December 13, 2019

The Electricity Sector of the Past, Present, and Future

South Carolina Public Service Commission

“Utility of the Future” Workshop

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Today's Agenda

1. History, Trends, and Challenges facing Regulation and Markets
2. Distributed Resource Capabilities and Value, and Implications for Compensation, Rate Design, and Planning
3. Best Practices in Resource Planning
4. **Approaches to Dealing with Misalignments in Traditional Regulation and Markets**
5. Process Options for Moving Change Forward

Options for Dealing with Misalignment

- Decoupling
- Performance-based regulation
  - Multi-year rate plans
  - Performance incentive mechanisms
  - Shared savings
  - State Examples
- Integrated Resource Planning, Integrated Distribution System Planning
- Increasing Competition in the Electricity Sector

Options for Dealing with Misalignment

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  - State Examples
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Decoupling

Sometimes known as Revenue Regulation

How do utilities make money under traditional (price-based) regulation?

- Under traditional regulation*:

  Price = Revenue Requirement/Projected Sales

- But:

  Actual Revenues = Price * **Actual** Sales

- Which means that:

  Net Income = **Actual** Revenues – **Actual** Costs

- The utility can make money by:
  - Reducing costs and
  - Increasing sales

*RR = Cost of Service = Test Year Expenses + Depreciation + Taxes + (Rate of Return * Rate Base)

Traditional Regulation:
The Throughput Incentive Problem

- Traditional ROR regulation sets *prices*, not *revenues*
  - The revenue requirement is only an estimate of the total cost to provide service, used only as the basis for determining rates
- By themselves, consumption-based rates ($/kWh and $/kW) link revenues (and thus net income) 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]
- Incentive to increase sales is *extremely powerful*
  - This is the "**throughput incentive**"

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%

How might a PUC address the throughput incentive?

Or, why should it matter to the utility CFO
how cold it is in the winter
and how warm it is in the summer?

Revenue-Based Regulation or "Decoupling"

- **Prices** set the old-fashioned way: in a rate case
- Rely on the **revenue requirement** from the rate case :
  - The "revenue requirement" becomes the company's "allowed" (or "authorized" or "target") revenue
- Differences between actual revenues and allowed revenues are **trued-up** through periodic rate adjustments (monthly, quarterly, yearly)
- Other (non-sales-related) adjustments to revenue can also be made to customize the system
  - E.g., inflation, productivity, changes in numbers of customers, exogenous factors, rewards/penalties for performance, etc.

In our experience, Decoupling is best balanced solution, others?

High fixed charge, short run marginal variable rate	Violates historic principles, stresses low volume users
Annual rate cases	May be otherwise unnecessary
Lost revenue adjustment	Does not actually solve the problem

Revenue-Sales Decoupling (1)

- Objectives:
  - **Improve economic efficiency**
    - Enhance the utility's incentive to improve its operational efficiency
      - Net income remains a function of utility operations & management
    - Removes the utility's incentive to increase net income by increasing sales
    - Enables a shift in focus to customer service, policy priorities
  - **Reduce risk for both the utility and the customer**
    - Removes financial impacts (up or down) on revenue from weather, changes in the economy, and other exogenous factors
    - Likewise, eliminates impacts associated with **least-cost actions** that tend to **reduce sales**

