits and consumer bills
- In mild weather, consumption goes down, along with profits and consumer bills
- Both utility and customer face risk, with opposite economic effect

Addressing concerns about price volatility

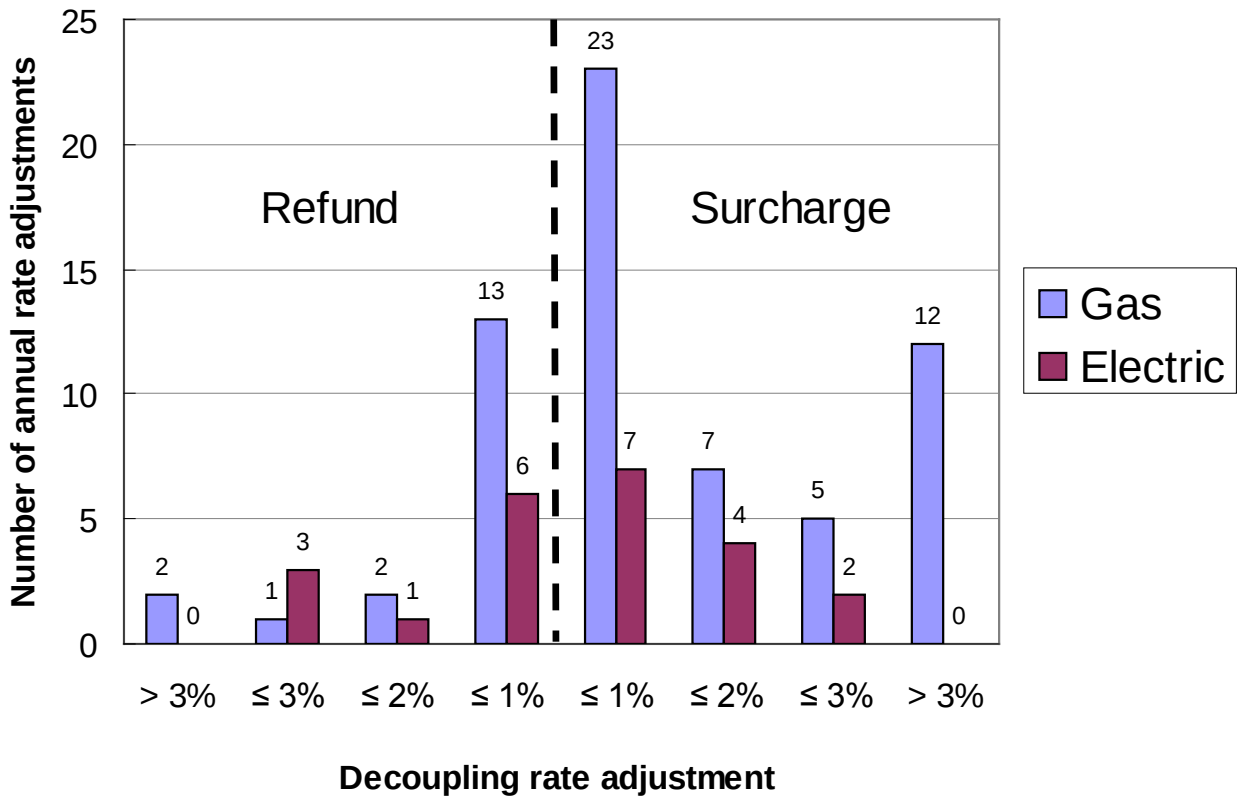
- Actual price adjustments experienced elsewhere imply low risk of price shock
- Risk may be somewhat higher where annual adjustments are imposed, as opposed to using "current" methodology
- But, commission can bound the magnitude of any given price change in order to mitigate against potential
  - Raises question of whether "difference" is tracked in balancing account or "foregone" by utility

How Big are the Price Adjustments?

	Northwest Natural		Power	
Year	PGA % Change	Decoupling % Change	PCA % Change (Res)	Decoupling % Change
1995	(6.2)			
1996	(4.8)			
1997	10.5			
1998	9.2			
1999	7.2			
2000	21.4			
2001	20.8			
2002	(12.7)		7.5	
2003	4.9	0.6	(18.9)	
2004	20.1	0.36	0	
2005	16.6	0.77	0	
2006	3.8	(0.27)	(14.0)	
2007	(8.7)	(0.1)	11.0	
2008	15.6	<(1.0)	8.45	(0.8)
2009			10.2	0.8

Source: Lesh, *Rate Impacts And Key Design Elements Of Gas And Electric Utility Decoupling: A Comprehensive Review*, The Electricity Journal (June 2009)

Do Prices Always Go Up?



Source: Lesh, *Rate Impacts And Key Design Elements Of Gas And Electric Utility Decoupling: A Comprehensive Review*, The Electricity Journal (June 2009)

Pitfalls to Avoid: Maine

- Decoupled with annual deferral account
- Experienced significant economic decline
- Large price increases followed
- Decoupling was blamed, but a rate case would have certainly been required anyway
- Solution: Bound the results or have a “trigger” for review

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

Thanks for you Attention

- Questions?
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