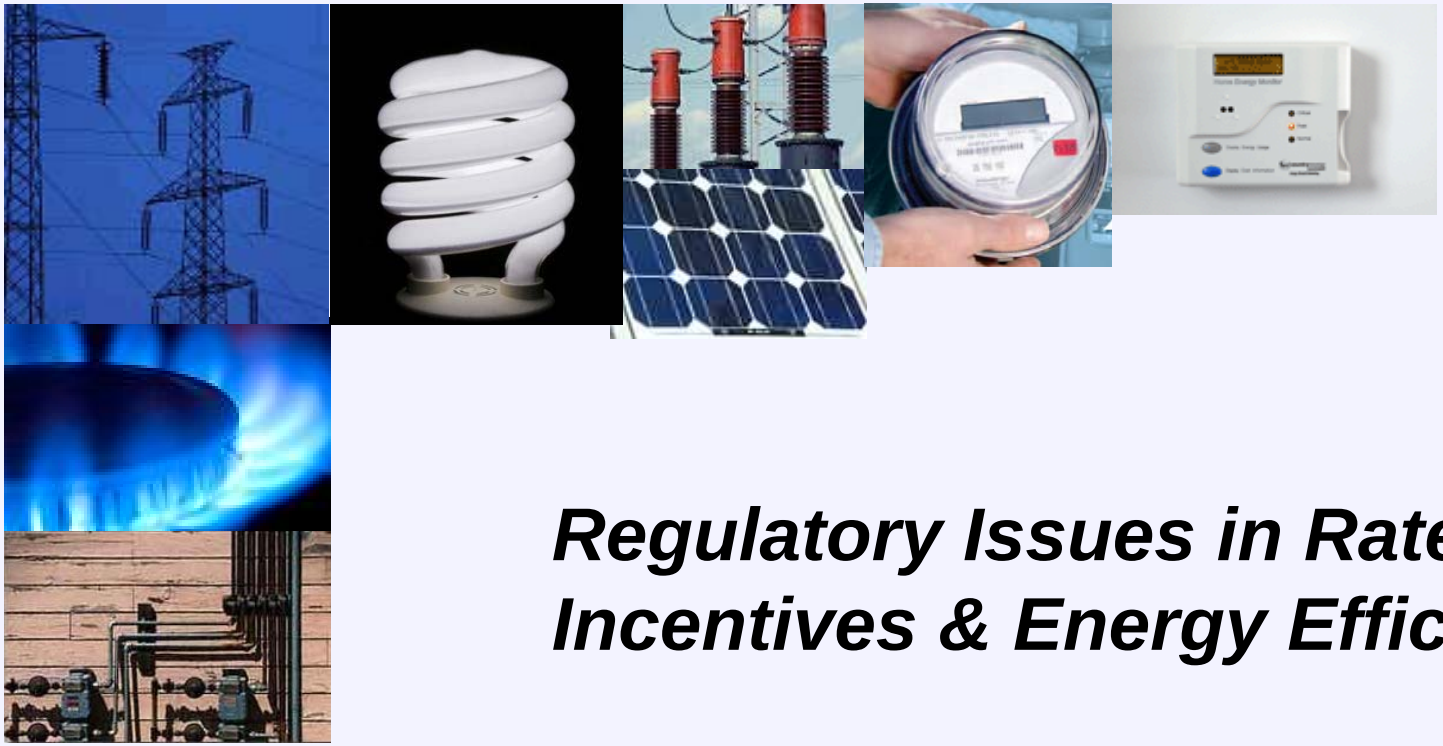

Regulatory Issues in Rate Design, Incentives & Energy Efficiency

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Current Motivations for Energy Efficiency

- High natural gas prices and volatility.
- Gas impacting power more significantly at the margin.
- Changing usage patterns.
- Emerging need for baseload capacity.
- Regulatory need to “do something soon.”
- Increasing environmental concerns and perceived long-run fossil fuel supply risk.

Perceived Utility Incentive Issues

- Rate design practices send the wrong signals to utilities.
- Rates are tied to sales, and in order to increase profits, utilities need to increase sales.
- Utilities will not promote energy efficiency since lower sales result in lower profits.
- The profit incentive to increase sales is extremely powerful.