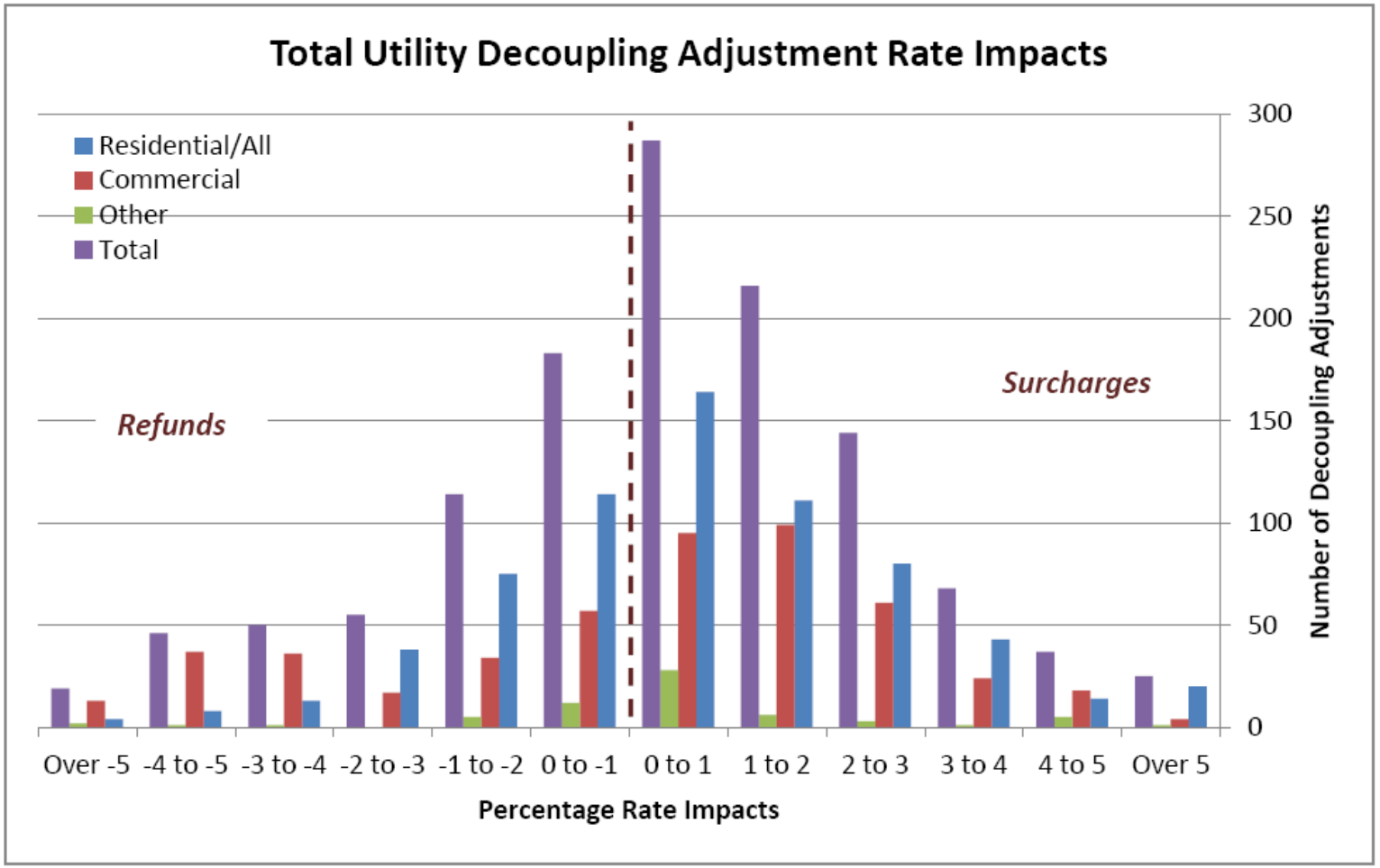
Revenue-Sales Decoupling (2)

- Decoupling operates on *revenue*, not *prices*:
  - Does not and is not intended to decouple customers bills from their consumption
  - Customers continue to see the cost implications of their consumption decisions through usage-based pricing
  - Use more, pay more. Use less, pay less

How Decoupling Works

Periodic Decoupling Calculation	
From the Rate Case	
Target Revenues	$10,000,000
Test Year Unit Sales	100,000,000
Price	$0.10000
Post Rate Case Calculation	
Actual Unit Sales	99,500,000
Required Total Price	$0.1005025
Decoupling Price "Adjustment"	$0.0005025

