# Forward Test Years for US Energy Utilities

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# Introduction

The choice of a test year for rate cases is an important issue in regulation

Use of forward test years in rate cases is growing

Economic research can help regulators improve test year practices

This presentation provides useful results applicable to vertically integrated electric utilities (VIEUs) and energy distributors.

# Plan of Presentation

- Test Year Basics
- Forward Test Year Pros & Cons
- When are Future Test Years Needed?
- Statistical Methods for Cost Projections
- Making FTYs Work

# Test Year Basics

| | |
|---|---|
| **Rate Year** | Year rates take effect (usually t+1) |
| **Historical Reference Year** | Reference year for most test year calculations (usually t-1) |
| **Historical Test Year (HTY)** | Ends before rate case (usually t-1) |
| **Forward Test Year (FTY)** | Starts after rate case (usually t+1)<br>Usually corresponds to rate year |

# FTY Pros & Cons

**Pro**

Rates reflect current business conditions better

Rates more just and reasonable, less operating risk

**Con**

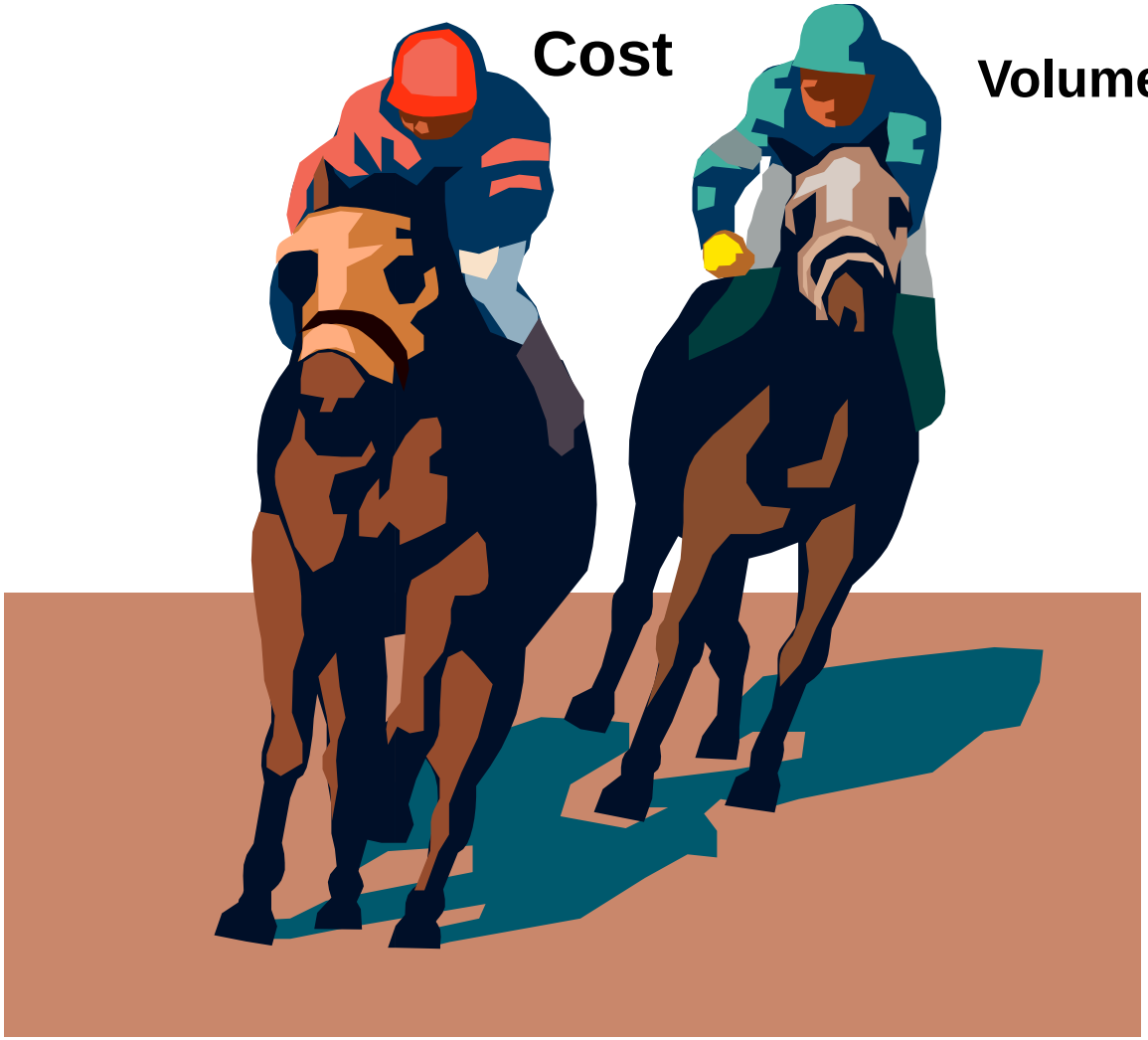
Information and financial asymmetries can benefit utilities at customers' expense

Higher regulatory cost

Sanction for cost growth exceeding industry norms weakens performance incentives

Does not reduce rate case frequency when pressures are *chronic*

# When Are FTYs Needed?



# Attrition Drivers

Utilities need forward test years when *cost* is growing faster than *revenue.*

*growth Cost > growth Revenue* [1]

Statistical research useful for analyzing this tendency

Growth in billing determinants drives revenue between historical reference year and rate year

With legacy rate designs, revenue is drawn chiefly from volumetric & other usage charges

*growth Revenue = growth Use* [2]

>>> "Horse race" between cost & system use determines whether FTY needed

# **Attrition Drivers** (cont'd)

Utility Cost Growth Formula

*Growth Cost = growth Input Prices + growth Capacity*
*– growth Productivity* [3]

Several dimensions of operating scale drive cost growth

| | |
|---|---|
| All utilities | **Customers** |
| | Transformer capacity |
| | Line miles |
| VIEUs | Generation capacity |

Customers is a good summary scale index for energy *distributors*

Trend in scale of *VIEUs* requires a multidimensional capacity *index*

# **Attrition Drivers** (cont'd)

[1]-[3] imply that FTYs are needed when

(*growth Input Prices – growth Productivity*)
> (*growth Use – growth Capacity*) [3a]

For energy distributors,

(*growth Input Prices – growth Productivity*) > *growth Use/Customer* [3b]

>>> Need for FTY (and rate relief generally) depends on

- "Inflation - productivity gap"
- Trend in "average use"

# **Attrition Drivers** (cont'd)

Trend in average use depends on

- Real household income
- Demand-side management programs
- Appliance efficiency standards & building codes
- Distributed generation ("DG")

Inflation/Productivity Gap depends on

- Inflation
- Productivity Drivers
  - Technological change
  - Accelerated system modernization
  - Generating plant additions

