

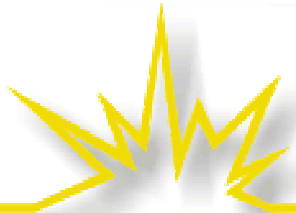
Understanding the Values of CHP in Today's Electric Sector

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The Regulatory Assistance Project

- RAP is a non-profit organization, formed in 1992, that provides workshops and education assistance to state government officials on electric utility regulation. RAP is funded by the Energy Foundation, US DOE and US EPA.
- RAP Mission:
RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.



Influencing Behavior: How Do Utilities Make \$?

- Under traditional rate-of-return (ROR) regulation:
 - ❖ $P = RR/sales$
- But:
 - ❖ **Actual Revenues** = $P * Q$
 - ◆ Where: $Q = \text{actual sales}$
- And, therefore:
 - ❖ Profit = **Actual Revenues** – **Actual Costs**
- The utility makes money by:
 - ❖ Reducing costs and
 - ❖ Increasing sales



Traditional Regulation: The Throughput Problem

- Traditional ROR regulation sets *prices*, not *revenues*
 - ❖ The revenue requirement is simply an estimate of the total cost to provide service
- Without adjustment, consumption-based rates (\$/kWh and \$/kW) link profits to sales
 - ❖ The more kilowatt-hours a utility sells, the more money it makes
 - ❖ This is because, in most hours, the price of electricity is greater than the cost to produce it
 - ◆ *Utility makes money even when the additional usage is wasteful, and loses it even when the reduced sales are efficient*
- The profit incentive to increase sales is extremely powerful



Lowered Consumption Reduces Revenues and Profits

- Vertically integrated utility with \$284 mn ratebase
- ROE at 11%—\$15.6 million
- Power costs \$.04/kwh, retail rates average \$.08;
Sales at 1.776 TWh
 - ❖ At the margin, each saved kWh cuts \$.04 from profits
 - ❖ If sales drop 5%: profits drop \$3.5 mn, thus
- DR equal to 5% of sales will cut profits by 23%
 - ❖ The effect is even worse for the wires-only business: a reduction in sales of 5% lowers profits by 57%



Two Solutions

- Adjustments for net lost revenues under traditional ROR ratemaking
 - ❖ Compensates utility for contribution to fixed costs that is lost as a consequence of successful distributed resource deployment such as CHP
- Decoupling
 - ❖ Ratemaking is reformed to break the link between sales and profits entirely



Net Lost Revenue Recovery

- For every kWh saved through EE, the utility avoids a marginal cost but also loses a contribution to fixed costs
 - ❖ Recovery of that contribution can be assured through either
 - ◆ The use of a projected test year, adjusted for expected EE savings, or
 - ◆ An *ex post* calculation:
 - Net lost revenues = $(P - MC) * \text{kWh saved}$



Decoupling: How it Works

- Instead of rewarding the utility for increased sales, create a system that holds the company harmless (i.e., no effect on profits) for reductions in sales due to efficiency
- Replaces traditional ratemaking with a formula that determines how *revenues* will change over time
- The company, knowing what revenue levels to expect, is then free to take whatever actions it wants (within other legal and accounting constraints) to improve its profitability



One Approach to Decoupling: Per-Customer Revenue Cap

- A truth that traditional regulation ignores:
 - ❖ *In the short run, electric utility costs vary more closely with changes in numbers of customers than they do with changes in electricity sales*
- A per-customer revenue formula tells the company how much money it will be allowed to keep, on average, for every customer it serves
 - ❖ This gives the company a very strong incentive to make sure its customers are efficient, that is, that they impose as few costs upon it as possible: the fewer the costs, the greater the share of revenue that can go to its bottom line



Per-Customer Revenue Formula

- Revenue-per-customer (RPC)
 - ❖ $RR_t / \text{number of customers}_t = \text{revenue per customer (RPC)}$
- The RPC can be adjusted by inflation (I), productivity (X), and exogenous factors (Z) to allow for multi-year plan
 - ❖ Revenues in the first year (RR_t) are calculated in the traditional manner: a revenue requirements analysis
- $RPC_{(t+1)} = [RPC_t * (1 + I_t - X_t)] \pm Z_t$
- Allowed revenues in year $t + 1$
 - ❖ $RR_{(t+1)} = RPC_{(t+1)} * \text{number of customers}_{(t+1)}$
- ***Important: This is not how rates should be designed, but only how revenues should be determined***



What About the Long Term?

