Rate Design Options and Revenue Decoupling

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Vermont ♦ Maine ♦ New Mexico ♦ California ♦ Beijing

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About
The Regulatory Assistance Project

- Non-profit organization formed in 1992 by former utility regulators
- Principals are former regulators from Maine, Vermont, New Mexico and California
- Principal funding:
  - The Energy Foundation
  - US DOE and
  - US EPA
- Provides workshop and educational assistance to legislators, regulators and other government agencies

About
Jim Lazar

- Consulting Economist based in Olympia, Washington.
- Involved professionally in utility rate and resource studies since 1978.
- Expert witness before 15 regulatory bodies 1978 - 2008
- RAP Associate and Senior Advisor since 1998.
- Extensive work domestically and internationally, including New England Demand Response Initiative, Mid-Atlantic Demand Response Initiative, and decoupling assistance in numerous states.

Overview of Presentation

- In all classes, move from simple “default” rate designs to more complex cost-based rates and optional rates.
- Residential Rate Design
  - Inverted, TOU, and Critical Period Pricing
- Small Commercial
  - Simple Rates; Rolling Baseline Rates
- Large Users
  - Demand/Energy, TOU, Critical Period, and Real-Time Pricing
- Revenue Decoupling
  - Removing the disincentive for utilities to seek additional throughput
  - Ensuring that utility earnings are not made more volatile as a result of efficient cost-based rate design.

Matrix of Rate Design Options By Customer Class

	Typical Current Rate Design	Inverted Rate	TOU Rate (Fixed time periods)	TOU plus Critical Peak Pricing	Baseline-Referenced RTP	Market Indexed RTP
Residential	Flat Energy Charge	Default (if kwh-only metering in place)	Default (if TOU meters in place)	*Optional*	*Not Available*	*Not Available*
Small Commercial 0 - 20 kw demand	Flat Energy Charge	*Not Available*	Default (if TOU meters in place)	*Optional*	*Not Available*	*Not Available*
Medium General Service 20 - 250 kw	Demand Charge --- Flat Energy Charge	*Not Available*	Default (until interval metering installed)	Default (after interval metering installed)	*Not Available*	*Not Available*
Large General Service 250 - 2,000 kw	Demand Charge --- Flat Energy Charge	*Not Available*	*Not Available*	Default	*Optional*	*Optional*
Extra Large General Service >2000 kw	Demand Charge --- Flat Energy Charge	*Not Available*	*Not Available*	*Not Available*	Customer Must Choose Between These Two Options	

Residential Rate Design

- "Default" rate design is a customer charge to cover metering and billing, + flat rate.
- Inverted rates are the norm in the West, based on multiple cost methodologies.
  - An inverted rate design is cost-based;
  - It functions as both a demand/energy rate and as a seasonal rate
- Experiments with more complex rate designs have had mixed results.

History of Inverted Rates in the Western U.S.

- Puget, Avista: ~1975, based on load factor
- WUTC: "Baseline Rates" ordered in 1980
- Seattle: 1982, as part of PURPA
- Oregon, Idaho: Early 1980's
- Arizona: Mid-1980's, Summer Only
- California: Implemented in 1980's; During 2000-2001 Crisis, moved to 5-blocks.
- BPA, 2008 (effective in 2012)
- Gas: <u>Only</u> California utilities have inverted rates.

Example Inverted Rates

(Larger Set on a Handout)