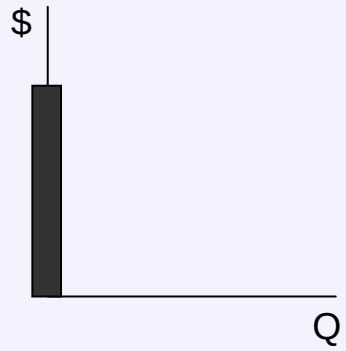
Basic Rate Design Structure (Base Rates)

Distribution Bill = Fixed Customer Charge + Variable Charge

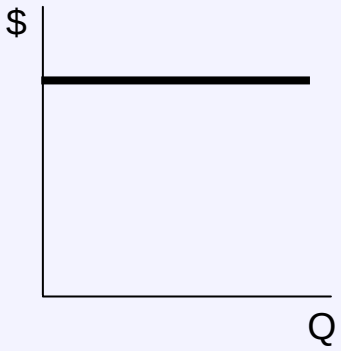
- Traditional distribution rate design in utility regulation is referred to as "two-part tariff:" consists of a fixed customer charge, and variable usage charge exclusive of fuel (kWh, MMBtu).
- Also referred to as a "non-linear tariff" since average rates will fall as usage increases.
- Use of this type of pricing claimed to date back to Jules Dupuit's work on the "Utility of Public Works," with further work by Frank Ramsey (1927). [see Wilson, *Non-Linear Pricing*.]
- Use of this type of tariff in utility pricing is dated back to the early part of the 20th century by an English engineer named John Hopkinson. [see Kahn, *Economics of Regulation*.]
- Since that time, there have been numerous utility pricing structures based off the two-part tariff approach.

Examples of Various Rate Design Structures

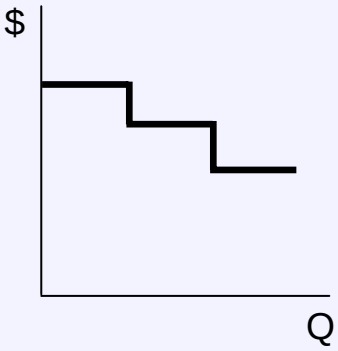
flat rate per period, no usage charge



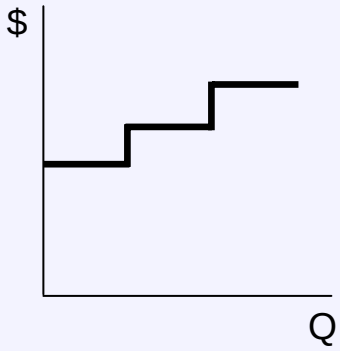
uniform: flat rate per unit



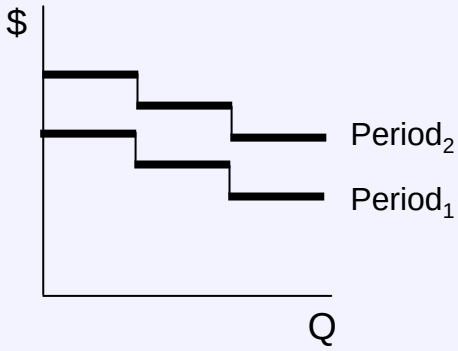
declining block



inverted block



seasonal or time-of-use



Source: From similar example provided by NRRI.

Common Types of Revenue Neutrality Programs

- Straight-Fixed Variable Rate Design: eliminates all variable distribution charges and assigns fixed customer charge alone (gas LDCs).
- Sales-Revenue Decoupling: separates revenue recovery from sales (sets annual revenues to a “per-customer” target.)
- Sales-Margin Decoupling: separates margin recovery from sales (sets margin per customer target).
- Lost Revenue: allows specific recovery of lost revenues associated with specific DSM program offerings.