# Inflation/Productivity Gap of U.S. Power Distributors

| | Input Price Inflation [A] | Multifactor Productivity Growth [B] | Inflation-Productivity Gap [A-B] |
|---|---|---|---|
| 1997 | 5.23% | 1.53% | 3.70% |
| 1998 | -0.33% | -0.93% | 0.60% |
| 1999 | 3.42% | 0.31% | 3.11% |
| 2000 | 3.36% | 0.78% | 2.58% |
| 2001 | 1.61% | 0.62% | 0.99% |
| 2002 | 2.72% | 2.74% | -0.02% |
| 2003 | 0.85% | -1.40% | 2.25% |
| 2004 | 1.22% | 2.17% | -0.95% |
| 2005 | 4.77% | 1.40% | 3.37% |
| 2006 | 6.14% | -0.43% | 6.57% |
| 2007 | 2.66% | 0.06% | 2.61% |
| 2008 | -1.12% | -0.41% | -0.71% |
| 2009 | -2.02% | 0.69% | -2.71% |
| 2010 | 6.67% | 1.42% | 5.25% |
| 2011 | 1.55% | 0.96% | 0.59% |
| 2012 | 1.42% | 0.64% | 0.78% |
| 2013 | 4.85% | 0.46% | 4.39% |
| 2014 | 0.48% | -0.58% | 1.06% |
| **Average Annual Growth Rate** | | | |
| **1997-2014** | 2.42% | 0.56% | 1.86% |
| **1997-2007** | 2.88% | 0.62% | 2.26% |
| **2008-2014** | 1.69% | 0.45% | 1.24% |

**Source: PEG Research**

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# **Attrition Drivers** (cont'd)

How average use affects need for FTY:

| | |
|---|---|
| 2% + | HTY clearly suitable |
| 2-0.5% | Gray zone |
| < 0.5% | FTY clearly suitable |

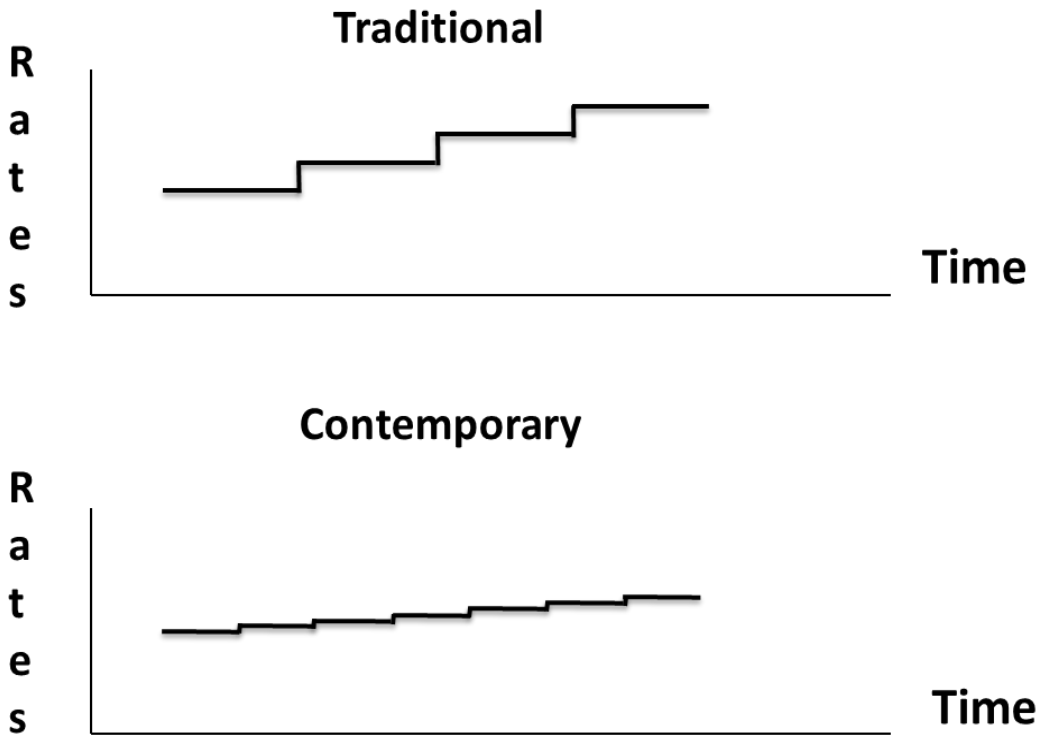
# Average Annual Electricity Use per Residential & Commercial Customer 1926-2011

| Year | Residential | | Commercial | |
|---|---|---|---|---|
| | Level | Growth Rate | Level | Growth Rate |
| 1927-1930 | 478 | 7.1% | 3,659 | 6.7% |
| 1931-1940 | 723 | 5.4% | 4,048 | 2.0% |
| 1941-1950 | 1,304 | 6.5% | 6,485 | 5.1% |
| 1951-1960 | 2,836 | 7.5% | 12,062 | 6.3% |
| 1961-1970 | 5,235 | 6.1% | 28,893 | 9.5% |
| 1971-1980 | 8,205 | 2.5% | 49,045 | 3.1% |
| 1981-1990 | 9,062 | 0.6% | 56,571 | 1.4% |
| 1991-2000 | 10,061 | 1.1% | 67,006 | 1.7% |
| 2001-2007 | 10,941 | 0.7% | 74,224 | 0.6% |
| 2008-2011 | 11,181 | 0.1% | 75,265 | -0.5% |

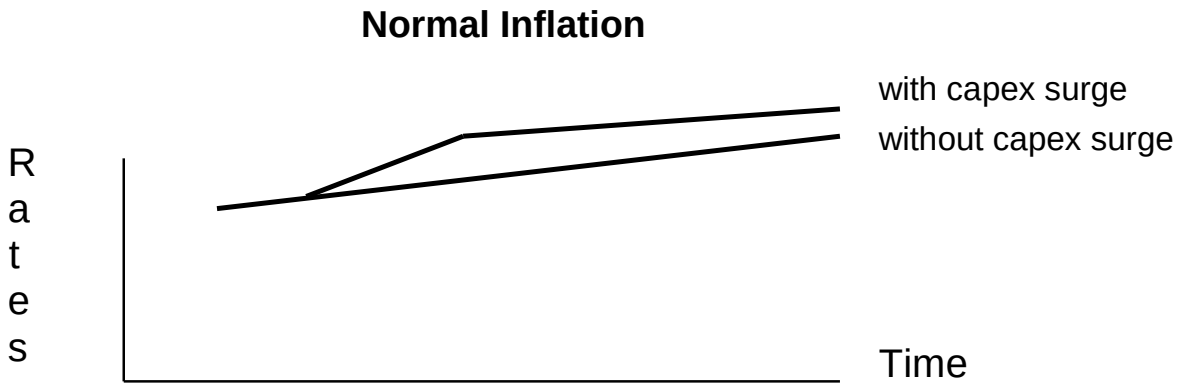
**Sources**: U.S. Department of Energy, Energy Information Administration, Form EIA-861, "Annual Electric Utility Report," and Form EIA-826, "Monthly Electric Utility Sales and Revenues Report with State Distributions," and EIA-0035, "Monthly Energy Review."