- **Pacific Power**, Washington

- Customer Charge: $6.00
- First 600 kWh: $.04914
- Over 600 kWh: $.07751

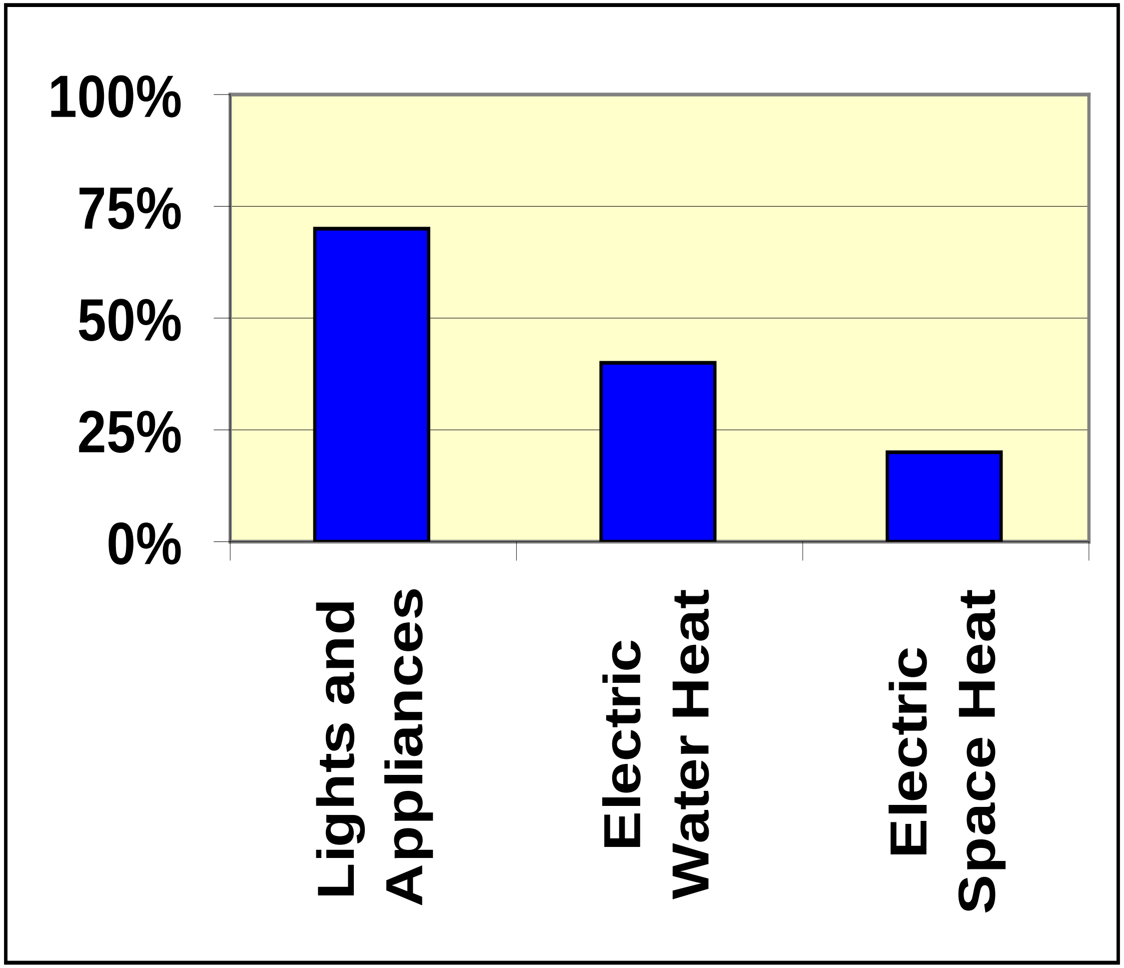
Schedule 16, Oct. 9, 2008

- **Arizona Public Service Company**, Arizona

- Customer Charge: $7.59
- Summer
  - First 400 kWh $.08570
  - Next 400 kWh $.12175
  - Over 800 kWh $.14427
- Winter
  - All kWh $.08327

Schedule E-12, July 1, 2007

Cost Basis of Inverted Rates Load-Factor Based



- Lights and Appliances are stable, year-round uses. ~ 70% LF
- Water heat is concentrated morning and evening. ~ 40% LF
- Space conditioning is seasonal and peak-oriented. ~ 20% LF