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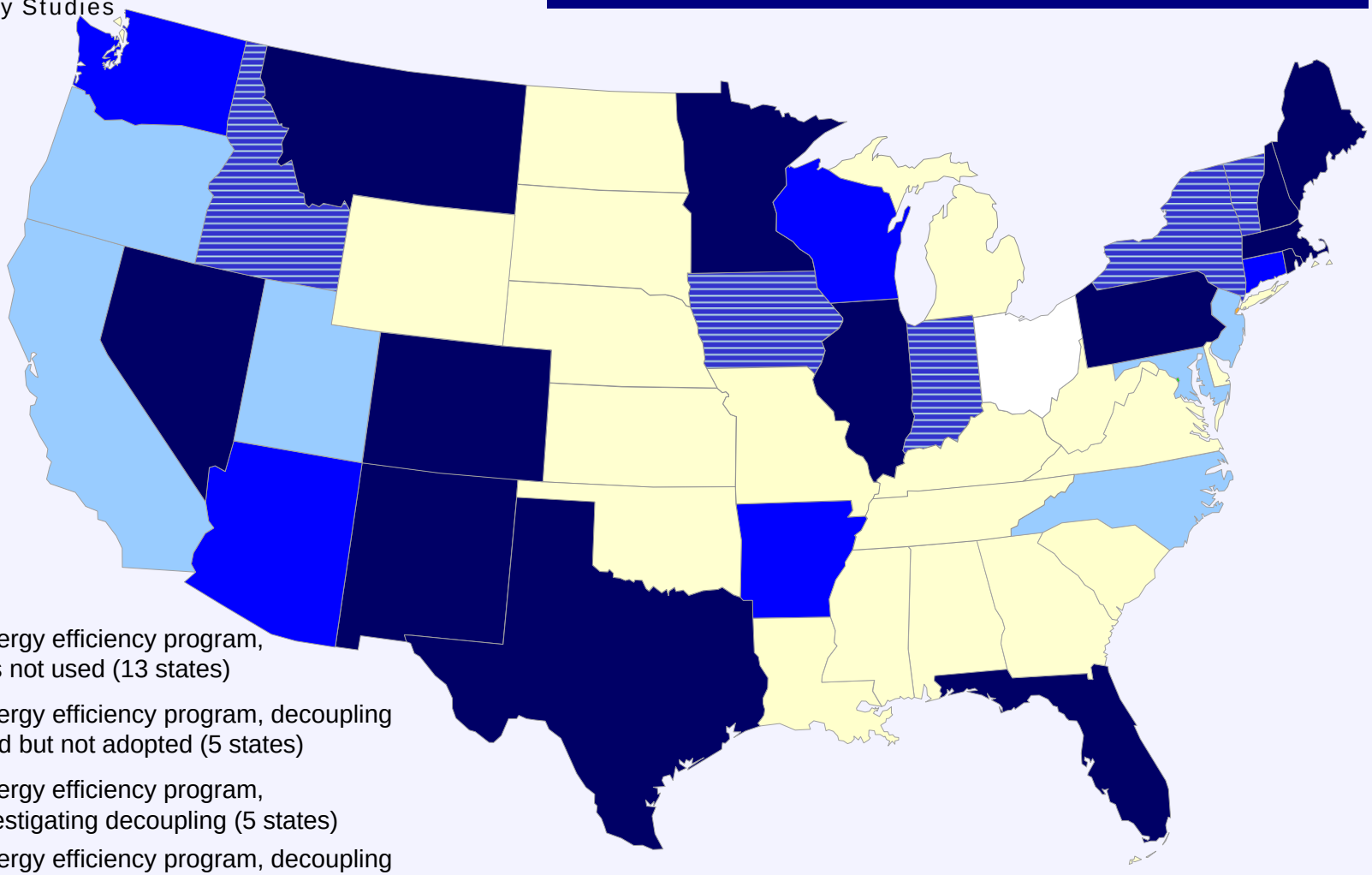
States with Energy Efficiency Programs – Decoupling Status



- State has energy efficiency program, decoupling is not used (13 states)
- State has energy efficiency program, decoupling was proposed but not adopted (5 states)
- State has energy efficiency program, currently investigating decoupling (5 states)
- State has energy efficiency program, decoupling has been approved for at least one utility (6 states)
- State has no energy efficiency program, decoupling has been approved for at least one utility (1state)

Note: In Connecticut, the electric utilities do not have decoupling, but two natural gas LDCs have a partial decoupling mechanism in connection with their energy efficiency programs for low-income customers (a conservation adjustment mechanism). Washington has utilities with decoupling, but rejected the most recent utility proposal (January 2007).

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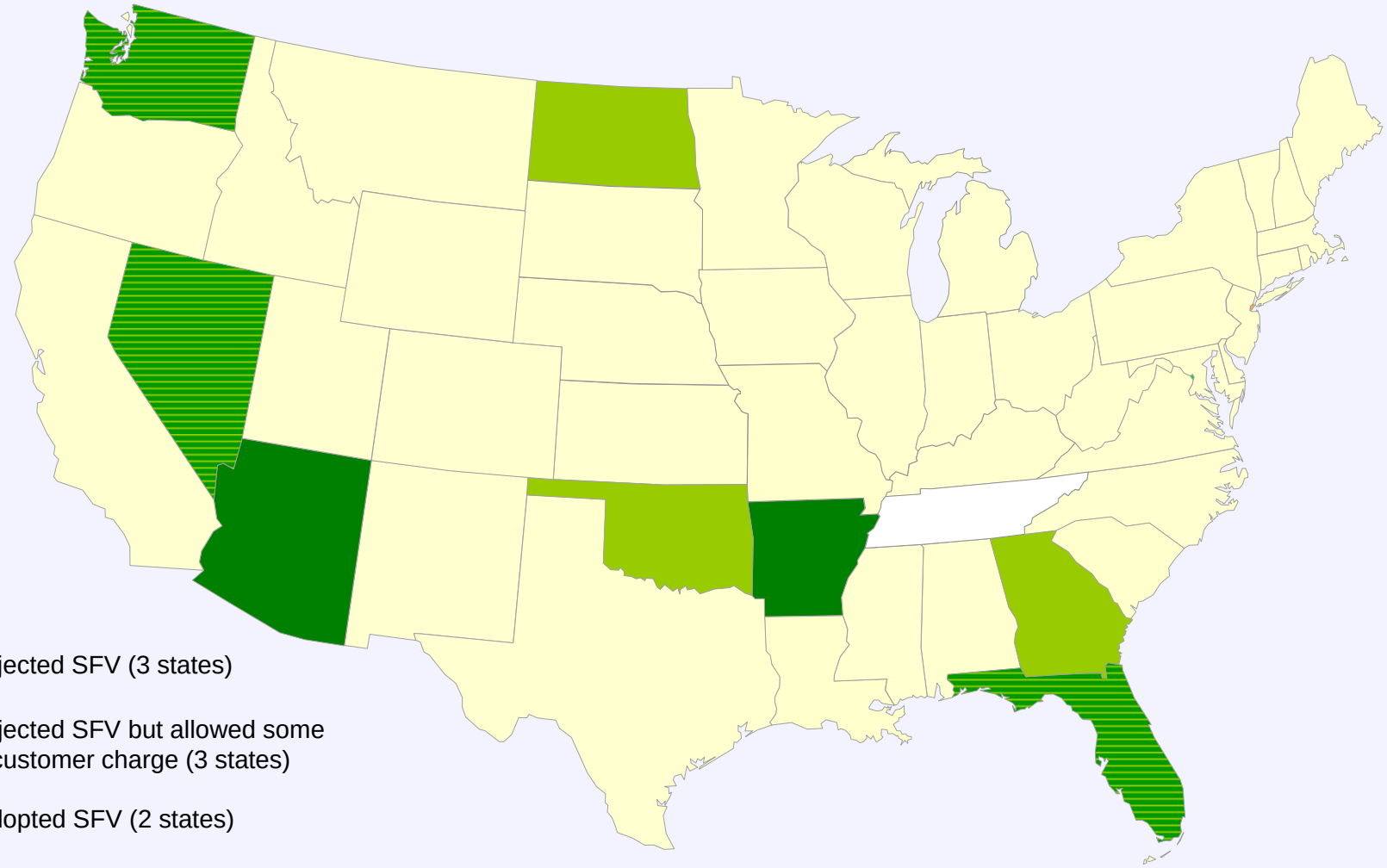
States that have Considered SFV