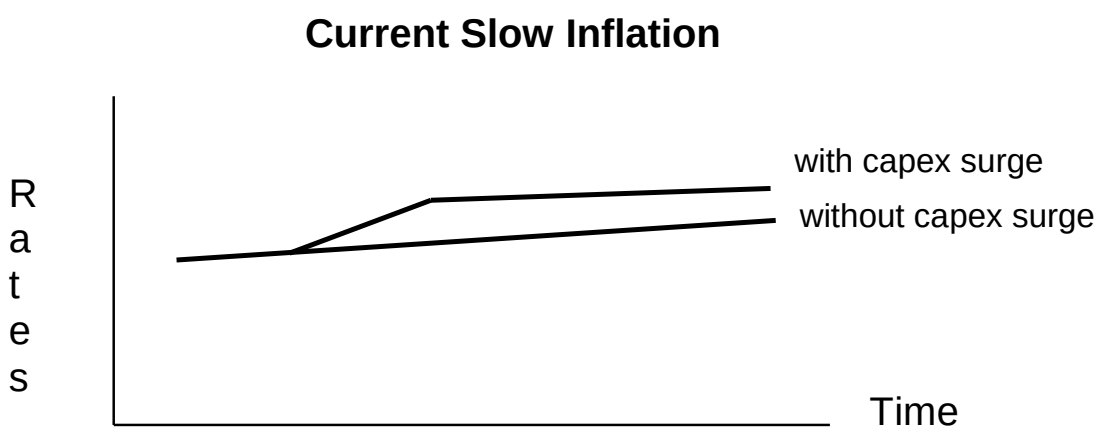
>>> Brisk growth in average use *used to* be enough to offset inflation-productivity gap but is no longer available

# Rate Escalation Requirements: VIEUs



# Rate Escalation Requirements: Distributors



# Statistical Forecasting Methods

Two methods in widespread use:

- Econometric forecasting models
- Cost Indexing

Statistical methods are useful for FTY projections

- Strengthen performance incentives
- Reduce regulatory cost
- Less concern about asymmetric information

Utility cost growth formula provides basis for projections

$$Cost^{O\&M}_{t+1} = Cost^{O\&M}_{t-1} \times (1 - \Delta Input\ Prices - \Delta Productivity^{Industry} + \Delta Capacity^{Utility})$$

Many utilities use *inflation-only* escalators to forecast O&M expenses

# US Power Distributor Productivity Trends

| Year | Customers | Input Quantities | | | Productivity | | |
|---|---|---|---|---|---|---|---|
| | | O&M | Capital | Multifactor | O&M | Capital | MFP |
| | [A] | [B] | [C] | [D] | [E = A - B] | [F = A - C] | [G=A-D] |
| 1997 | 1.44% | -1.33% | 0.70% | -0.09% | 2.76% | 0.74% | 1.53% |
| 1998 | 1.56% | 6.24% | 0.37% | 2.49% | -4.68% | 1.19% | -0.93% |
| 1999 | 0.83% | 0.22% | 0.63% | 0.52% | 0.61% | 0.20% | 0.31% |
| 2000 | 1.55% | 0.51% | 1.05% | 0.77% | 1.03% | 0.50% | 0.78% |
| 2001 | 1.79% | 1.54% | 0.75% | 1.18% | 0.25% | 1.04% | 0.62% |
| 2002 | 1.28% | -4.51% | 0.52% | -1.47% | 5.79% | 0.76% | 2.74% |
| 2003 | 0.75% | 5.10% | 0.51% | 2.15% | -4.34% | 0.24% | -1.40% |
| 2004 | 1.11% | -3.99% | 0.51% | -1.06% | 5.10% | 0.60% | 2.17% |
| 2005 | 1.27% | -0.90% | 0.37% | -0.12% | 2.17% | 0.90% | 1.40% |
| 2006 | 0.50% | 1.31% | 0.59% | 0.93% | -0.82% | -0.10% | -0.43% |
| 2007 | 1.06% | 1.99% | 0.28% | 1.01% | -0.93% | 0.78% | 0.06% |
| 2008 | 0.56% | 1.43% | 0.46% | 0.97% | -0.87% | 0.09% | -0.41% |
| 2009 | 0.25% | -2.10% | 0.05% | -0.43% | 2.35% | 0.20% | 0.69% |
| 2010 | 0.41% | -1.16% | -0.66% | -1.01% | 1.57% | 1.08% | 1.42% |
| 2011 | 0.29% | -1.80% | -0.35% | -0.67% | 2.09% | 0.63% | 0.96% |
| 2012 | 0.57% | -1.01% | 0.54% | -0.07% | 1.57% | 0.02% | 0.64% |
| 2013 | 0.30% | -1.02% | 0.20% | -0.16% | 1.31% | 0.10% | 0.46% |
| 2014 | 0.65% | 2.62% | 0.22% | 1.23% | -1.97% | 0.43% | -0.58% |
| **Average Annual Growth Rates** | | | | | | | |
| **1997-2014** | **0.90%** | **0.18%** | **0.37%** | **0.34%** | **0.72%** | **0.52%** | **0.56%** |
| **1997-2007** | **1.19%** | **0.56%** | **0.57%** | **0.57%** | **0.63%** | **0.62%** | **0.62%** |
| **2008-2014** | **0.43%** | **-0.43%** | **0.07%** | **-0.02%** | **0.87%** | **0.37%** | **0.45%** |

[1]Annual growth rates are calculated logarithmically.

[Fn] Costs of pensions, customer service and information, and sales were excluded from this analysis.

[Fn] Franchise fees were excluded from O&M costs.

***Source: PEG Research***

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# Alternative Escalators for Power Distributor O&M Expenses