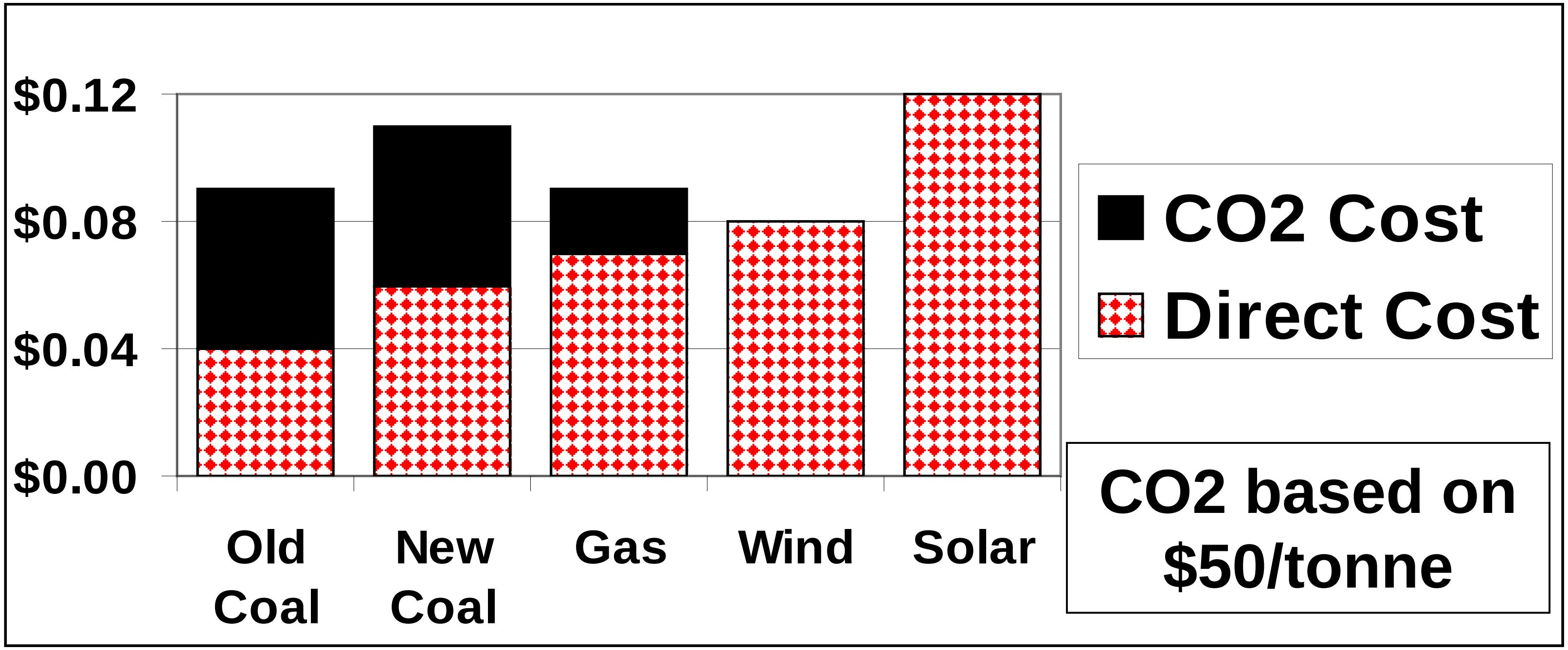
Cost Basis of Inverted Rates
Resource Cost Based

Hydro:	$.02
Older Baseload:	$.04
Newer Baseload:	$.08
Intermediate Gas:	$.12
Needle-Peak:	$.50+

- Different resources have different costs.
- New (marginal) resources cost more.
- Pricing a limited amount of power at the cost of older baseload and hydro resources is cost-based.

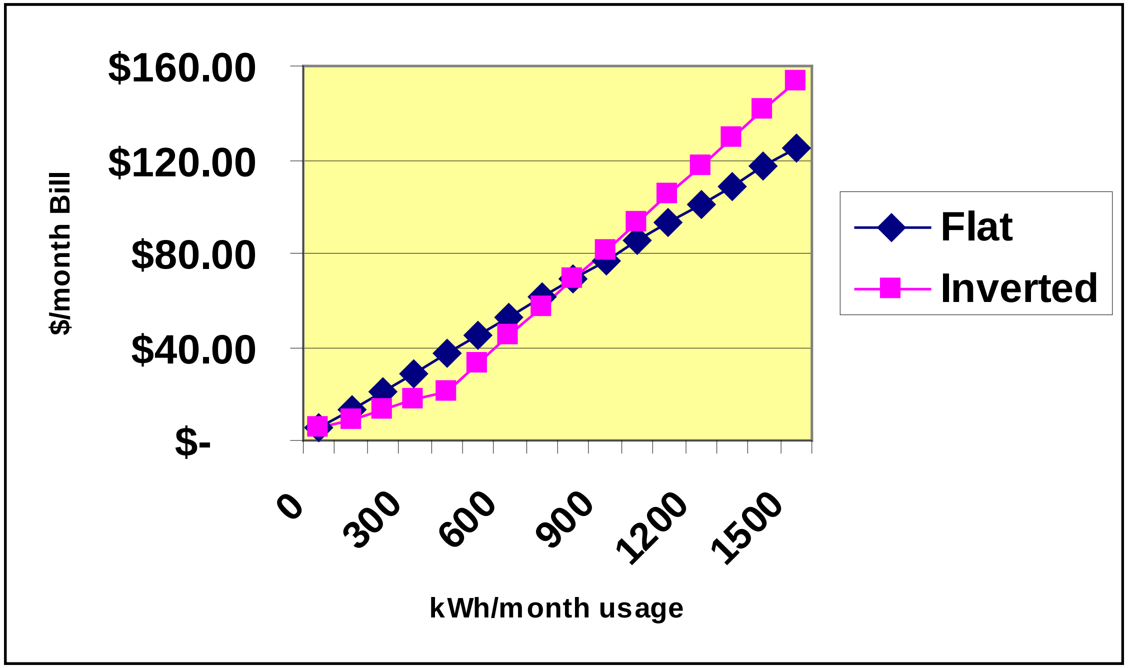
Cost Basis of Inverted Rates Environmental Costs