- State has rejected SFV (3 states)
- State has rejected SFV but allowed some increase in customer charge (3 states)
- State has adopted SFV (2 states)
- State has been proposed but still under consideration (1 state)

Arguments In Favor of Revenue Neutrality

- Aligns utility incentives with energy efficiency.
- Assists utility in earning its authorized rate of return that is challenged by the decreasing use per customer problem (gas).
- Easier for customers to understand and reduces bill volatility.
- Reduces regulatory costs and the need for frequent rate cases.

Common Reasons for Rejecting Revenue Neutrality

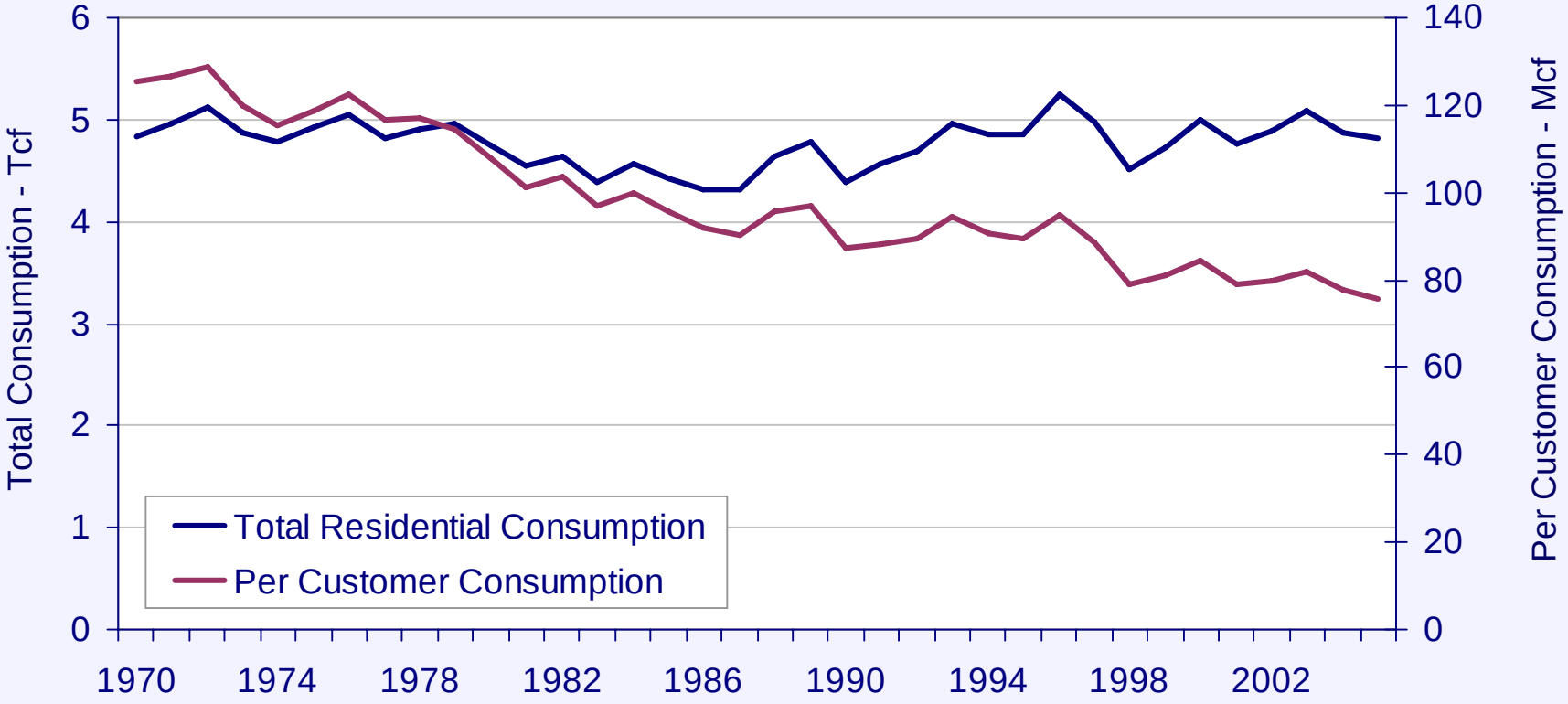
- Represents a significant departure from traditional regulation.
- Shifts sales risks from utilities to customers.
- The impact of changes in use per customer for the gas industry are overstated and address the wrong causes on changes in margins. Power industry faces an entirely different set of usage trends.
- At best, the incentive issue is not resolved and never can be with revenue decoupling.
- Current proposals, offered in conjunction with other "regulatory remedies" diminishes the simplicity argument and raises questions about the purpose of proposal.
- Proportionality issue – changing the rate design for all customers based upon programs for which an exceptionally small percentage of the customers will participate.
- Is actually contrary to "sound economic principles" and well-grounded regulatory policies.

