

# Barriers to Energy Efficiency

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# The Three Big Barriers to Energy Efficiency

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- Utility profitability
- Consumer Advocate concern about prices
- Regulators still catching up to restructuring



# *The Efficiency Barrier:* *The Utility Profit Barrier*

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- Profits = Revenues - Expenses
- Revenues = Price \* Sales Volume (in kW & kWh)
- Translation: The more you sell, the higher your profits; the less you sell the lower your profits
- Problem is aggravated by TOU pricing



# Sensitivity of Profits: 5% Reduction in Sales

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- Vertically Integrated Utility:
  - Also reduces power production/purchase expenses
  - May impact earnings on order of 20-25%
- Wires-only Distribution Utility:
  - No associated reduction in expenses between rate cases
  - May impact earnings on order of 45-50%



# Fuel & Purchase Power Costs: Relationship to Profits

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- For company with a F&PP clause:  $\Delta \text{ Profits} = (\text{Retail Price} - \text{Difference Between Marginal and Average F\&PP Cost}) * \Delta \text{ Volume}$
- For company without a F&PP clause:  $\Delta \text{ Profits} = (\text{Retail Price} - \text{Marginal F\&PP Cost}) * \Delta \text{ Volume}$
- For wires only company:  $\Delta \text{ Profits} = \text{Retail Price} * \Delta \text{ Volume}$



# Regulatory Solutions

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- Lost Base Revenue Adjustments (LRAs)
  - Replaces revenues lost due to energy efficiency deployment
  - Measured energy savings from energy efficiency used to compute lost revenues
  - Subsequently recovered through adjustment mechanism
- Revenue decoupling
  - Severs relationship between revenues and sales volume
  - Sets allowed revenue per customer
  - Periodically prices are adjusted to reflect changes in revenue per customer



# Decoupling vs. LRAs

	<b>Decoupling</b>	<b>Lost Revenues</b>
<b>SALES</b>	Removes sales incentive and all energy efficiency disincentives	Removes some energy efficiency disincentives, does not remove sales incentives.
<b>M&amp;E</b>	Does not require sophisticated measurement and/or estimation	Requires sophisticated measurement and/or estimation.
	Utility does not profit from energy efficiency which does not actually produce savings.	Utility may profit from energy efficiency which does not actually produce savings.
<b>SCOPE</b>	Addresses revenues lost due to: Rate design All energy efficiency programs Customer energy efficiency Efficiency standards	Addresses revenues lost due to utility energy efficiency programs only.



# Decoupling vs. LRAs

<b>Decoupling</b>	<b>Lost Revenues</b>
Eliminates load forecast gaming	No direct effect on subsequent rate cases
Low litigation potential, low administrative cost	Cost recovery uncertainty, litigation prone, high administrative cost
Reduces volatility of utility revenue resulting from many causes	No effect on the volatility of utility earnings





# Decoupling Revenues

## Does Not Mean Fixed Prices

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- Some utilities have sought to abandon volumetric *prices* in favor of fixed charges
- Often rationalized with erroneous argument that distribution costs are “fixed”
- In reality distribution costs are mostly driven by peak usage
  - Distribution companies invest over \$5 billion/yr in distribution system expansion and upgrades
  - Especially in high cost distribution zones, consumers should see volumetric pricing
- Fixed charges eliminate savings to consumer from increased efficiency



# Decoupling Revenues

## Does Not Mean Fixed Earnings

- Utilities concerned that decoupling “caps” their upside potential
- Wires only companies have lower risk profile (especially with decoupling), but should still have avenue to higher earnings
- Decoupling can be combined with a sliding scale or range of earnings potential that rewards increasing efficiency



# Consumer Advocates' View

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- Historically opposed energy efficiency investments over fears of higher prices (use of RIM “no loser” tests)
  - Ignores the losers when there is no efficiency investment and makes losers of us all in the long-run
  - Can be penny-wise and pound-foolish position
- Consider: current efficiency targets are often in the 1% of load range accumulating to 20% of load over twenty years
  - Compute savings if system capacity were 20% smaller
  - We should have done this twenty years ago!
- Solution:
  - Identify bills savings, not just price changes
  - Ensure that fair share of energy efficiency investments are targeted to vulnerable customers



# Beware the Externalities

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- RIM and UCT tests focus on narrow cost measures
- Misses often large societal costs external to system
- Example: Clean Air Task Force study found \$178 Billion in annual health costs from power plant pollution – concentrated in area from Mid-west to New England



# Regulatory Paths to Energy Efficiency

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- System benefit charge for direct funding
- Make part of portfolio management standard for POLR and SOS
- Integrate energy efficiency as a resource in an all-resource capacity market (e.g. California loading order)
- Identify and enable niche values (e.g. high distribution system cost zones)



# Distribution System Costs: The Missing Piece

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- Regulators (and industry) often fixed on “supply side” view of utility service
- Where wires only companies predominate, distribution is the only hardware still regulated
- Historically regulators spent little or no time understanding distribution costs
- Matching energy efficiency to high cost distribution zones offers new opportunities



# Marginal Distribution Cost/MW\* Yr. to Yr. Average (1994-1999)

<b>Company</b>	<b>Transformers &amp; Substations</b>	<b>Lines &amp; Feeders</b>
Baltimore Gas & Electric	\$ 298,396	\$ 1,413,312
Delmarva Power & Light	\$ 38,832	\$ 228,399
Jersey Central Power & Light	\$ 46,154	\$ 346,517
Pennsylvania Electric Company	\$ 473,071	\$ 2,815,919
Potomac Electric Power Company	\$ 577,587	\$ 1,384,774
Public Service Electric & Gas	\$ 223,148	\$ 725,035
Potomac Edison Company	\$ 3,579,279	\$ 19,483,006
Virginia Electric & Power Company	\$ 93,441	\$ 372,106

\*Average change in distribution investment divided by average growth in system peak  
Source: FERC Forms 1; *Distribution System Cost Methodologies*, RAP (September 2000)



# Regulators' New Role

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- Oversight of POLR and Standard Offer services makes regulators the *de facto* purchasing agent for consumers
- Focus on distribution system costs promises savings not previously identified
- Commissioners are best positioned to provide leadership
- Regional forums can help define options and share knowledge and experiences: e.g. MADRI





# Energy Efficiency Bottom Line

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- Even without externalities, energy efficiency remains:
  - Cheapest marginal resource on the system
  - Cleanest resource on the system
- Delivers external savings to society
- In short, why buy anything else until the marginal cost of energy efficiency equals the marginal cost of new supply?



# More Resources

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- RAP Website: <http://www.raonline.org>
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