- Different Resources Have Different Environmental Impacts.
- These are not reflected in utility revenue requirement (yet).
- We have a pretty good idea what the cost is. \$50 - \$150 / tonne.
- An inverted rate can reflect incremental costs in incremental rates, despite a revenue requirement based on accounting costs.



Expected Impact of Inverted Rates

- Flat Rate: $.08/kWh, avg 800 kWh/month
- 70% of customers using 85% of power will see the end block.
- Inverted Rate: 400 kWh @ $.04 / then $.12 over 400 kWh
- Elasticity savings of about 5% of usage expected.



Impact on Low-Income Consumers

- About 70% of low-income consumers use less than the average residential monthly usage, and will benefit from inverted rates.
- A small number use much more than average, and will see significant adverse impacts.
- Their homes are less efficient than average. They benefit most from energy efficiency programs.
- There are a few large low-income families with high usage that will still be adversely impacted.

Complex Residential Rates

- TOU rates
- TOU + Inverted Rates
- Critical Period Pricing

- Evidence shows these are only cost-effective for larger users, BUT
- Costs for advanced metering and billing are coming down.

TOU + Inverted Rates

- Puget Sound Energy applied this to 300,000 customers in 2000-2002.
- After evaluation was underway, PSE requested termination of the pilot.
- Cost of incremental meter reading and data handling exceeded economic benefit.

Customer Charge	$5.00
Off-Peak	$.04
Mid-Peak	$.06
On-Peak	$.08
Credit for first 600 kWh	($.02)

Residential
Critical Period Pricing

- Requires advanced meters.
- Adds a limited period of critical peak with a very high rate.
- Customers notified in advance when those hours occur.
- Limited to 50 – 100 hours / year (5 – 10 days / year)
- Can work with automatic load shedding systems without notification.

Customer Charge	**$5.00**
Off-Peak	**$.05**
On-Peak	**$.10**
Critical Hours	**$.50**

Commercial and Industrial Rates

- Commercial and Industrial customers span the realm from small retailers and offices to oil refineries and manufacturing plants.
- Small commercial customers have little sophistication about electricity, and only 1% - 2% of their budget goes to electricity.
- Large industrial customers and supermarket chains employ full-time energy managers.

Small Commercial
(Under 20 kW, 10,000 kWh/month)

- Typical rates are very simple: Customer charge and flat energy charge.
- Inverted rates are inapplicable, as size varies dramatically from customer to customer.
- Energy efficiency programs are a definite way to target these consumers.
- TOU and Critical Period Pricing are reasonable options.
- Rolling baseline rates may be an option.

Typical Small Commercial Rate Design

Customer Charge	**$10.00**
Energy Charge	**$.10**

Small Commercial Rolling Baseline Rates

- Historical usage priced at an average rate.
- Increased usage from a base period priced at a marginal cost rate.
- Decreased usage can be credited at a marginal cost rate as well.
- Quite common as "economic development" rates with LOWER rates for incremental usage.

Customer Charge	**$10.00**
Up to 80% of historical usage	**$.08**
Over 80% of historical usage	**$.15**

This can dramatically shorten the payback period for efficiency investments.

Large Commercial / Small Industrial Rates

- Customer charge to cover metering and billing. TOU metering not a cost issue.
- Demand charge to cover distribution capacity costs.
- TOU energy charge to cover power supply costs.

Customer Charge	$25.00
Demand Charge	$10.00 / kW
Off-Peak Energy	$.07
On-Peak Energy	$.14

More Innovative Large Commercial Rates

- Fixed Facility Charges for distribution, based on connected load.
- Critical Period Pricing alternatives.
- Interruptible Rates

- Inverted rates do not work, except as rolling baseline rates.

