Decoupling Utility Profits From Sales: Issues for the Solar Industry

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Introduction

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 EPA & US DOE.

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.

What We'll Cover Today

- A regulatory problem, associated with traditional utility regulation, called the "throughput incentive"
- A regulatory technique for solving the problem: Revenue Decoupling
  - Note: Only applies to so-called "fixed costs" of utility and NOT to commodity costs
- Implications for the Solar Industry

Traditional Regulatory Framework

- Unlike most companies, utilities are price regulated
- Regulators use a “cost of service” framework to set prices
- Rate cases resolve three questions:
  - What are the total costs incurred to provide service to customers?
  - How do you allocate those costs among customer classes?
  - What pricing regime do you use to collect those costs from each customer class?

Terms of Art

- Test Year = 12 month financial snapshot of utility, adjusted for "known & measurable" changes
- Rate Base = Total investment in utility plant, net of depreciation
- Cost of service = O&M+ Depreciation + Interest on Debt + Return on Equity + Taxes
- Revenue Requirement = Cost of Service
- Tax Adjusted Weighted Cost of Capital =

  (Interest on Debt X Share of Debt in Total Capitalization X (1- Tax Rate)) +

  (ROE X Share of Equity in Total Capitalization / (1-Tax Rate))
- Cost of Equity = Allowed ROE
  - From a regulatory and customer perspective, ROE is a "cost"
  - From a utility and investor perspective, ROE is the utility's "profit"

Terms of Art

- Class Cost Allocation = Process for determining how much of the Revenue Requirement should be collected from each class
- Rate Design = The art of deciding how what types of prices to charge each customer class to collect the class revenue requirement (e.g. Small Commercial class likely has a customer charge, a demand charge ($/kW) and an energy charge ($/kWh))
- Generally, once prices are set, they remain constant until changed at the end of next rate case

Pricing & Revenues Simplified

- Prices are set to generate an allowed amount of revenue, so:
  - Price = Revenue Requirement ÷ Test Year Billed Determinants (i.e. units sold)
- But, actual revenues are a function of total consumption:
  - Actual Revenues = Actual Units Sold X Price
- Actual Revenues never equal Test Year Revenues, so once prices are set, increased sales increase profits and decreased sales decrease profits

Traditional Regulation: Provides Strong Disincentives for Demand-side Resources

- Utility revenues and profits are linked to unit sales (kW, kWh, therms, etc.)
- Loss of sales due to successful implementation of Demand-side Resources (DR) will lower utility profitability
- The effect may be quite powerful…

Assumptions for A Sample Utility

Assumptions	
Operating Expenses	$160,000,000
Rate Base	$200,000,000
Tax Rate	35.00%