Shift in Regulatory Approach

- Base rates are typically fixed and based upon an allowed rate of return under traditional regulation
- Between rate cases, actual rates of return can vary from allowed.
- Regulatory lag can provide important incentives and has been harnessed in many incentive regulation structures.
- Between rate cases, it is up to the utility to manage risk associated with sales (revenue) and find opportunities for efficiency (cost).
- Revenue decoupling and other revenue neutrality mechanisms substantially reduce, if not eliminate the need to manage sales risk between rate cases.

US Residential Natural Gas Use

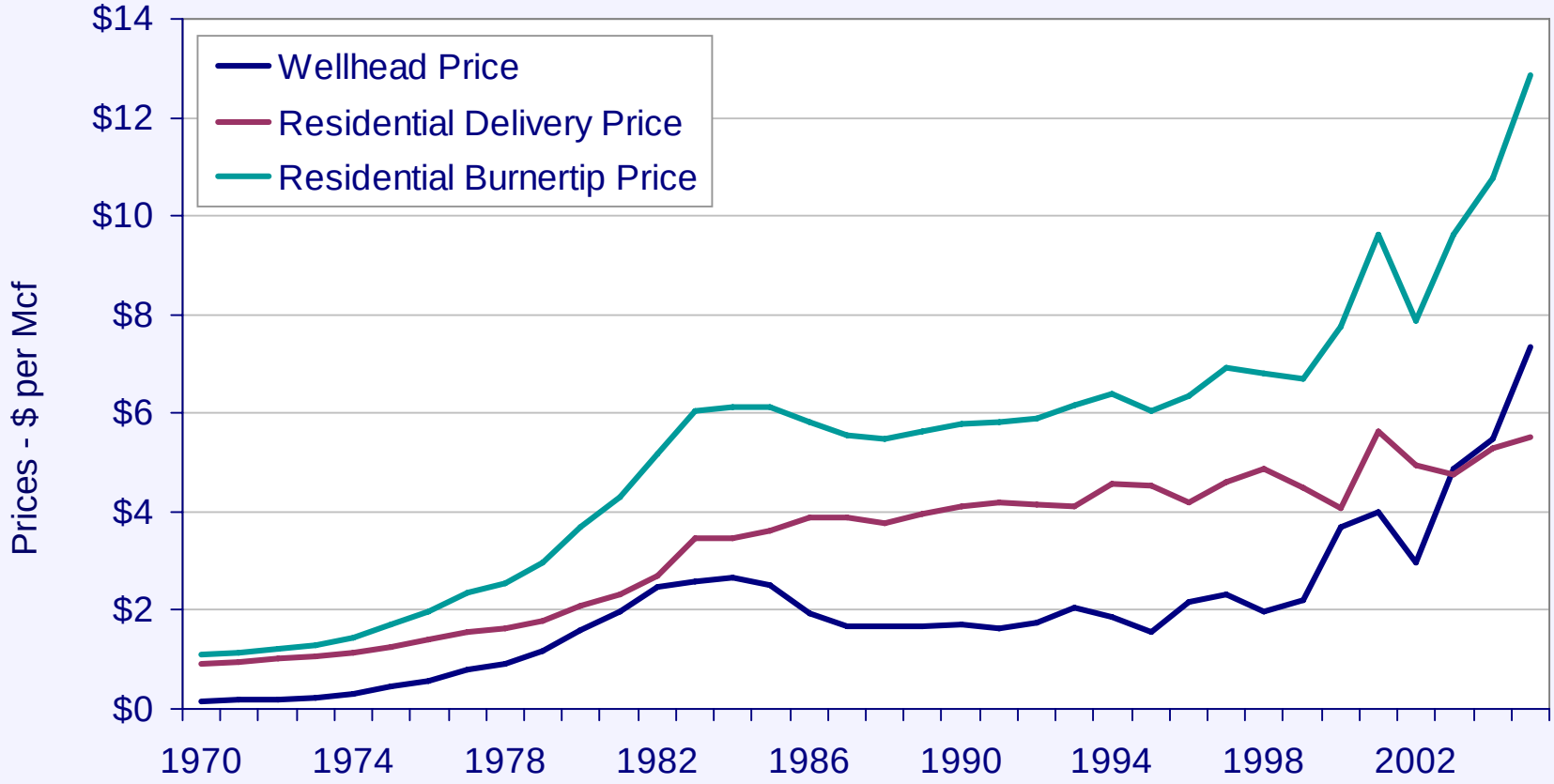
While overall use per customer is decreasing, overall residential natural gas usage is increasing.