| | O&M Escalators | | | | | O&M Expenses | Tracking Accuracy | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | GDPPI [A] | O&M Input Price Inflation [B] | O&M Productivity [C] | Customers [D] | Custom Escalator [E = B-C+D] | [F] | GDPPI Inflation Only [G = A-F] | Inflation Only [H = B-F] | Custom Escalator [I = E-F] |
| 1997 | 1.71% | 0.96% | 0.72% | 1.44% | 1.68% | -0.36% | 2.06% | 1.32% | 2.04% |
| 1998 | 1.08% | 0.23% | 0.72% | 1.56% | 1.07% | 6.48% | -5.40% | -6.25% | -5.41% |
| 1999 | 1.42% | 4.70% | 0.72% | 0.83% | 4.80% | 5.51% | -4.09% | -0.82% | -0.71% |
| 2000 | 2.25% | 3.35% | 0.72% | 1.55% | 4.17% | 3.86% | -1.61% | -0.51% | 0.31% |
| 2001 | 2.25% | 0.35% | 0.72% | 1.79% | 1.42% | 1.90% | 0.35% | -1.55% | -0.48% |
| 2002 | 1.52% | 3.90% | 0.72% | 1.28% | 4.46% | -0.61% | 2.13% | 4.51% | 5.07% |
| 2003 | 1.97% | 2.03% | 0.72% | 0.75% | 2.05% | 7.02% | -5.05% | -4.99% | -4.97% |
| 2004 | 2.71% | 3.45% | 0.72% | 1.11% | 3.84% | -0.55% | 3.26% | 4.00% | 4.39% |
| 2005 | 3.17% | 5.09% | 0.72% | 1.27% | 5.64% | 4.20% | -1.03% | 0.90% | 1.45% |
| 2006 | 3.03% | 3.44% | 0.72% | 0.50% | 3.21% | 4.75% | -1.72% | -1.32% | -1.54% |
| 2007 | 2.63% | 3.68% | 0.72% | 1.06% | 4.02% | 5.67% | -3.04% | -2.00% | -1.66% |
| 2008 | 1.91% | 2.75% | 0.72% | 0.56% | 2.58% | 4.17% | -2.26% | -1.42% | -1.59% |
| 2009 | 0.79% | 0.86% | 0.72% | 0.25% | 0.39% | -1.24% | 2.03% | 2.10% | 1.63% |
| 2010 | 1.22% | 2.63% | 0.72% | 0.41% | 2.32% | 1.46% | -0.24% | 1.17% | 0.87% |
| 2011 | 2.04% | 3.44% | 0.72% | 0.29% | 3.01% | 1.66% | 0.38% | 1.78% | 1.34% |
| 2012 | 1.83% | 1.33% | 0.72% | 0.57% | 1.17% | 0.34% | 1.49% | 0.99% | 0.83% |
| 2013 | 1.62% | 1.48% | 0.72% | 0.30% | 1.06% | 0.46% | 1.16% | 1.02% | 0.60% |
| 2014 | 1.63% | 0.53% | 0.72% | 0.65% | 0.45% | 3.14% | -1.51% | -2.61% | -2.69% |
| **Average Annual Growth Rates** | | | | | | | | | |
| **1997-2014** | **1.93%** | **2.46%** | **0.72%** | **0.90%** | **2.63%** | **2.66%** | **-0.73%** | **-0.20%** | **-0.03%** |
| **1997-2007** | **2.16%** | **2.83%** | **0.72%** | **1.19%** | **3.31%** | **3.44%** | **-1.29%** | **-0.61%** | **-0.14%** |
| **2008-2014** | **1.58%** | **1.86%** | **0.72%** | **0.43%** | **1.57%** | **1.43%** | **0.15%** | **0.43%** | **0.14%** |

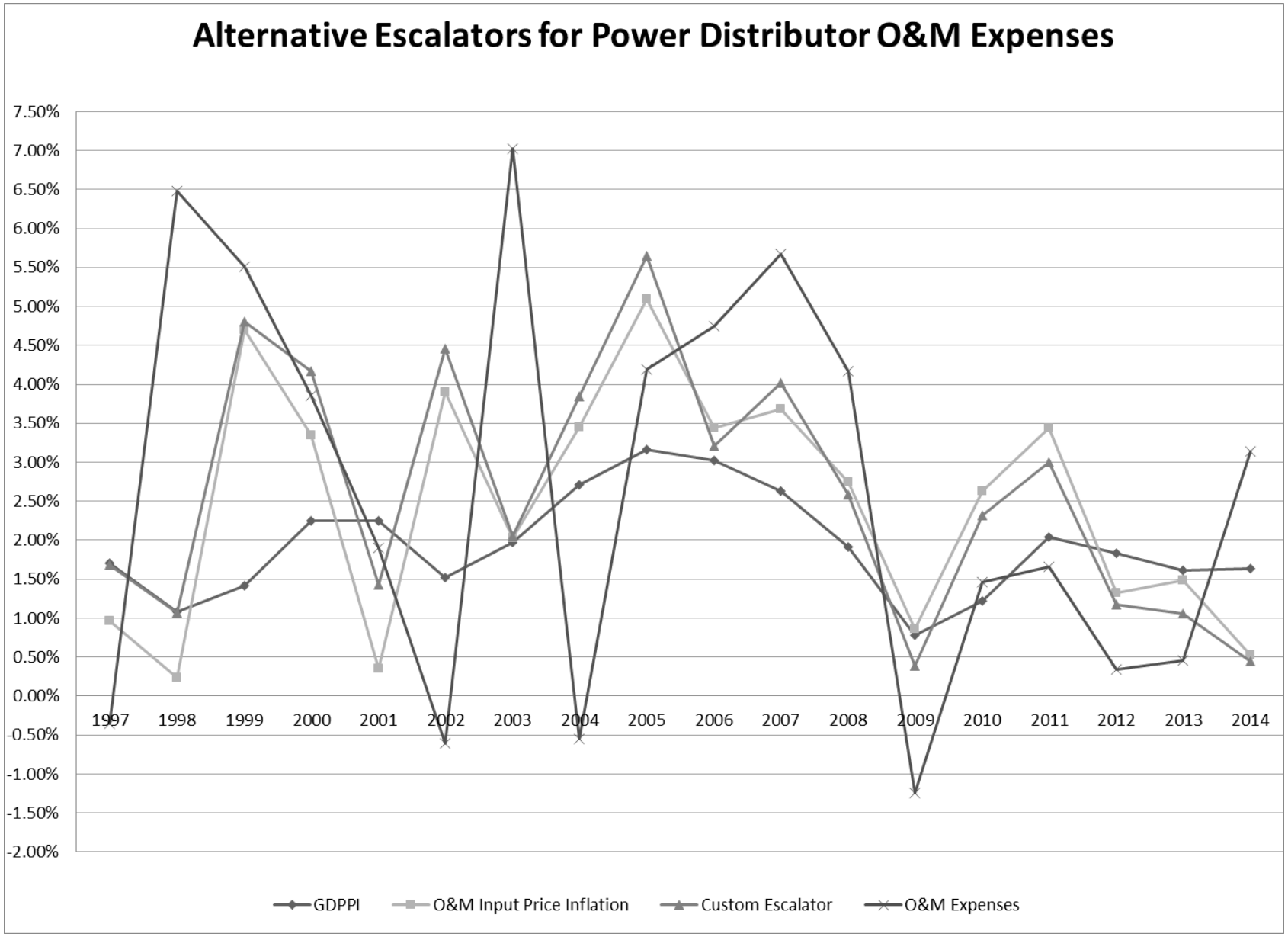
Notes

Annual growth rates are calculated logarithmically.

Pensions, customer service and information, sales and franchise fee expenses were excluded from O&M expenses.

Gross Domestic Product Price Index. United States National Income and Product Accounts Tables. Table 1.1.4. Compiled by the Bureau of Economic Analysis.