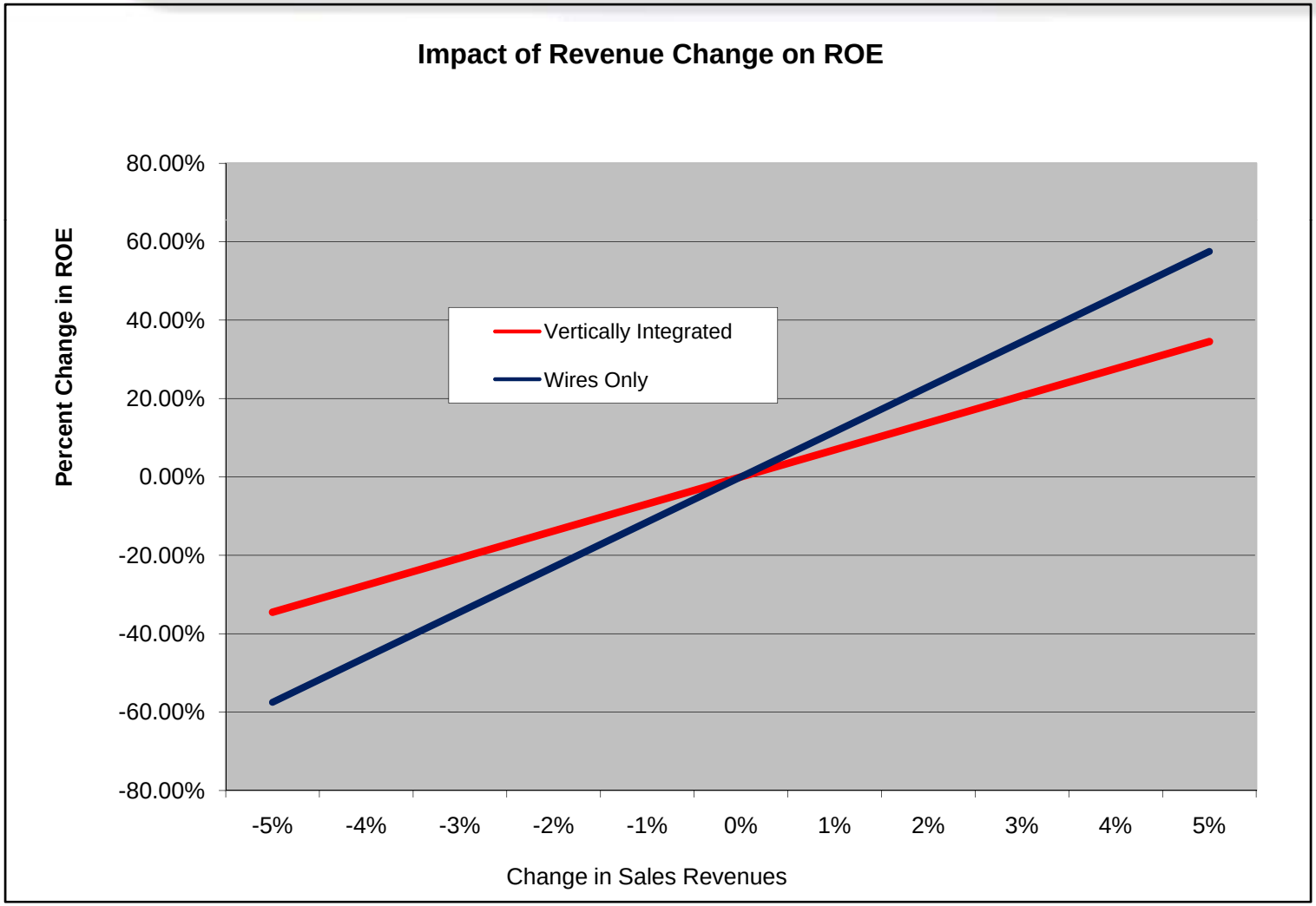
Cost of Capital	% of Total	Cost Rate	Weighted Cost Rate		Dollar Amount	
			Pre-tax	After-Tax	Pre-Tax	After-Tax
Debt	55.00%	8.00%	4.40%	2.86%	$8,800,000	$5,720,000
Equity	45.00%	11.00%	4.95%	7.62%	**$9,900,000**	$15,230,769
Total	100.00%			10.48%		

Revenue Requirement	
Operating Expenses	$160,000,000
Debt	$5,720,000
Equity	$15,230,769
Total	$180,950,769
Allowed Return on Equity	$9,900,000

How Changes in Sales Affect Earnings

	Revenue Change		Impact on Earnings		
% Change in Sales	Pre-tax	After-tax	Net Earnings	% Change	Actual ROE
5.00%	$9,047,538	$5,880,900	$15,780,900	**59.40%**	17.53%
4.00%	$7,238,031	$4,704,720	$14,604,720	**47.52%**	16.23%
3.00%	$5,428,523	$3,528,540	$13,428,540	**35.64%**	14.92%
2.00%	$3,619,015	$2,352,360	$12,252,360	**23.76%**	13.61%
1.00%	$1,809,508	$1,176,180	$11,076,180	**11.88%**	12.31%
0.00%	$0	$0	$9,900,000	**0.00%**	11.00%
-1.00%	-$1,809,508	-$1,176,180	$8,723,820	**-11.88%**	9.69%
-2.00%	-$3,619,015	-$2,352,360	$7,547,640	**-23.76%**	8.39%
-3.00%	-$5,428,523	-$3,528,540	$6,371,460	**-35.64%**	7.08%
-4.00%	-$7,238,031	-$4,704,720	$5,195,280	**-47.52%**	5.77%
-5.00%	-$9,047,538	-$5,880,900	$4,019,100	**-59.40%**	4.47%