Decoupling Rate Adjustments Have Generally Been Small



Credit Implications of Decoupling

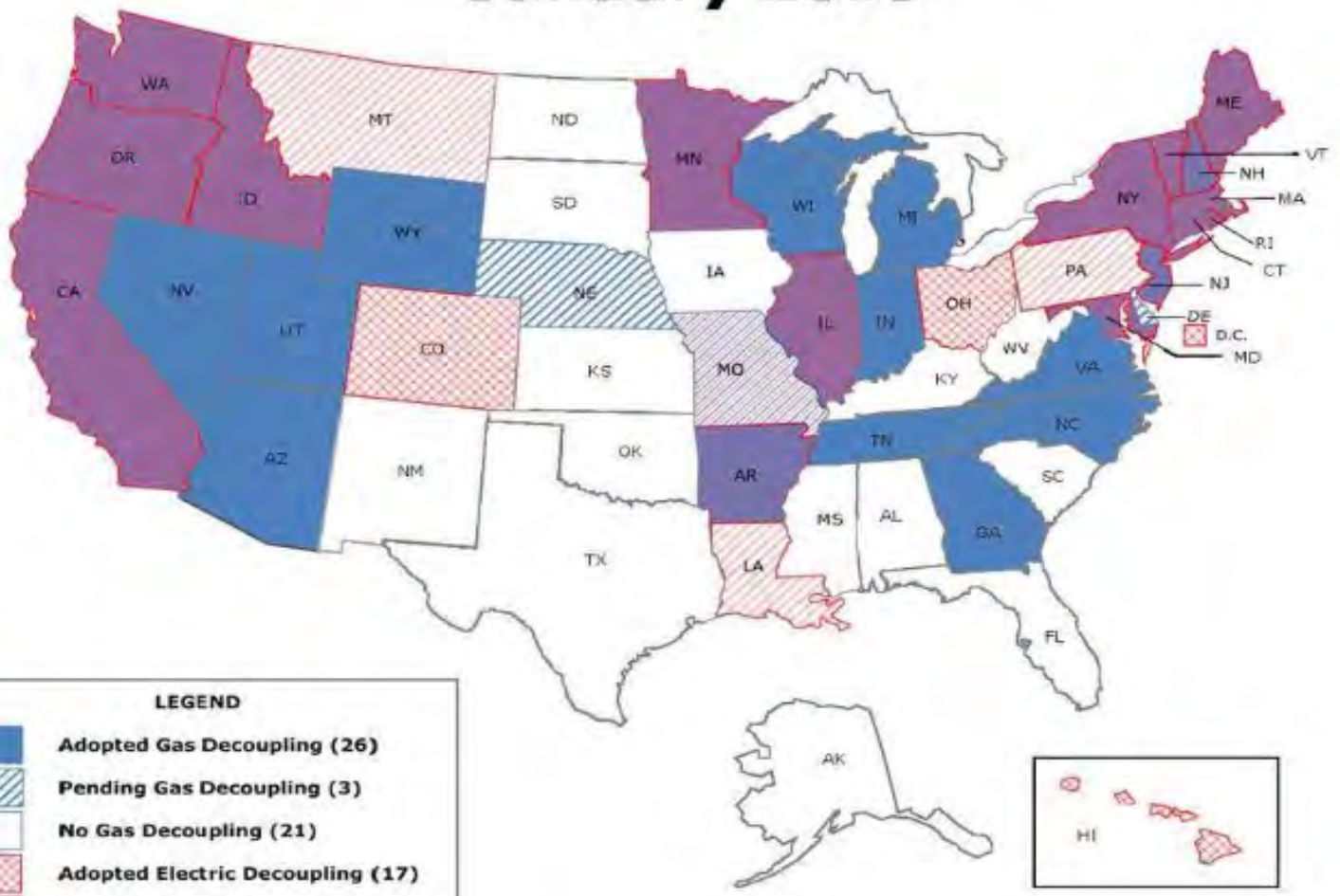
- Standard & Poor Views Decoupling as Generally Positive from a Credit Perspective:
  - Provides the opportunity for a utility to earn a pre-determined level of distribution revenue regardless of the actual KWH sold
  - Enables utilities to project cash flow more accurately and avoid much of the earnings volatility from changes due to policy goals (and other influences – weather/economy) that occur under traditional regulations
  - Reduces the need for rate case filings, resulting in lower overall costs for the utilities

Cautions regarding decoupling

- Scope of costs covered
- Guard rails on price changes
- Guard against destructive cost cutting
- Data freshness
- Engage the public on priorities

Decoupling is a concept and can be adapted to fit most circumstances

Electric and Gas Decoupling in the U.S. January 2019



LEGEND

- Adopted Gas Decoupling (26)
- Pending Gas Decoupling (3)
- No Gas Decoupling (21)
- Adopted Electric Decoupling (17)
- Pending Electric Decoupling (7)
- No Electric Decoupling (27)

	2013		2018	
	Utilities	States	Utilities	States
Gas	49	20	64	26
Electric	24	14	42	17
Total	73	25	106	32

Dylan Sullivan and Donna DeConstanzo, "Gas and Electric Decoupling," *NRDC*, August 24, 2018, https://www.nrdc.org/resources/gas-and-electric-decoupling.