Customer Charge	$25.00
Demand Charge	$10.00 / kW
Off-Peak Energy	$.06
On-Peak Energy	$.13
Critical Hours	$.50

Biggest Mistakes In Large Commercial and Industrial Rates

- Too much emphasis on demand charges. The "ideal" customer is not the high load-factor customer. It is the off-peak customer.
  - TOU energy charges are a better way to recognize load <u>shape</u>, as opposed to load <u>factor</u>.
  - Smaller businesses with "diversity" in their loads are treated unfairly when demand charges are too high.
- Assuming that "demand" is stable while "energy" is volatile in extreme weather. Actually, the opposite is likely the case.
  - In a hot summer, demand increases 25%, energy 10%

Revenue Decoupling

- Simply stated, a system of regulation where the allowed <u>revenue</u> is fixed, not the allowed <u>rate</u>.
- If sales decline, a surcharge is added.
- Individual customers still have a strong incentive to constrain usage, because they see a per-unit price.
- Utility does not have an incentive to pursue increased sales volumes.

Typical Decoupling Design

- Power supply (or gas supply) costs are recovered through a cost-based tracking mechanism.
- Transmission and distribution costs are subject to a decoupling adjustment.
- If sales decline by 1% from the test year volumes, transmission and distribution rates increase by 1%.
- All customers still see smaller bills when they use less, both due to the power supply cost flow-through and because <u>their own</u> usage has almost no impact on the rate.

Some States With Decoupling Mechanisms

Electricity

- California
- Delaware
- Idaho
- Maryland

Natural Gas

- Arkansas
- California
- Maryland
- New Jersey
- North Carolina
- Oregon
- Utah

Source: Florida PSC, Dec, 2008

Key Decoupling Terms

- Full Decoupling: All changes in usage, including weather, conservation, and business cycle, are adjusted.
- Partial Decoupling: Only a percentage of changes in usage result in a rate adjustment. Example: 90% is flowed through.
- Limited Decoupling: Only some causes of changed usage are adjusted. Example: weather is excluded from (or the only factor included in) the adjustment.

Define Decoupling and It's Purpose

- Decoupling is a mechanism to ensure that utilities have a reasonable opportunity to earn the same revenues that they would under conventional regulation, independent of changes in sales volume <u>for which the regulator wants to hold them harmless</u>.

How Does Decoupling Differ from Conventional Regulation

- Conventional Regulation: Set rates based on cost, and let the revenues flow as sales volumes change between rate cases.
- Decoupling: Set revenues based on cost, and let the rates flow as sales volumes change between rate cases.
- Decoupling should NOT be used as an attrition mechanism. If sales volumes and revenues are trending downward, study the causes and follow the trends in setting up a mechanism.

What are the Benefits of Decoupling

- **Remove the throughput incentive**, removing a barrier to utility support of conservation programs, the most cost-effective resource.
- **Reduce utility earnings volatility** due to weather, business cycle, conservation, or other factors that are included within the mechanism. This will reduce the utility's cost of capital and revenue requirement.

Yes
There Are Alternatives to Decoupling

- Straight Fixed Variable Rate Design
- Lost Margin Recovery Mechanism for Conservation Programs
- Incentive Regulation Tied to Conservation Performance that Provides Effective Lost Margin Recovery at Target Levels of Performance.
- Conservco: Remove conservation responsibility from the utility.

A Six-Point Plan for Effective and Fair Decoupling Mechanisms

- The mechanism should provide about the same revenues as conventional regulation, save for the elements you want to decouple.
- Effective conservation programs (Avista)
- Progressive Rate Design (PG&E)
- Cost of Capital Adjustment (WUTC)
- Rate Collar (Most proposals)
- Periodic Rate Proceedings to “re-link” to costs (California)

Five Examples: Awful to Excellent

- Straight Fixed / Variable Rate Design
- "Flawed Mechanisms"
  - Puget Power Electric PRAM (1991 – 1996)
  - Cascade Natural Gas Proposal (2005)
- "Promising Mechanisms"
  - Avista Utilities Gas (2006)
  - NWEC Proposal for Puget Sound Energy Electric System (2006)

Straight Fixed-Variable Rate Design

Traditional Rate Design		
Customer Charge / Month		$5.00
Delivery Margin / Therm		$ 0.30
Annual Margin / Customer @ 800 Therms/year		$ 300.00

Straight Fixed / Variable		
Customer Charge / Month		$24.33
Delivery Margin / Therm		$ 0.01
Annual Margin / Customer @ 800 Therms/year		$ 300.00

Impact On Usage		
Arc Elasticity of Demand		-0.3
Commodity Cost of Gas		$ 0.80
Price under Conventional Rate		$ 1.10
Price under Fixed/Variable Rate		$ 0.81
Change in Price ($/therm)		$ (0.29)
Change in Price (%)		-26%
Change in Usage		**7.9%**