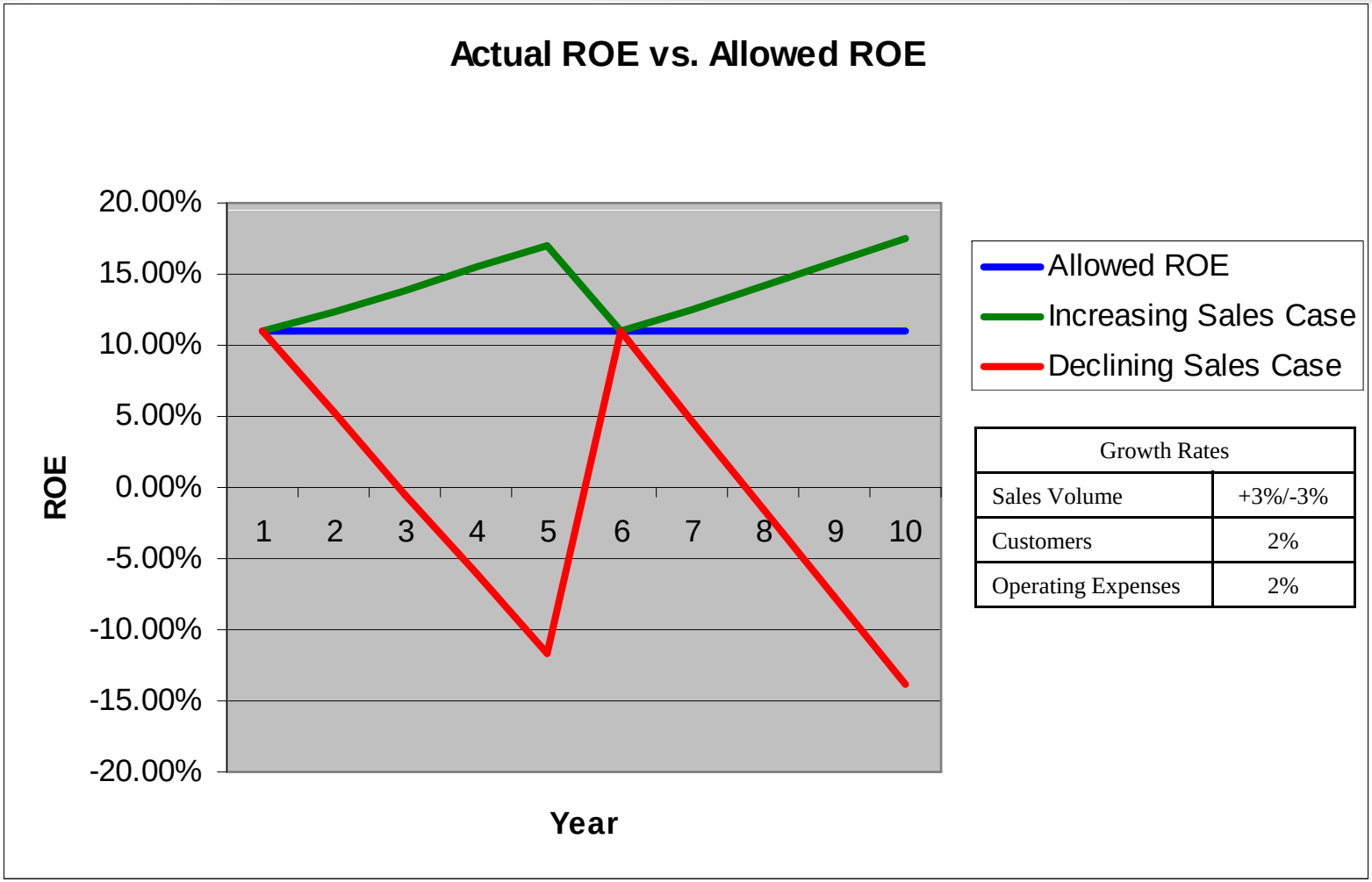
“Wires Only” Companies Are More Sensitive To Changes in Sales



Not All Utilities Are The Same

- Rising revenue-per-customer utilities:
  - Experience rising earnings between rate cases
  - Typical of many electric utilities
- Declining revenue-per-customer utilities:
  - Experience declining earnings between rate cases
  - Typical of many gas utilities
- Under comparable assumptions, not symmetric between rising and declining cases
- Usually driven by differences in the average consumption between new and old customers

What Happens to ROE Under Traditional Regulation?