- Costs may vary with numbers of customers in the short run (several years), but in the long run costs are driven by demand for electricity
- Thus, the prices that consumers pay must be designed to reflect the causes of costs in the long run
 - ❖ Therefore, consumption-based prices
- Each customer does not pay the RPC
 - ❖ The RPC is merely a tool for calculating how much money the company is entitled to each year.



Pricing Under RPC Formula

- Prices are still set in the usual way
 - ❖ Consumption-based unit prices: per kWh, per kW
 - ❖ Retains customer incentives for efficiency
- Prices are adjusted periodically (up or down) to reflect:
 - ❖ Changes in the allowed RPC and
 - ❖ Over- or under-collections from the previous periods



Current Activity on Decoupling

- Several gas utilities have adopted revenue per customer method
- Mid-Atlantic Distributed Resources Initiative forum is improving on decoupling for electric, building in protections and ease of administration
- See:
 - ❖ www.energetics.com/madri
 - ❖ www.raonline.org/madri



Performance Incentives

- Decoupling and, to a lesser extent, net lost revenue recovery remove the profit *disincentive* to EE investment
- To encourage superior performance, some states offered utilities positive financial incentives



Performance Incentives: For Both ROR and RPC

- Shared savings
 - ❖ Return to utility of some fraction (say, 10-20%) of the savings (avoided costs) from distributed resource deployment
 - ◆ Goes directly to utility's bottom line
 - ❖ Collars and dead bands
- Performance targets
 - ❖ Specified rewards (e.g., % of program budget) for achieving a mix of targets
 - ◆ Energy savings, capacity reductions, customer installations, reductions in program administration costs, etc.
- ROE adder
 - ❖ A premium on the ROE applied to unamortized portion of EE costs included in ratebase



Identifying and Capturing the Value of CHP

- Barriers or opportunities?
 - ❖ Economic Disaggregation
 - ❖ Regulatory Environment