What's the Problem? Increased Usage

Adverse impact on low-income users

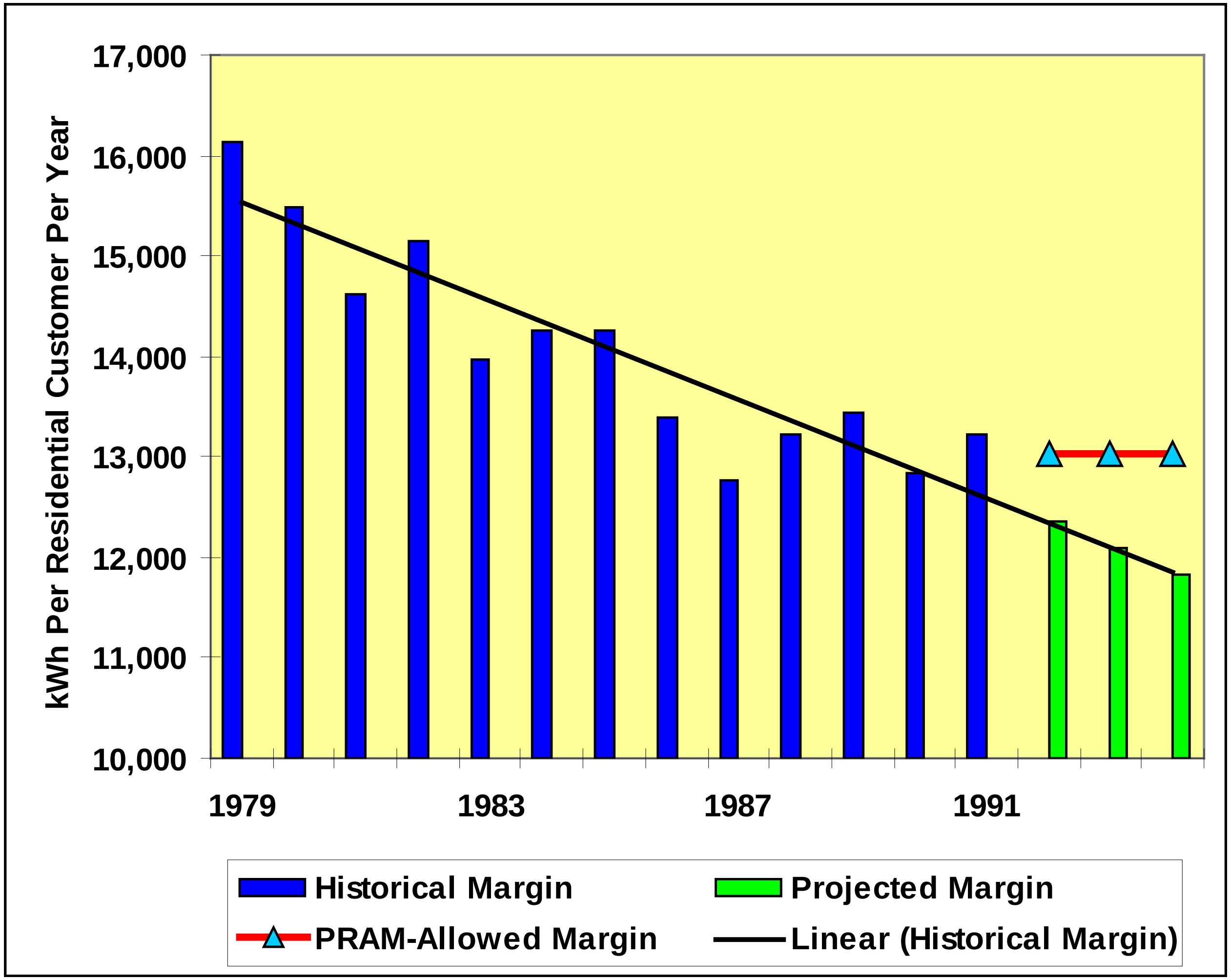
Increased pressure on gas markets

Increased CO_2 Emissions

Puget Sound Energy PRAM 1991 - 1996

- Revenue Per Customer decoupling.
- Most power supply costs handled through a power cost mechanism.
- Company had significant conservation programs
- Failed to consider declining use per customer due to gas availability and building codes.
- No collar on rates. Power cost increases were very large.
- No requirement to re-calibrate to cost at any particular date.

Puget PRAM Failed To Consider Declining Usage Patterns



Margin per customer frozen at a level higher than that which would result from traditional regulation.