O&M input price index developed by PEG from Bureau of Labor Statistics producer price and employment cost indexes


Alternative Escalators for Power Distributor O&M Expenses
7.50%
7.00%
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6.00%
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5.00%
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4.00%
3.50%
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-1.00%
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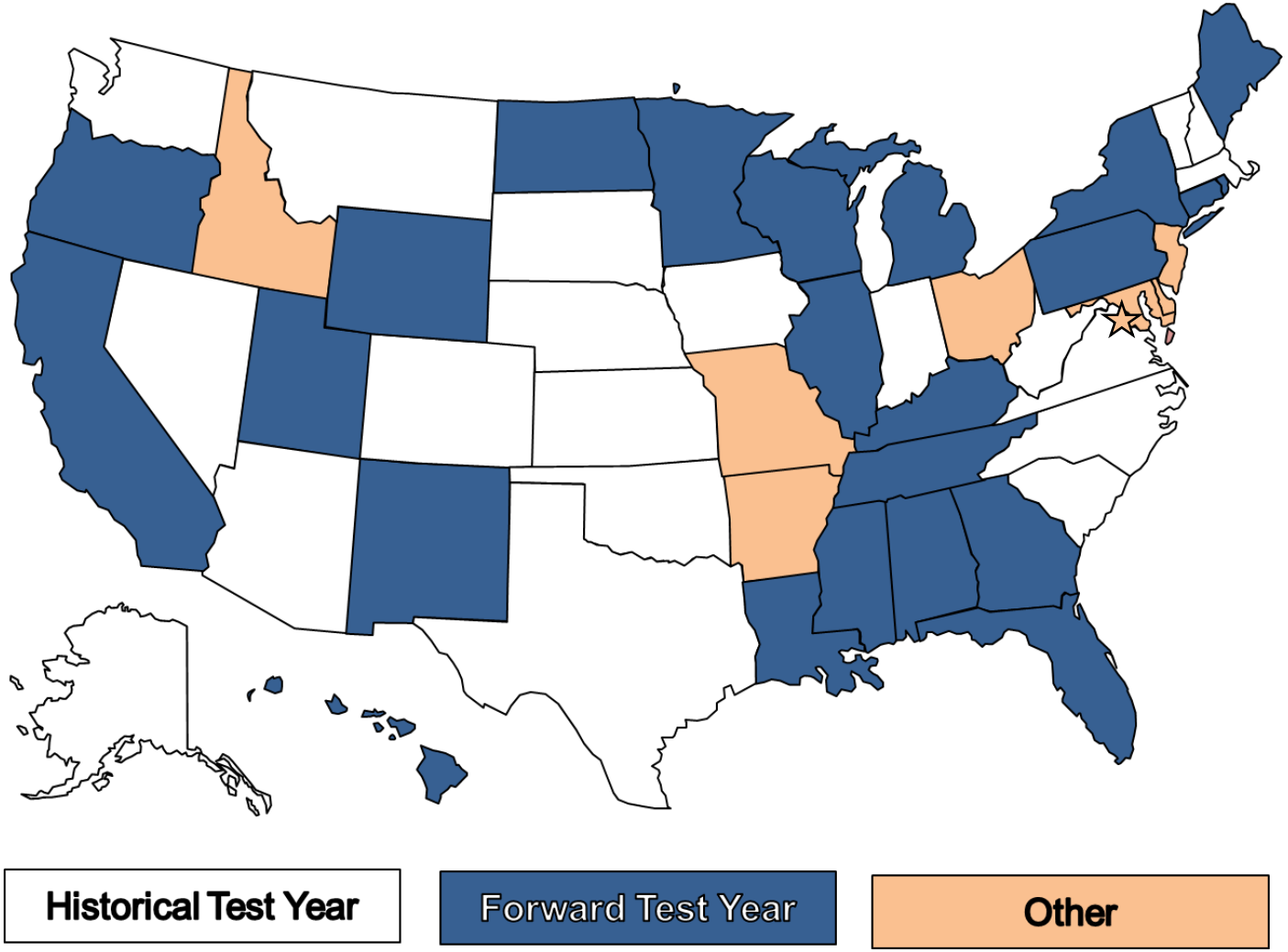
2011
2012
2013
2014
GDPPI
O&M Input Price Inflation
Custom Escalator
O&M Expenses

# Making FTYs Work

- Review need for FTYs in each rate case
- Use standard, statistically based escalators where possible
- Track accuracy of utility forecasts
- More funding for staff and interveners
- Revenue decoupling reduces billing determinant controversy
- Alternatives to FTY rate cases sometimes work better
  - Cost Trackers
  - Multiyear rate plans

# Additional Slides

# Current Test Year Policies

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# Test Year Approaches of US Jurisdictions

## Fully-Forecasted Test Years Commonly Used (15)

| | |
|---|---|
| Alabama | Utilities operate under forward-looking formula rate plans |
| California | |
| Connecticut | |
| FERC | Rate cases use forward test years but some formula rate plans use historical test years |
| Florida | |
| Georgia | |
| Hawaii | |
| Maine | |
| Michigan | |
| Minnesota | |
| New York | |
| Oregon | |
| Rhode Island | |
| Tennessee | |
| Wisconsin | |

## Fully-Forecasted Test Years Occasionally Used (9)

| | |
|---|---|
| Illinois | Utilities use various test years including forward test years ("FTYs") |
| Kentucky | Utilities use various test years including FTYs |
| Louisiana | Utilities use various test years including FTYs |
| Mississippi | Both electric utilities operate under forward-looking formula rate plans. Gas formula rate plans rely on historical test years ("HTYs"). |
| New Mexico | A recently passed law allows for use of FTYs, and at least one rate increase based on FTY evidence has been approved |
| North Dakota | Utilities use various test years including FTYs |
| Pennsylvania | Partially-forecasted test years have traditionally been the norm. However, a law allowing fully-forecasted test years passed in 2012 and several electric utility rate increases based on FTY evidence have been approved. |
| Utah | Test year selection is part of the rate case and can be contested. Several recent rate cases have used FTYs. |
| Wyoming | Rocky Mountain Power has recently used FTYs |

Source: Mark Newton Lowry, Matt Makos, and Gretchen Waschbusch, *Alternative Regulation for Emerging Utility Challenges: 2015 Update*, Edison Electric Institute 2015

# Test Year Approaches of US Jurisdictions

| Partially-Forecasted Test Years Commonly or Occasionally Used (8) | |
|---|---|
| Arkansas | Utilities have typically used partially forecasted test years in rate cases. However, a recent bill authorized the use of formula rates with either historical or forecasted test periods. |
| Delaware | Before restructuring FTY filings were common, but companies have used a mix of HTYs and partially-forecasted test years in recent filings |
| District of Columbia | PEPCO has filed rate cases using both hybrid and historical test years recently |
| Idaho | |
| Maryland | Utilities use various test years excluding FTYs |
| Missouri | Utilities have the option to file partially-forecasted test years |
| New Jersey | |
| Ohio | |

| Historical Test Years Commonly Used (20) | |
|---|---|
| Alaska | |
| Arizona | |
| Colorado | Utilities have filed FTY evidence. However, no FTY rates have yet been approved but a recent case made extraordinary HTY adjustments. |
| Indiana | A recently passed law allows for use of FTYs, but no rate increase based on FTY evidence has been approved for an energy utility to date |
| Iowa | |
| Kansas | |
| Massachusetts | |
| Montana | |
| Nebraska | Nebraska has no electric IOUs. Gas companies are legally authorized to use FTYs but commonly use HTYs. |
| Nevada | |
| New Hampshire | |
| North Carolina | |
| Oklahoma | |
| South Carolina | |
| South Dakota | |
| Texas | |
| Vermont | |
| Virginia | |
| Washington | |
| West Virginia | |