Source: Energy Information Administration, US Department of Energy

US Natural Gas Price Trends
Wellhead to Burner-Tip Price

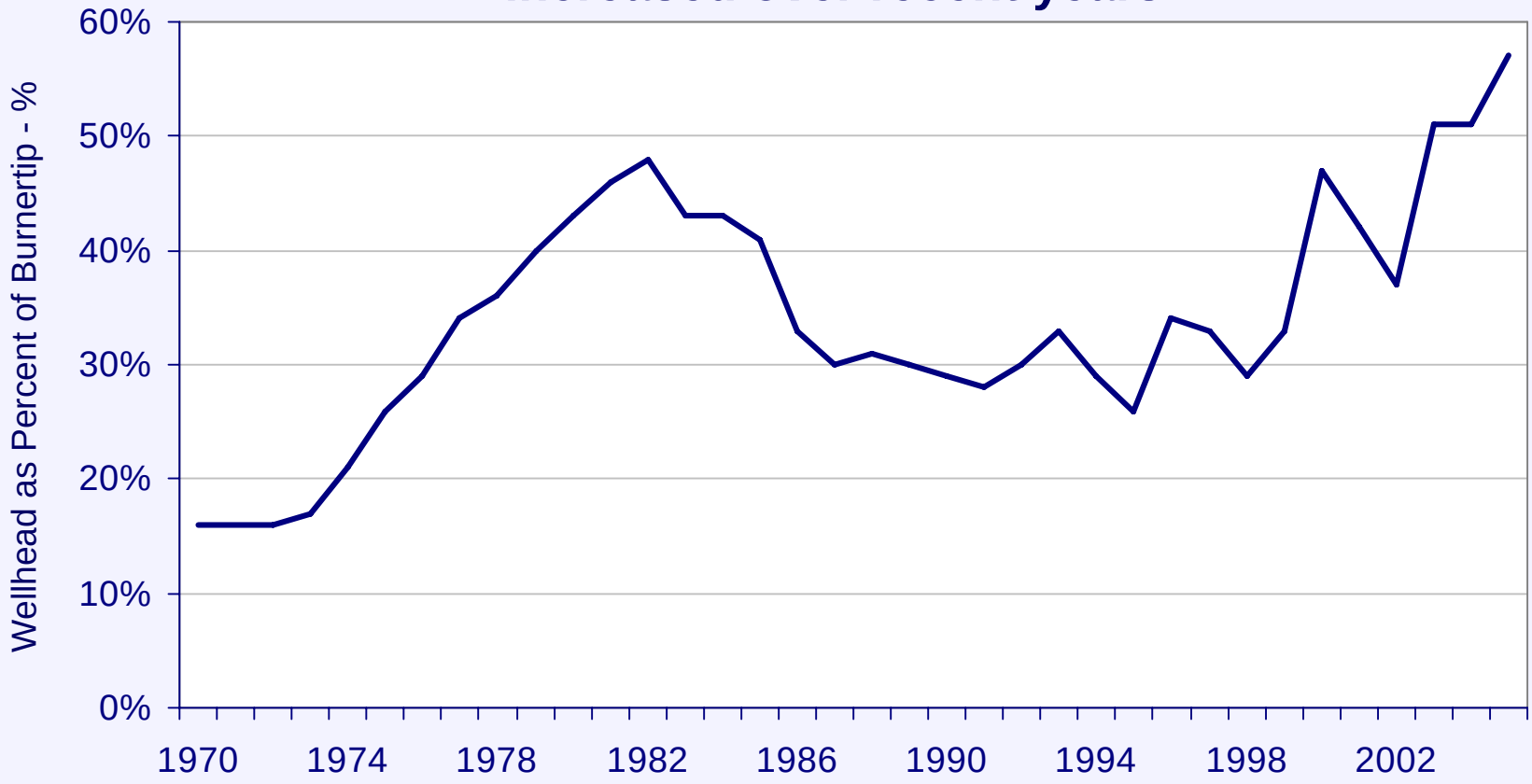
Retail prices have increased significantly since 2000-2001.