Performance-based regulation

“All regulation is incentive regulation”

Incentives of traditional regulation

- Build rate base in a rate case
- Exaggerate costs for a future test year
- Increase volume of sales between rate cases, i.e., the “throughput” incentive
- Cost reduction between rate cases

Bradford, P. (1989). Incentive Regulation from a State Commission Perspective. Remarks to the Chief Executive’s Forum

Performance-Based Regulation (PBR) is…

- A regulatory framework to connect achievement of specified policy objectives to utility financial performance and executive compensation
- A PBR plan can include a collection of performance incentive mechanisms (PIMs), namely, metrics and formulas that determine the levels of financial rewards or penalties (i.e., adjustments to allowed revenues) for achievement of the specified objectives

A successful Performance-Based Regulation Plan will…

- Deliver better outcomes related to public policy
- More closely align utility actions with public policy

- And it may...
  - Promote market innovation in service to policy
  - See rewards offset by cost controls
  - Lead to a more educated public about utility service

Why Consider Performance?

- The power sector is evolving rapidly
- Evolving goals
  - Build new infrastructure → *Maintain*
  - Reliability → with *Resilience*
  - Deliver power → deliver *clean power*
  - Serve customers → *customer satisfaction, choices*
- Evolving options
  - Centralized power plants, T&D, PLUS...
  - Innovative *distributed* resources (EE, DR, PV, EVs), &
  - Advanced IT/data management & rate designs

Why Consider Performance?

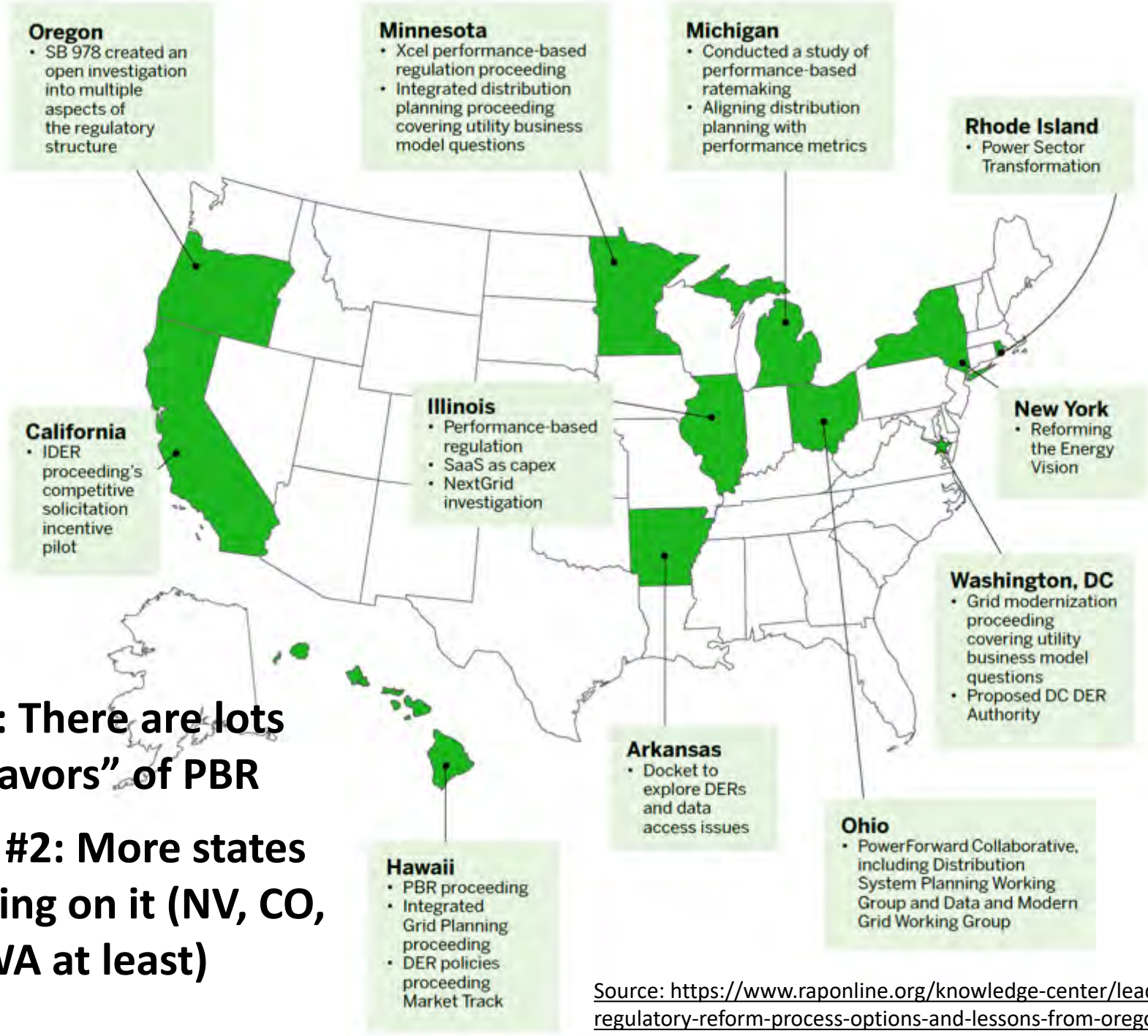
- More focus on **outcomes**, less focus on inputs (e.g. costs, or how outcomes are achieved)
- PBR can take a broad approach to modify the regulatory incentives inherent in traditional regulation