Source: Mark Newton Lowry, Matt Makos, and Gretchen Waschbusch, *Alternative Regulation for Emerging Utility Challenges: 2015 Update*, Edison Electric Institute 2015

# Recent Trends in Average Deliveries of Electric Power to US Residential & Commercial Customers

| | Residential | | | | Commercial | | | |
|---|---|---|---|---|---|---|---|---|
| | Deliveries MWh | Customers | Average Use MWh / Customer | Growth Rates* | Deliveries MWh | Customers | Average Use MWh / Customer | Growth Rates* |
| 1990 | 924,018,699 | 97,094,514 | 9.52 | | 751,026,562 | 12,081,942 | 62.16 | |
| 1991 | 955,417,350 | 98,295,518 | 9.72 | 2.1% | 765,663,613 | 12,178,694 | 62.87 | 1.1% |
| 1992 | 935,938,788 | 99,512,728 | 9.41 | -3.3% | 761,270,543 | 12,367,205 | 61.56 | -2.1% |
| 1993 | 994,780,818 | 100,860,071 | 9.86 | 4.8% | 794,573,370 | 12,526,377 | 63.43 | 3.0% |
| 1994 | 1,008,481,682 | 102,320,846 | 9.86 | -0.1% | 820,269,462 | 12,733,153 | 64.42 | 1.5% |
| 1995 | 1,042,501,471 | 103,917,312 | 10.03 | 1.8% | 862,684,775 | 12,949,365 | 66.62 | 3.4% |
| 1996 | 1,082,511,751 | 105,343,005 | 10.28 | 2.4% | 887,445,174 | 13,181,065 | 67.33 | 1.1% |
| 1997 | 1,075,880,098 | 107,065,589 | 10.05 | -2.2% | 928,632,774 | 13,542,374 | 68.57 | 1.8% |
| 1998 | 1,130,109,120 | 109,048,343 | 10.36 | 3.1% | 979,400,928 | 13,887,066 | 70.53 | 2.8% |
| 1999 | 1,144,923,069 | 110,383,238 | 10.37 | 0.1% | 1,001,995,720 | 14,073,764 | 71.20 | 0.9% |
| 2000 | 1,192,446,491 | 111,717,711 | 10.67 | 2.9% | 1,055,232,090 | 14,349,067 | 73.54 | 3.2% |
| 2001 | 1,201,606,593 | 114,890,240 | 10.46 | -2.0% | 1,083,068,516 | 14,867,490 | 72.85 | -0.9% |
| 2002 | 1,265,179,869 | 116,622,037 | 10.85 | 3.7% | 1,104,496,607 | 15,333,700 | 72.03 | -1.1% |
| 2003 | 1,275,823,910 | 117,280,481 | 10.88 | 0.3% | 1,198,727,601 | 16,549,519 | 72.43 | 0.6% |
| 2004 | 1,291,981,578 | 118,763,768 | 10.88 | 0.0% | 1,230,424,731 | 16,606,783 | 74.09 | 2.3% |
| 2005 | 1,359,227,107 | 120,760,839 | 11.26 | 3.4% | 1,275,079,020 | 16,871,940 | 75.57 | 2.0% |
| 2006 | 1,351,520,036 | 122,471,071 | 11.04 | -2.0% | 1,299,743,695 | 17,172,499 | 75.69 | 0.2% |
| 2007 | 1,392,240,996 | 123,949,916 | 11.23 | 1.8% | 1,336,315,196 | 17,377,219 | 76.90 | 1.6% |
| 2008 | 1,380,661,745 | 125,037,837 | 11.04 | -1.7% | 1,336,133,485 | 17,582,382 | 75.99 | -1.2% |
| 2009 | 1,364,758,153 | 125,208,829 | 10.90 | -1.3% | 1,306,852,524 | 17,562,235 | 74.41 | -2.1% |
| 2010 | 1,445,708,403 | 125,717,935 | 11.50 | 5.4% | 1,330,199,364 | 17,674,338 | 75.26 | 1.1% |
| 2011 | 1,422,801,093 | 126,143,072 | 11.28 | -1.9% | 1,328,057,439 | 17,638,062 | 75.29 | 0.0% |
| 2012 | 1,374,514,708 | 126,832,343 | 10.84 | -4.0% | 1,327,101,196 | 17,729,029 | 74.85 | -0.6% |
| 2013 | 1,394,812,129 | 127,777,153 | 10.92 | 0.7% | 1,337,078,777 | 17,679,562 | 75.63 | 1.0% |
| 2014 | 1,407,208,311 | 128,680,416 | 10.94 | 0.2% | 1,352,158,263 | 17,853,995 | 75.73 | 0.1% |
| **Average Annual Growth Rates*** | | | | | | | | |
| **1991-2007** | | | | **1.0%** | | | | **1.3%** |
| **2008-2014** | | | | **-0.4%** | | | | **-0.2%** |

Source: U.S. Energy Information Administation
* Growth rates are calculated logarithmically

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# How Credit Metrics of Electric Utilities Differed by Test Year, 2006 - 2008

| Test Year | Return on Capital (%) | EBITDA/Interest Coverage | FFO/debt (%) |
|---|---|---|---|
| Historical | 7.9 | 4.3 | 18.3 |
| Hybrid | 9.5 | 5.9 | 19.9 |
| Forward | 9.1 | 5.0 | 20.6 |
| Indeterminate | 7.8 | 4.3 | 18.1 |
| All Companies | 8.5 | 4.8 | 19.3 |

Source: Standard & Poor's Ratings Direct, *Credit Stats: Electric Utilities - U.S.* August 24, 2009.