Source: Energy Information Administration, US Department of Energy

US Natural Gas Price Trends
Wellhead as a Percent of Burner-Tip Price

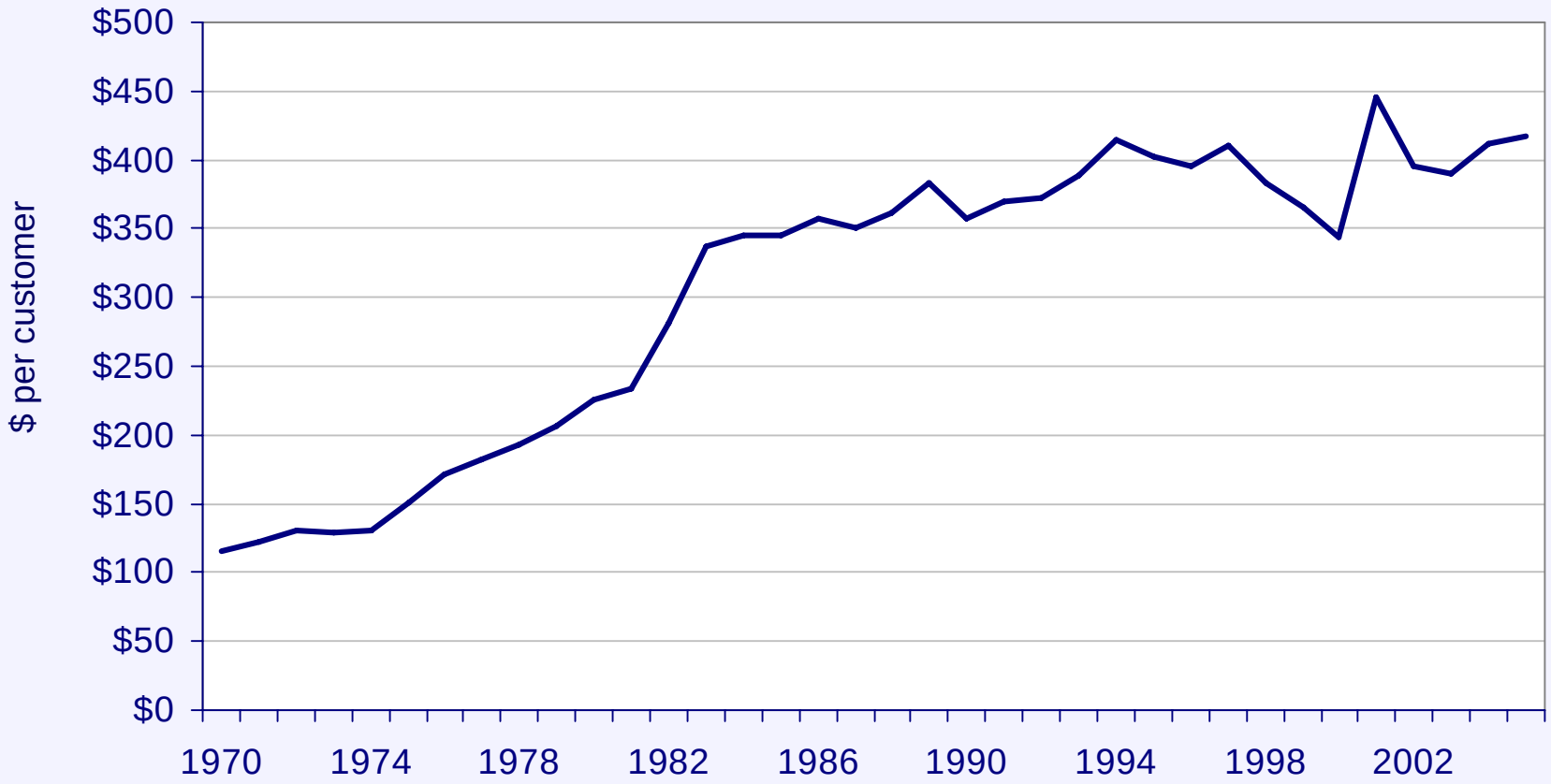
The commodity share of overall natural gas rate has increased over recent years.