Performance-based regulation

Changes the central question...

From: “Did we pay the right amount for what we got?”

To: “**Are we paying the right amount for <u>what we want</u>?**”

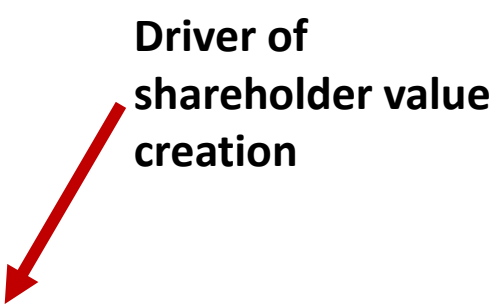


Note: There are lots of "flavors" of PBR

Note #2: More states working on it (NV, CO, PA, WA at least)

Source: https://www.raponline.org/knowledge-center/leading-utility-regulatory-reform-process-options-and-lessons-from-oregon/

PBR: A Couple Equations



Traditional regulation

Revenue = [Rate Base x RoR] + Operating Expenses

- Earning based heavily on investment value
  - Also on cost management
- Revenue increases as investment increases

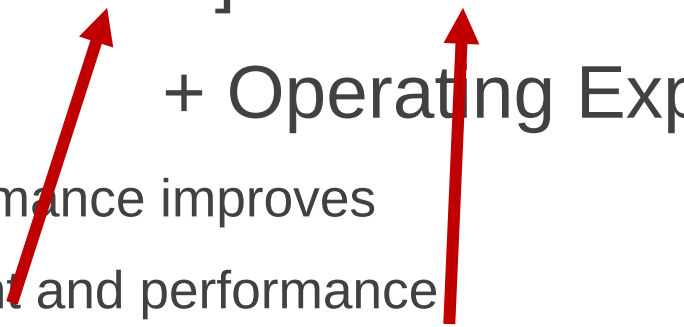
PBR: A Couple Equations

Performance-based (one option, simplified)