# Bibliography

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Mark Newton Lowry, David Hovde, Lullit Getachew and Matt Makos, *Forward Test Years for US Electric Utilities*, Edison Electric Institute (2010)

# Contact Information

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- Leading PBR consultant since 1990s
- Specialties: multi-year rate plans, statistical benchmarking, performance metrics, revenue decoupling
- Former Penn State University energy economics professor
- PhD Applied Economics, University of Wisconsin

# Traditional Rate Regulation

*Forward Test Years for US Energy Utilities*

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# Traditional Cost of Service Regulation (COSR)

## COSR Basics

- Base rates adjusted in rate cases
- Rate cases occur *as needed*
- Trackers for fuel, purchased power, & demand side management expenses
- Usage (volumetric and demand) charges collect many "fixed" costs

## General COSR Problems

- Performance incentives vary with rate case frequency, scope of cost trackers
- Incentive to increase rate base ("Averch Johnson effect")
- Incentive to increase sales ("throughput incentive")
- >> Utilities have incentive to resist DERs even when they are low cost option
- High regulatory cost
- Limited marketing flexibility

# Performance-Based Regulation

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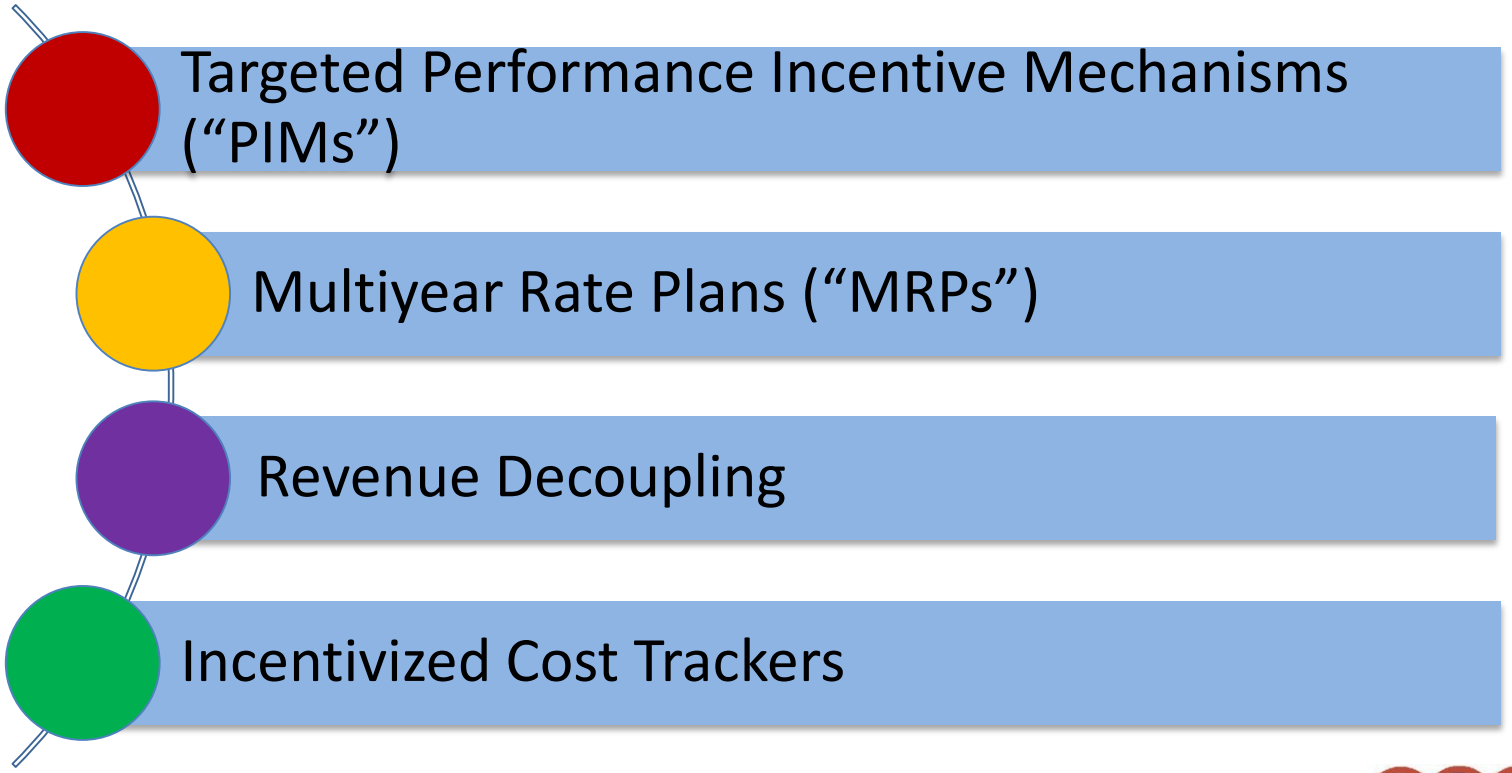
# Performance-Based Regulation

Regulation designed to improve utility performance with stronger incentives

4 well-established PBR approaches



# Revenue Decoupling

## Objectives

- Eliminate "throughput incentive" by decoupling base rate revenue from system use

## Key Components

- **Revenue decoupling mechanism** helps actual revenue track allowed revenue
- **Revenue Adjustment Mechanism** adjusts allowed revenue automatically for cost pressures

## Advantages

- Removes throughput incentive for wide range of DSM initiatives
- No need for complicated load savings estimates
- Full decoupling achievable immediately
- No restrictions on rate designs
- Side Benefits… Automatic rate relief for declining average use
  Reduced controversy over billing determinants in rate cases

>>> Decoupling used even where utilities lack large DSM programs

# Recent Trends in Average Deliveries of Electric Power to US Residential & Commercial Customers

| | Residential | | | | Commercial | | | |
|---|---|---|---|---|---|---|---|---|
| | Deliveries MWh | Customers | Average Use MWh / Customer | Growth Rates* | Deliveries MWh | Customers | Average Use MWh / Customer | Growth Rates* |
| 1990 | 924,018,699 | 97,094,514 | 9.52 | | 751,026,562 | 12,081,942 | 62.16 | |
| 1991 | 955,417,350 | 98,295,518 | 9.72 | 2.1% | 765,663,613 | 12,178,694 | 62.87 | 1.1% |
| 1992 | 935,938,788 | 99,512,728 | 9.41 | -3.3% | 761,270,543 | 12,367,205 | 61.56 | -2.1% |
| 1993 | 994,780,818 | 100,860,071 | 9.86 | 4.8% | 794,573,370 | 12,526,377 | 63.43 | 3.0% |
| 1994 | 1,008,481,682 | 102,320,846 | 9.86 | -0.1% | 820,269,462 | 12,733,153 | 64.42 | 1.5% |
| 1995 | 1,042,501,471 | 103,917,312 | 10.03 | 1.8% | 862,684,775 | 12,949,365 | 66.62 | 3.4% |
| 1996 | 1,082,511,751 | 105,343,005 | 10.28 | 2.4% | 887,445,174 | 13,181,065 | 67.33 | 1.1% |
| 1997 | 1,075,880,098 | 107,065,589 | 10.05 | -2.2% | 928,632,774 | 13,542,374 | 68.57 | 1.8% |
| 1998 | 1,130,109,120 | 109,048,343 | 10.36 | 3.1% | 979,400,928 | 13,887,066 | 70.53 | 2.8% |
| 1999 | 1,144,923,069 | 110,383,238 | 10.37 | 0.1% | 1,001,995,720 | 14,073,764 | 71.20 | 0.9% |
| 2000 | 1,192,446,491 | 111,717,711 | 10.67 | 2.9% | 1,055,232,090 | 14,349,067 | 73.54 | 3.2% |
| 2001 | 1,201,606,593 | 114,890,240 | 10.46 | -2.0% | 1,083,068,516 | 14,867,490 | 72.85 | -0.9% |
| 2002 | 1,265,179,869 | 116,622,037 | 10.85 | 3.7% | 1,104,496,607 | 15,333,700 | 72.03 | -1.1% |
| 2003 | 1,275,823,910 | 117,280,481 | 10.88 | 0.3% | 1,198,727,601 | 16,549,519 | 72.43 | 0.6% |
| 2004 | 1,291,981,578 | 118,763,768 | 10.88 | 0.0% | 1,230,424,731 | 16,606,783 | 74.09 | 2.3% |
| 2005 | 1,359,227,107 | 120,760,839 | 11.26 | 3.4% | 1,275,079,020 | 16,871,940 | 75.57 | 2.0% |
| 2006 | 1,351,520,036 | 122,471,071 | 11.04 | -2.0% | 1,299,743,695 | 17,172,499 | 75.69 | 0.2% |
| 2007 | 1,392,240,996 | 123,949,916 | 11.23 | 1.8% | 1,336,315,196 | 17,377,219 | 76.90 | 1.6% |
| 2008 | 1,380,661,745 | 125,037,837 | 11.04 | -1.7% | 1,336,133,485 | 17,582,382 | 75.99 | -1.2% |
| 2009 | 1,364,758,153 | 125,208,829 | 10.90 | -1.3% | 1,306,852,524 | 17,562,235 | 74.41 | -2.1% |
| 2010 | 1,445,708,403 | 125,717,935 | 11.50 | 5.4% | 1,330,199,364 | 17,674,338 | 75.26 | 1.1% |
| 2011 | 1,422,801,093 | 126,143,072 | 11.28 | -1.9% | 1,328,057,439 | 17,638,062 | 75.29 | 0.0% |
| 2012 | 1,374,514,708 | 126,832,343 | 10.84 | -4.0% | 1,327,101,196 | 17,729,029 | 74.85 | -0.6% |
| 2013 | 1,394,812,129 | 127,777,153 | 10.92 | 0.7% | 1,337,078,777 | 17,679,562 | 75.63 | 1.0% |
| 2014 | 1,407,208,311 | 128,680,416 | 10.94 | 0.2% | 1,352,158,263 | 17,853,995 | 75.73 | 0.1% |
| **Average Annual Growth Rates*** | | | | | | | | |
| **1991-2007** | | | | **1.0%** | | | | **1.3%** |
| **2008-2014** | | | | **-0.4%** | | | | **-0.2%** |