Yesterday's Value Set

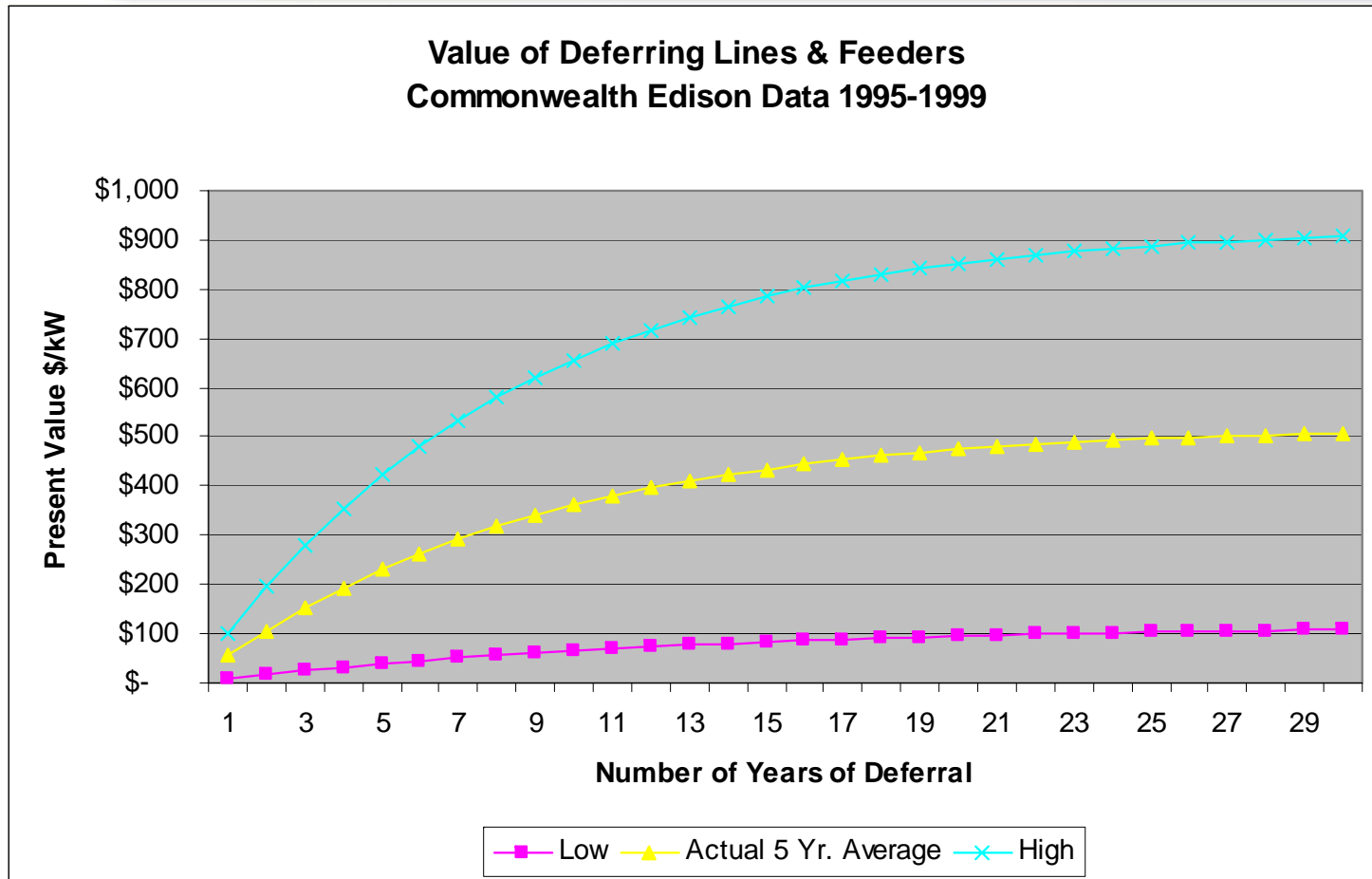
- Single vertically integrated entity could “see” all values in the system:
 - ❖ Energy
 - ❖ Capacity (Generation, Transmission & Distribution)
 - ❖ Reliability
 - ❖ Public Goods
 - ❖ Avoided Cost/Opportunity Cost Relationships



Economics of CHP

- Single installation may deliver:
 - ❖ Energy savings to customer
 - ❖ Capacity value to wholesale market
 - ❖ Reliability to transmission and distribution system
 - ❖ Distribution investment deferral savings to all customers
 - ❖ Market price mitigation values to all customers
- Who pays whom for these values?

Example Value: Deferring Distribution Investments



Source: Distributed Resource Policy Series: Distribution System Cost Methodologies for Distributed Generation, The Regulatory Assistance Project, September 2001.



Participation in the Regulatory Process

- Not considered part of traditional business plan for competitive businesses
- Nonetheless, as regulated monopolies, local utilities play key role in success or failure of demand-side resources such as CHP
- If you're not at the table, your issues won't be heard!
- Contrary to popular opinion, regulators usually support constructive participation and are likely to be responsive to legitimate issues and concerns



Challenges Ahead

- Overcoming resistance to decoupling
- Creating market mechanisms to connect with revenue streams
- Correctly defining the role of default/standard offer service providers
- Creating and maintaining a presence in the regulatory forum for CHP and other third party service providers



Thanks for your attention

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