As customer count grew, regular rate increases were inevitable.

Terminated when Puget and Washington Natural Gas merged in 1996.

Cascade Natural Gas (2005) Trying to Turn Back the Clock

Proposed Revenue Per Customer Decoupling, based on margin per customer allowed in previous rate case.

Had not had a rate case since 1995.

Did not consider causes of decreased sales per customer.

Company had no history of offering conservation programs

	1995 Actual	Effect of Proposal, Based on 2004 Usage
Use Per Customer	798	711
Margin Per Customer	$ 228.91	$ 209.19
Customer Charge	$ 48.00	$ 48.00
Volumetric Margin Per Customer at Current Rates	$ 180.91	$ 161.19
Volumetric Margin/therm at current rates	$ 0.2267	$ 0.2267
Total Margin/therm at decoupling rates	$ 0.2869	$ 0.2942
Proposed Increase in $/year/Customer		$ 19.72
Percent Increase in Margin/Customer		**9.4%**

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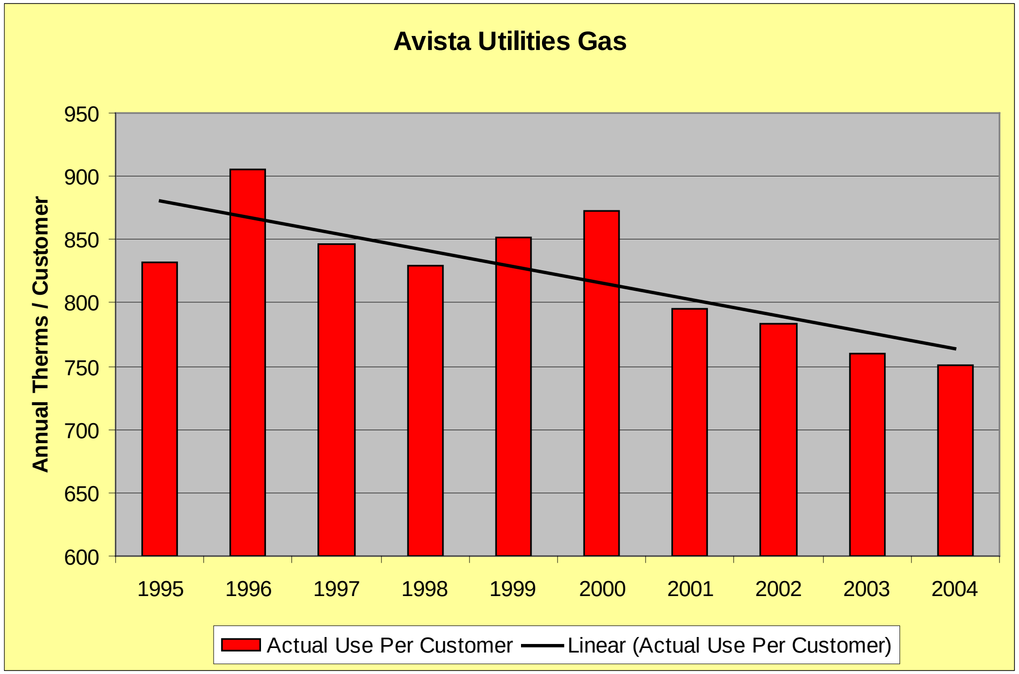
Avista Utilities (2006) Proposal "Decoupling Light" To Allay Fears

Weather-normalized (Company continues to absorb weather risk);

Only applies to customers included in the historic test year used to set the rates. New customers are removed from both numerator and denominator;