Source: U.S. Energy Information Administation
* Growth rates are calculated logarithmically

***Forward Test Years for US Energy Utilities***

Pacific Economics Group Research, LLC

# Recent Trends in Average Use of Natural Gas by US Residential & Commercial Customers

| | Residential | | | | Commercial | | | |
|---|---|---|---|---|---|---|---|---|
| | Deliveries MMcf | Customers | Average Use Mcf / Customer | Growth Rates* | Deliveries MMcf | Customers | Average Use Mcf / Customer | Growth Rates* |
| 1990 | 4,391,324 | 50,187,178 | 87.5 | | 2,622,721 | 4,236,280 | 619.1 | |
| 1991 | 4,555,659 | 51,593,206 | 88.3 | 0.9% | 2,728,581 | 4,357,252 | 626.2 | 1.1% |
| 1992 | 4,690,065 | 52,331,397 | 89.6 | 1.5% | 2,802,751 | 4,409,699 | 635.6 | 1.5% |
| 1993 | 4,956,445 | 52,535,411 | 94.3 | 5.1% | 2,861,569 | 4,464,906 | 640.9 | 0.8% |
| 1994 | 4,847,702 | 53,392,557 | 90.8 | -3.8% | 2,895,013 | 4,533,905 | 638.5 | -0.4% |
| 1995 | 4,850,318 | 54,322,179 | 89.3 | -1.7% | 3,031,077 | 4,636,500 | 653.7 | 2.4% |
| 1996 | 5,241,414 | 55,263,673 | 94.8 | 6.0% | 3,158,244 | 4,720,227 | 669.1 | 2.3% |
| 1997 | 4,983,772 | 56,186,958 | 88.7 | -6.7% | 3,214,912 | 4,761,409 | 675.2 | 0.9% |
| 1998 | 4,520,276 | 57,321,746 | 78.9 | -11.8% | 2,999,491 | 5,044,497 | 594.6 | -12.7% |
| 1999 | 4,725,672 | 58,223,229 | 81.2 | 2.9% | 3,044,658 | 5,010,189 | 607.7 | 2.2% |
| 2000 | 4,996,179 | 59,252,728 | 84.3 | 3.8% | 3,182,469 | 5,010,817 | 635.1 | 4.4% |
| 2001 | 4,771,340 | 60,286,364 | 79.1 | -6.3% | 3,022,712 | 4,996,446 | 605.0 | -4.9% |
| 2002 | 4,888,818 | 61,107,254 | 80.0 | 1.1% | 3,144,170 | 5,064,384 | 620.8 | 2.6% |
| 2003 | 5,079,351 | 61,871,450 | 82.1 | 2.6% | 3,179,493 | 5,152,177 | 617.1 | -0.6% |
| 2004 | 4,868,797 | 62,496,134 | 77.9 | -5.2% | 3,128,972 | 5,139,949 | 608.8 | -1.4% |
| 2005 | 4,826,775 | 63,616,827 | 75.9 | -2.6% | 2,998,920 | 5,198,028 | 576.9 | -5.4% |
| 2006 | 4,368,466 | 64,166,280 | 68.1 | -10.8% | 2,832,030 | 5,273,379 | 537.0 | -7.2% |
| 2007 | 4,722,358 | 64,964,769 | 72.7 | 6.6% | 3,012,904 | 5,308,785 | 567.5 | 5.5% |
| 2008 | 4,892,277 | 65,073,996 | 75.2 | 3.4% | 3,152,529 | 5,444,335 | 579.0 | 2.0% |
| 2009 | 4,778,907 | 65,329,582 | 73.2 | -2.7% | 3,118,592 | 5,322,332 | 585.9 | 1.2% |
| 2010 | 4,782,412 | 65,542,345 | 73.0 | -0.3% | 3,102,593 | 5,301,576 | 585.2 | -0.1% |
| 2011 | 4,713,777 | 65,940,522 | 71.5 | -2.1% | 3,155,319 | 5,319,817 | 593.1 | 1.3% |
| 2012 | 4,149,519 | 66,375,134 | 62.5 | -13.4% | 2,894,926 | 5,356,397 | 540.5 | -9.3% |
| 2013 | 4,897,372 | 66,812,393 | 73.3 | 15.9% | 3,295,301 | 5,372,522 | 613.4 | 12.7% |
| 2014 | 5,087,314 | 67,227,762 | 75.7 | 3.2% | 3,466,600 | 5,418,986 | 639.7 | 4.2% |
| **Average Annual Growth Rates*** | | | | | | | | |
| **1991-2007** | | | | **-1.1%** | | | | **-0.5%** |
| **2008-2014** | | | | **0.6%** | | | | **1.7%** |

Source: U.S. Energy Information Administation
* Growth rates are calculated logarithmically

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