Source: Energy Information Administration, US Department of Energy

DNG Revenue per Customer

Yet despite high prices, and decreases in use per customer, overall DNG revenues per customer are at close to historic highs.



Source: Energy Information Administration, US Department of Energy

Incentive Issue

- Revenue decoupling, at best, removes a disincentive and does not provide an active incentive for utilities to promote DSM/energy efficiency.
- In many instances, utilities will argue for additional mechanisms to “incent” the utility to promote energy efficiency.
- These mechanisms, rarely address some real incentive issues for energy efficiency:
    - Corporate culture
    - Earnings and rate base

Common Proposals Accompanying Revenue Neutral

Difficult to accept the "simplicity" argument when utilities typically propose a potpourri of adders and trackers alongside revenue neutrality.

Customer groups are "tracker fatigued."

- Purchased Gas Adjustment/Power Recovery Mechanisms
- Weatherization Clauses
- Shifts to 15 Year Normalization Periods
- Infrastructure Recovery Riders
- Lost and Unaccounted for Gas (LAUF) in PGA/GCR
- Uncollectibles Rider

Proportionality Issue

Significant change in rate design for a very small change in overall sales and very limited number of customers.

		Program Spending (million $)	Percent of Retail Revenues (%)	Gas Savings (Mcf/year)	Percent of Gas Sales Saved (%)	Volume saved per million $ (Mcf/year)	Benefit-Cost Ratio
Aquila	$	2.10	1.4%	146,000	0.5%	69,000	-
Centerpoint	$	5.60	0.5%	720,000	0.5%	128,600	2.60
Keyspan	$	12.00	1.0%	490,000	0.4%	41,000	3.00
Northwest Natural Gas	$	4.70	0.7%	85,000	0.1%	18,000	-
NSTAR	$	3.90	0.8%	71,500	0.2%	18,000	2.29
PG&E	$	13.50	0.4%	2,000,000	0.7%	148,000	2.10
PSE	$	3.80	0.4%	311,000	0.5%	82,275	1.93
SoCal Gas	$	21.00	0.6%	1,100,000	0.3%	52,000	2.67
Vermont Gas	$	1.10	1.6%	57,000	1.0%	52,000	5.60
Xcel Energy (MN)	$	4.00	0.7%	663,000	0.9%	166,000	1.56

Generally, less than one-half of one percent.

Source: S. Tegen and H. Geller, Natural Gas Demand-Side Management Programs: A National Survey. Boulder, CO: Southwest Energy Efficiency Project. January 2006. Based upon surveyed findings of the top ten gas utilities in 2004.

"Sound Economic Principles"

Efficiency criteria: SRMC = P

Challenge	"Tempering Principle and Practice"
Cost Characteristics	• Economic principles alone would suggest that all costs should be variable and based on marginal costs • Problem meeting this criteria for natural monopolies with declining costs. • Suggests that some level be recovered in fixed charge, but how much? • Wide range of literature on price discrimination.
Measurement Issues	• Often expensive or impossible to make finely tuned calculations. • Difficult to perfectly segment demand to allocate those fixed costs – failure to do so would represent another form of inefficiency. • Joint & common costs can confound. • Optimal rate design could suggest that (relatively) low load factor/low elasticity customers should have relatively higher variable charges, and vice versa.
Dynamic Considerations	• SRMC can be at, above, or below ATC at any point in time. • Fixing all capacity costs to a single charge challenges short run versus long run capacity utilization and can ultimately lead to overcapitalization. • Embedded costs versus long run forward looking costs: one can't be ignored at the expense of the other.

Revenue Neutrality Mechanisms Are Not the Only Options

- Projected test years: forecasts could account for anticipated energy efficiency savings.
- Cost-effectiveness tests: screening on RIM-passing measures only.
- Lost Revenues (*ex post*): periodic filings on proven, *ex post* lost revenues/sales.
- Rate design (inclining blocks): higher rates in upper blocks.
- Repression adjustments: usage adjustment to correct of DSM-related reductions in usage.
- Direct Incentives: performance-based incentives for programs.
- More frequent rate cases: traditional approach at correcting rates that get out of balance.

Conclusions

- Highly contentious issue among many consumer groups – environmental/efficiency advocates bring a new dimension to the debate.
- Represents a significant regulatory change for the gas industry that many believe will be difficult to unwind. Is a big change for relatively small overall rewards.
- Bigger picture question is should we continue to use a 1988 regulatory approach, and its corresponding justifications, for promoting energy efficiency in the information age and one based increasingly on competition?
- Growing trend to just move these activities away from utilities – do you really need utilities in this business? Decreases in use per customer could be interpreted as justification that utilities are not needed for gas efficiency.
- There are a wide range of less dramatic alternatives that should probably be explored prior to moving with revenue neutrality.

Questions, Comments, & Discussion

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