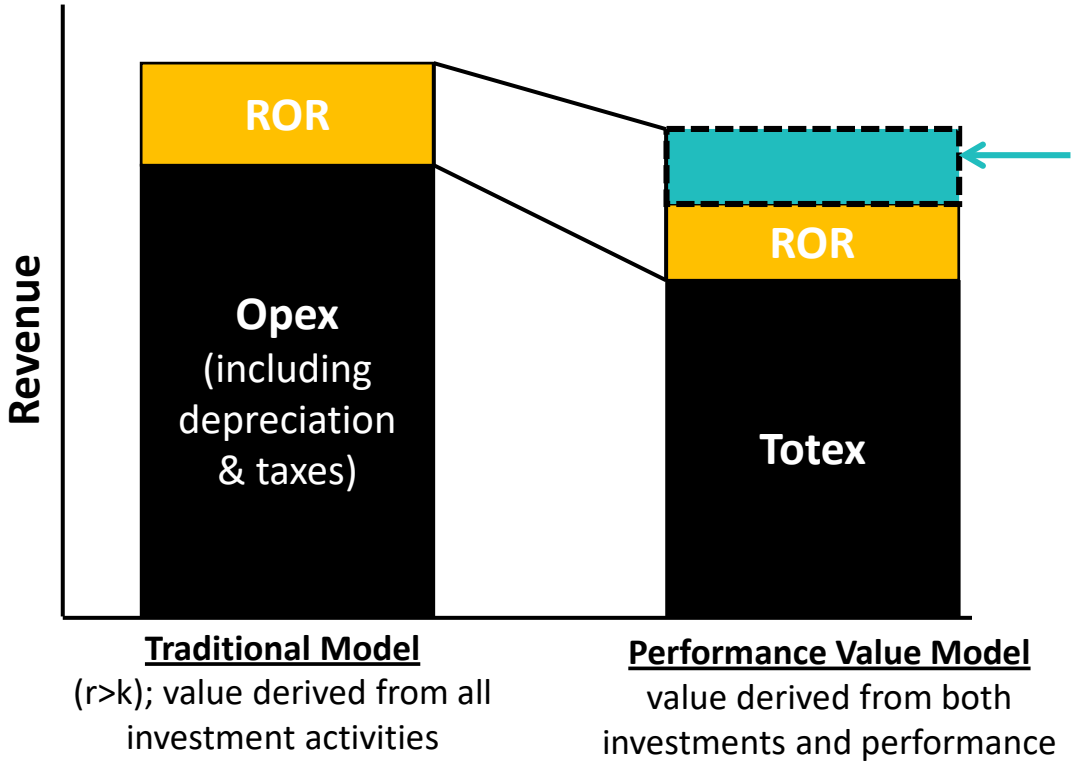
Revenue = [Rate Base x RoR] +/- Performance

+ Operating Expenses

- Revenue increases as performance improves
- Earnings based on investment and performance



Moving from Cost of Service to Performance-Based Regulation



Traditional Model
(r>k); value derived from all investment activities

Performance Value Model
value derived from both investments and performance

*Overall costs may actually decrease; but potential returns to shareholders should grow commensurate with the additional risk shifted to utilities

ILLUSTRATIVE

Elements of Successful Performance Mechanisms

1. Clear Goals
2. Measurable Metrics
3. Transparency
4. Value to the Public
5. Remove bad incentives
6. Align Benefits and Rewards
7. Learn from Experience
8. Simple Designs are Good
9. Evaluation and Verification
10. Public Review

For more information, see: *Next-Generation Performance-Based Regulation: Emphasizing Utility Performance to Unleash Power Sector Innovation*, available at https://www.raponline.org/knowledge-center/next-generation-performance-based-regulation-emphasizing-utility-performance-unleash-power-sector-innovation/

What could go wrong?

- Disproportionate rewards or penalties
- Unintended consequences
- Regulatory burden
- Poorly designed metrics
- Gaming and manipulation

Practices that can lead to difficulty

- Basing performance incentives on inputs ($$ spent)
- Rewards or penalties based on exogenous factors ex: weather, economic growth, etc.
- Unclear or uncertain metrics or goals
- Lack of clarity and measurement methodology
- **Not understanding utility motivations**

Energy Efficiency Funding U.S. State of Washington, 1980

- 2% increased return on equity for energy efficiency investments
- incentive to spend as much as possible on measures that save as little as necessary
- maximizing the incentive while minimizing the lost revenue to the utility.
- an example of focusing on inputs (amount spent), poor operational incentives and metrics.

Photo by Jay Mantri on Unsplash

Carte Blanche for Cost Cutting

Pacific Northwest Bell, 1986

5-year rate freeze, no restrictions on the cost-cutting methods

Result:

- Cut customer service
- 1-900 number for customer service
- Incentive to keep customers on hold

Photo by Quino Al on Unsplash

Why consider performance?