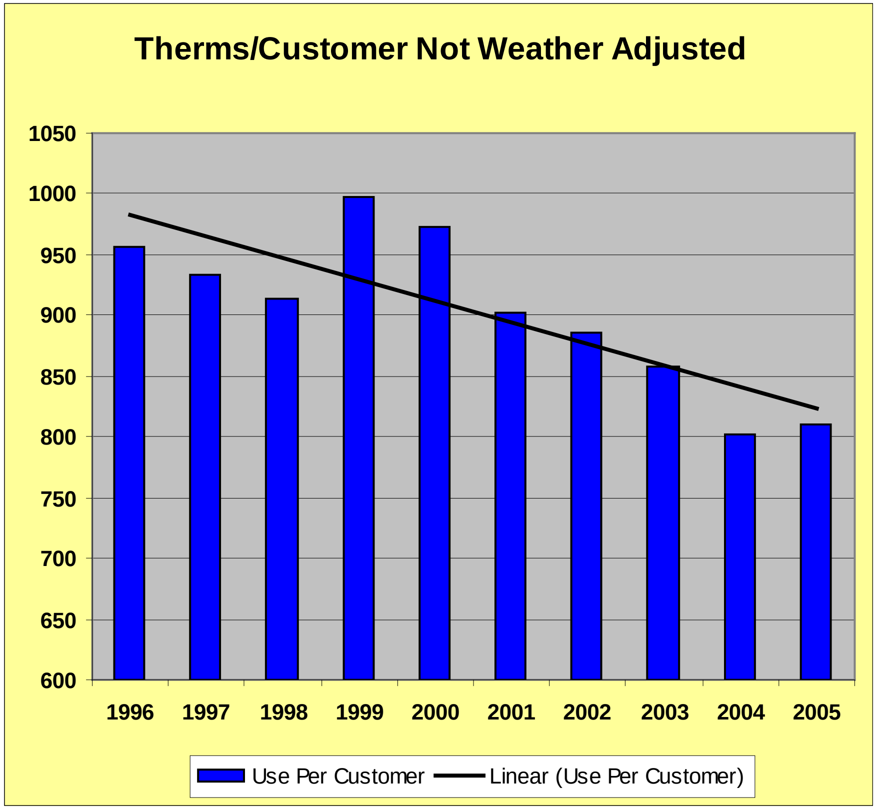
2% Annual Collar on Rate Impacts

Makes the Company whole for load reductions due to Company-funded conservation, customer-funded conservation, and price elasticity, but NOT because new homes are more energy-efficient. The line extension payment should cover this if revenues do not cover costs.



Northwest Energy Coalition Proposal for Puget Sound Energy Gas (2006)

- Puget filed a decoupling mechanism that froze revenue/customer at 834 therms/year level.
- Usage has been declining at 12 therms/year.
- Biggest driver is lower use of new customers: about 700 therms/year, vs. 800+ average.
- New customers are cheaper to serve and the line extension policy makes the Company whole if costs exceed revenues.



Elements of the NWEC Proposal

- Allows current revenue/customer for existing customers. Lower level for new customers.
- If rebates are due, they flow immediately.
- Surcharges are only partially recovered unless utility excels at conservation.
- Penalty for poor conservation performance.
- Explicit recognition of cost of capital impacts benefits associated with weather decoupling.
- 3-Year Pilot Program with formal evaluation.

Cost of Capital Impacts

Rating Agencies value earnings stability. Utility has lower earnings volatility, and needs less equity.

NWNG achieved a 1-step benefit in S&P Business Risk Profile due to weather decoupling.

1-step benefit means utility can achieve same bond rating with 3% less equity.

NWEC Proposed Recognizing the Cost of Capital Impacts, With Implementation In Next Rate Case

Without Decoupling	Ratio	Cost	Net of Tax Cost
Equity	43%	10.3%	4.43%
Preferred	7%	8.0%	0.56%
Debt	50%	7.0%	2.28%
Weighted Cost			7.26%
Net to Gross Factor			0.62
Revenue Requirement: $1 Billion Rate Base			$ 117,161,290

With Decoupling	Ratio	Cost	Net of Tax Cost
Equity	40%	10.3%	4.12%
Preferred	7%	8.0%	0.56%
Debt	53%	7.0%	2.41%
Weighted Cost			7.09%
Net to Gross Factor			0.62
Revenue Requirement: $1 Billion Rate Base			$ 114,379,032

Savings Due to Decoupling Cost of Capital Benefit:	$ 2,782,258

Critical Features and Pitfalls

- A decoupling mechanism is not an attrition adjustment. If the proposed mechanism is more likely to produce more rate increases than decreases independent of conservation program success, something is wrong.
- Follow the trend of revenue;
- If new customers are “different” recognize it.
- Get the cost of capital connection.

Double Agents and True Believers

- There are parties advocating "decoupling" that may have agendas other than objectivity.
  - Several gas utilities (Cascade, Puget, Questar) have packaged what are really gas utility attrition adjustments as "decoupling." They fail to recognize the "K" factor.
  - At least one environmental group has supported decoupling mechanisms that were favorable to shareholders to gain Company support for the concept, almost regardless of consumer impacts. Seems to assume that things can be "fixed" later.

Summary

- Decoupling means different things to different parties.
- If the goal is conservation, the mechanism should be designed to reward achievement.
- A decoupling mechanism should not be confused with an attrition adjustment.
- If use per customer is dropping, it is important to study the associated change in the cost of service per customer.
- There is a cost of capital benefit.