Growth Rates	
Sales Volume	+3%/-3%
Customers	2%
Operating Expenses	2%

A Change in Approach Is Needed

- "Throughput" incentive is at odds with policy goal of acquiring cost-effective DR
- Policies should, instead, align utilities' profit motives with acquisition of all cost-effective DR
- Magnitude of problem is large enough to be of concern
- Customer-owned solar, especially if net metered, is at-odds with utility's incentives

Three Approaches to Problem

- Use Rate Design
  - Usually means Straight Fixed Variable rates, which raise customer charge to be 90+% of consumer's bill
    - Problem: Decouples Customers' bills from sales, not just utility revenues
    - Undermines economics of DR for consumer
- Track and Restore Lost Revenues (net of expense savings) – "Net Lost Revenue Adjustment":
  - Involves considerable judgment to calculate
  - Tends to be controversial and highly litigious
- Use Revenue-Profit Decoupling

Revenue-Profit Decoupling: What is it?

- Breaks the mathematical link between sales volumes and profits
- Objective is to make profits levels immune to changes in sales volumes
  - This is a revenue issue
  - This is not a pricing issue
  - Volumetric pricing and other rate design (e.g. TOU) may be "tweaked" in presence of decoupling, but pricing structures need not be changed
- Not intended to decouple customers' bills from consumption

Revenue Decoupling: The Basic Concept

- Basic Revenue-Profit Decoupling has two primary components:
  - Determine a “target revenue” to be collected in a given period
  - Set a price which will collect that target revenue
- In the simplest form of revenue decoupling (sometimes called “revenue cap” regulation), Target Revenues are always equal to Test Year Revenue Requirements

The Decoupling Calculation

- Utility Target Revenue Requirement determined with traditional rate case
  - By class & by month (or other period coinciding with how often decoupling adjustment is made)
- Each future period *will have* different *actual* unit sales than Test Year
- The difference (positive or negative) is flowed through to customers by adjusting Price for that period (see Post Rate Case Calculation)

Periodic Decoupling Calculation	
From the Rate Case	
Target Revenues	$10,000,000
Test Year Unit Sales	100,000,000
Price	$0.10/Unit
Post Rate Case Calculation	
Actual Unit Sales	99,000,000
Target Revenues (from above)	$10,000,000
Required Total Price	$0.10101/Unit
Decoupling Price “Adjustment”	$0.00101/Unit

How Decoupling Is Administered

- Some (typical of California) use an annual accrual of the revenue over and under recoveries and then collect or refund that amount over an ensuing 12 mo. Period
  - CA also uses future test years and annual proceedings to approve decoupling adjustments
- Annual proceedings are potential opportunity for litigation and challenge

How Decoupling Is Administered

- Others use a “current” system which makes the decoupling adjustment directly on customers bills for that month (or, sometimes, with a 30-60 day lag)
  - Decoupling does not necessarily require any “lag” as is customary for fuel clauses
- When all inputs are derived directly from billing information, then process becomes ministerial and not subject to much litigation or challenge

Approaches Where Target Revenues Are Not Held Constant

- California
  - Embeds decoupling in broader PBR context
  - Allows Target Revenues to change – e.g. for inflation & productivity
- Many now use Revenue Per Customer model, where Target Revenues are recomputed to account for customer growth

RPC Decoupling

- Recognizes that, between rate cases, a utilities costs change in sync with the number of customers served
- For each volumetric price, a “revenue per customer” average can be calculated from the rate case test year data used to set prices

How RPC Decoupling Changes Allowed Revenues

- In any future period, the Target Revenue for any given volumetric price (i.e. demand charge or energy rate) is derived by multiplying the RPC value from the rate case by the then-current number of customers

Periodic Decoupling Calculation	
From the Rate Case	
Target Revenues	$10,000,000
Test Year Unit Sales	100,000,000
Price	$0.10/Unit
Number of Customers	200,000
Revenue Per Customer (RPC)	$50.00
Post Rate Case Calculation	
Number of Customers	200,500
Target Revenues ($50 X 200,500)	10,025,000
Actual Unit Sales	99,000,000
Required Total Price	$0.101768/Unit
Decoupling Price “Adjustment”	$0.001768/Unit