- More focus on **outcomes**, less focus on inputs (e.g. costs, or how outcomes are achieved)
- PBR can take a broad approach to modify the regulatory incentives inherent in traditional regulation

Challenge to regulators:
Active engagement in charting the future path for utility performance

Key areas of performance & where performance-based regulation fits

Performance Area	Performance Incentive
Affordability/ Cost Control	• Multi-year rate plans • Revenue caps or revenue per customer • Shared savings

Sustainability	• Performance Incentive Mechanisms
	  • Customer access to clean energy
	  • Ambient air pollutant reduction
	  • Efficiency performance incentives
	  • CO_2 per kWh or customer

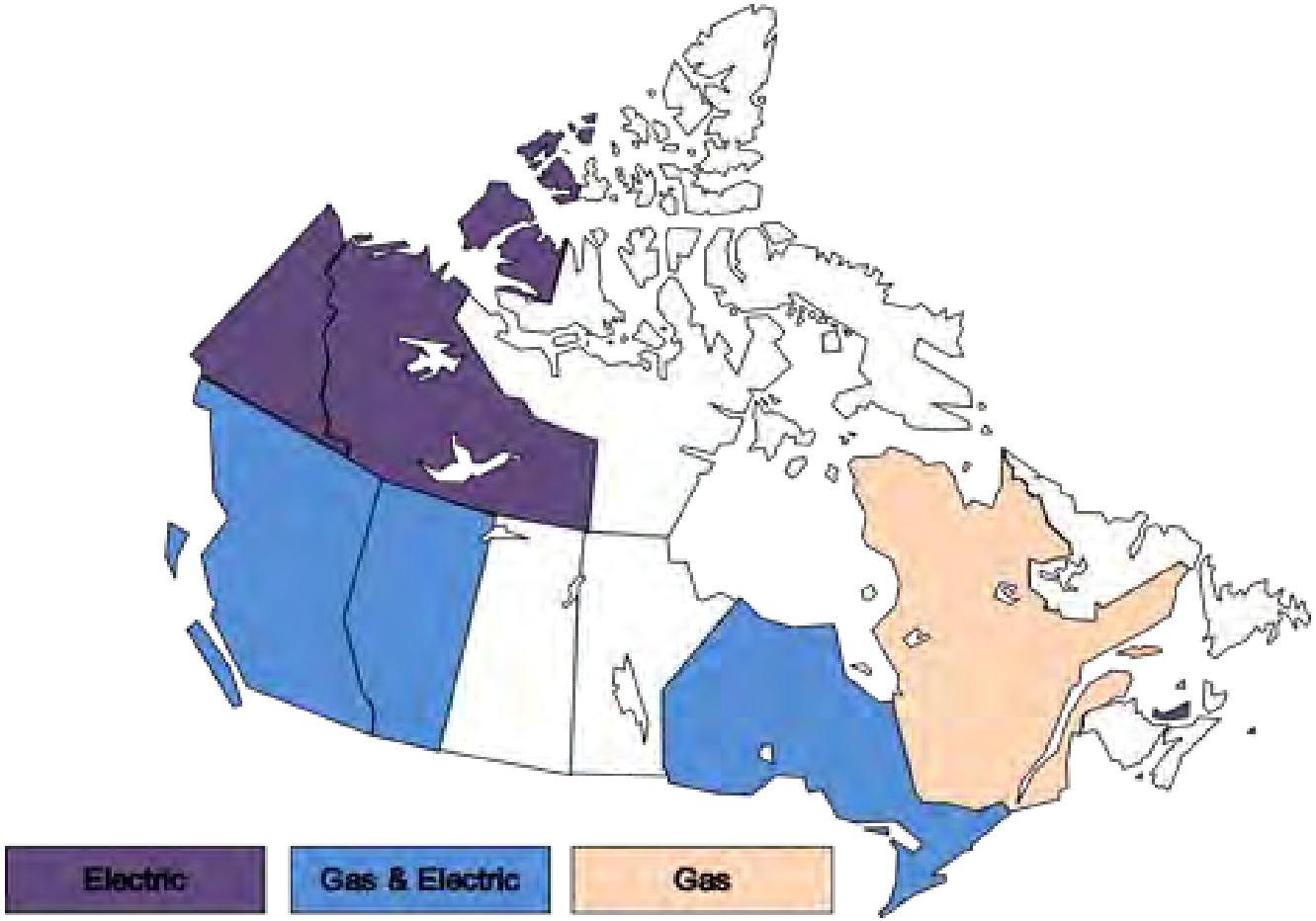
Reliability	• Standards or penalties
	  • Reliability
	  • Resilience – reliability for critical infrastructure or rapid system recovery