Weather Risk

- Prices are usually determined using weather-normalized billing determinants
- In extreme weather, consumption goes up, along with profits and consumer bills
- In mild weather, consumption goes down, along with profits and consumer bills
- Both utility and customer face risk, with opposite economic effect

Decoupling Also Decouples Revenues From Weather

- Because Target Revenues are weather-normalized values, decoupling eliminates effect of weather
- **Myth:** Decoupling "shifts" weather risk from utility to customer
- **Reality:** Utility and customer take (or avoid) weather risk together in near zero sum wealth transfer (tax payers take part of risk as well)
- Elimination of weather risk has cost of capital implications because utility revenues are less volatile, making profits more stable
  - Value can be captured through ROE adjustment OR Capital Structure adjustment (increase of debt as share of total capital)

Issues for The Solar Industry

- Under traditional PURPA model, solar was paid "avoided cost" which:
  - At most, was the levelized cost of generation, including all capital costs
  - Was often just the avoided energy cost rate (primarily fuel)
  - In both cases, avoided cost is usually less than retail rate (which includes all embedded costs of utility)

Issues for the Solar Industry: Impact of Net Metering

- Most customer-owned solar is net metered
- Net-metered energy is priced at the full retail tariff
- Maximizes impact of solar on utility's profits
- As a result, disincentives to utility are maximized

How Solar Is Like Other DR

- All customer-side activities, whether energy efficiency or distributed generation, have effect of reducing revenues at full retail rate (if DG is net-metered)
- While solar could be directly metered to assess lost revenues (which could then be restored as a “known” value), most likely, solar will share the same incentive structure (and regulatory solutions) as applied to all forms of DR
- Lost revenue approaches tend to be highly litigious, and therefore, not popular among regulators and many stakeholders, and certainly not popular with solar industry

Conclusions

- Throughput incentive is likely more important than generally perceived
- Solar industry should be alert to regulatory approaches to solve problem (especially SFV Rate Design)
- Incentive problem may motivate utility to erect barriers to DG in ways that seem unrelated to throughput problem (e.g. interconnection rules, standby rates, etc.)

Decoupling Status

- Arizona – Under Commission consideration
- California – 3 IOUs (Electric & Gas)
- Colorado – Under Commission consideration
- Connecticut – Mandated by legislation for distribution system revenue requirements (Electric & Gas)
- Delaware – Commission investigation (Electric & Gas)
- District of Columbia – PEPCO proposal pending (Electric)
- Idaho – RPC Decoupling 3 Year Pilot Idaho Power (Electric)
- Illinois – Pending legislation

Decoupling Status

- Indiana – Vectren (Gas)
- Maryland – In place for gas utilities, proposed (PEPCO & Delmarva) and expected (BG&E) for electric
- Minnesota – Legislation allowing voluntary pilots (Electric & Gas, but only Gas expected)
- Missouri – Atmos (Gas)
- New Hampshire – Commission investigation
- New Jersey – New Jersey Natural Gas
- New Mexico – Legislation mandating removal of negative incentives, decoupling filings expected

Decoupling Status

- New York – Commission has ordered all electric & gas utilities to file decoupling proposals with current or next rate case
- North Carolina – 3 Year pilot for all Gas Utilities
- North Dakota – NSP
- Oregon – Northwest Natural Gas & Cascade Natural Gas
- Utah – Questar (Gas)
- Vermont – Green Mountain Power (Electtric)
- Washington (Avista & Cascade)

Learn More

- **Profits & Progress Through Least-cost Planning**
  - http://www.raponline.org/Pubs/General/Pandplcp.pdf
- **Profits and Progress Through Distributed Resources**
  - http://www.raponline.org/showpdf.asp?PDF_URL=Pubs/General/ProfitsandProgressdr.pdf
- **Performance-based Regulation For Distribution Utilities**
  - http://www.raponline.org/Pubs/General/DiscoPBR.pdf
- **Performance-Based Regulation in a Restructured Electricity Industry**
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