Multi-year Rate Plans

Multi-Year Rate Plans:
Two Decades+ of Experience

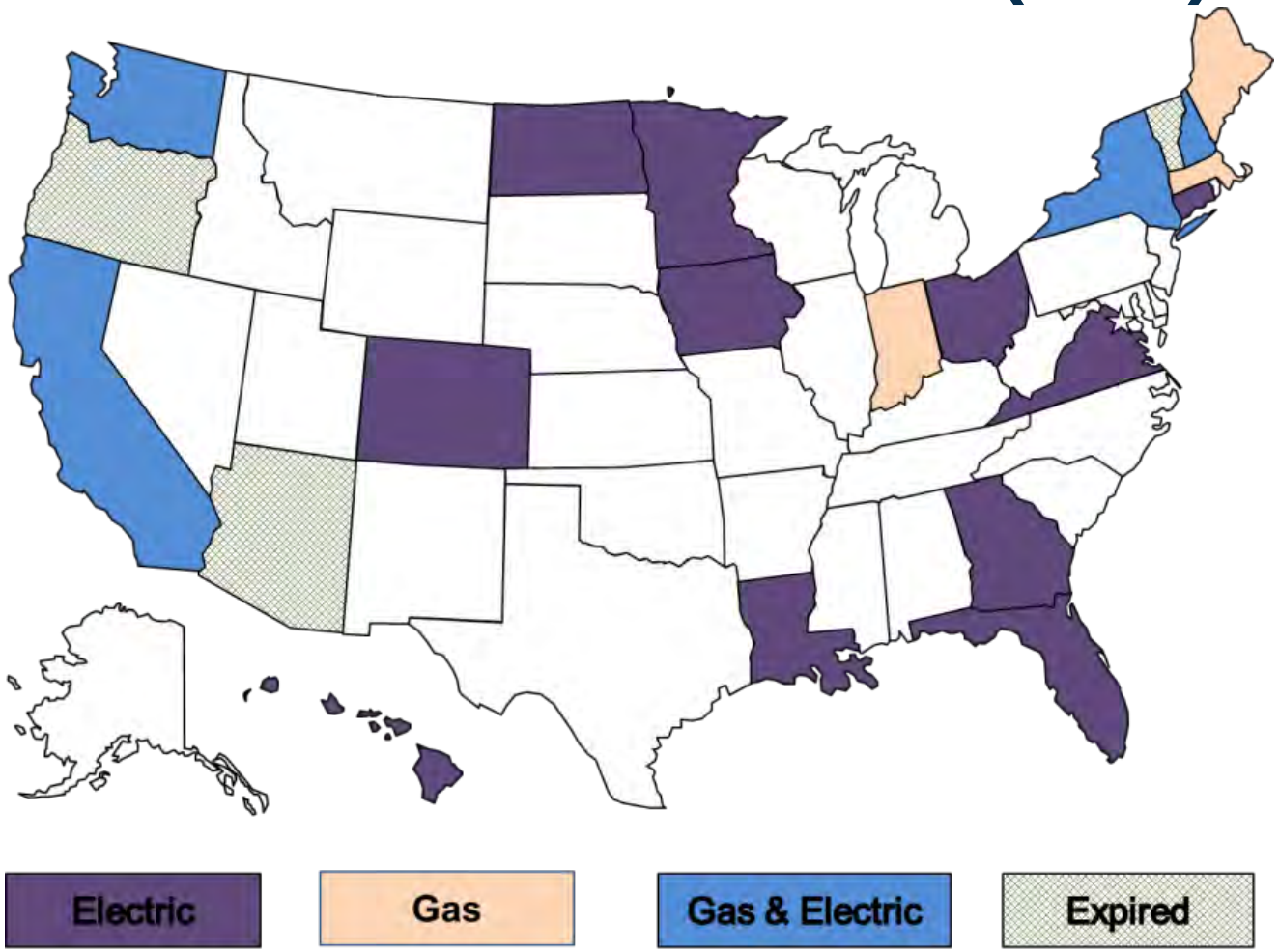
- Set rates for longer period
- Allow utility to keep some/all savings consistent with good performance until next rate case
- First used in CA, NY, New England
- Common now in Australia, UK, Germany, New Zealand, Canada, other states

Multi-Year Rate Plans in Canada (2017)



Source: M. Lowry et al. State PBR Using Multi-Year Rate Plans for U.S. Electric Utilities, July 2017.

Multi-Year Rate Plans in the U.S. (2017)

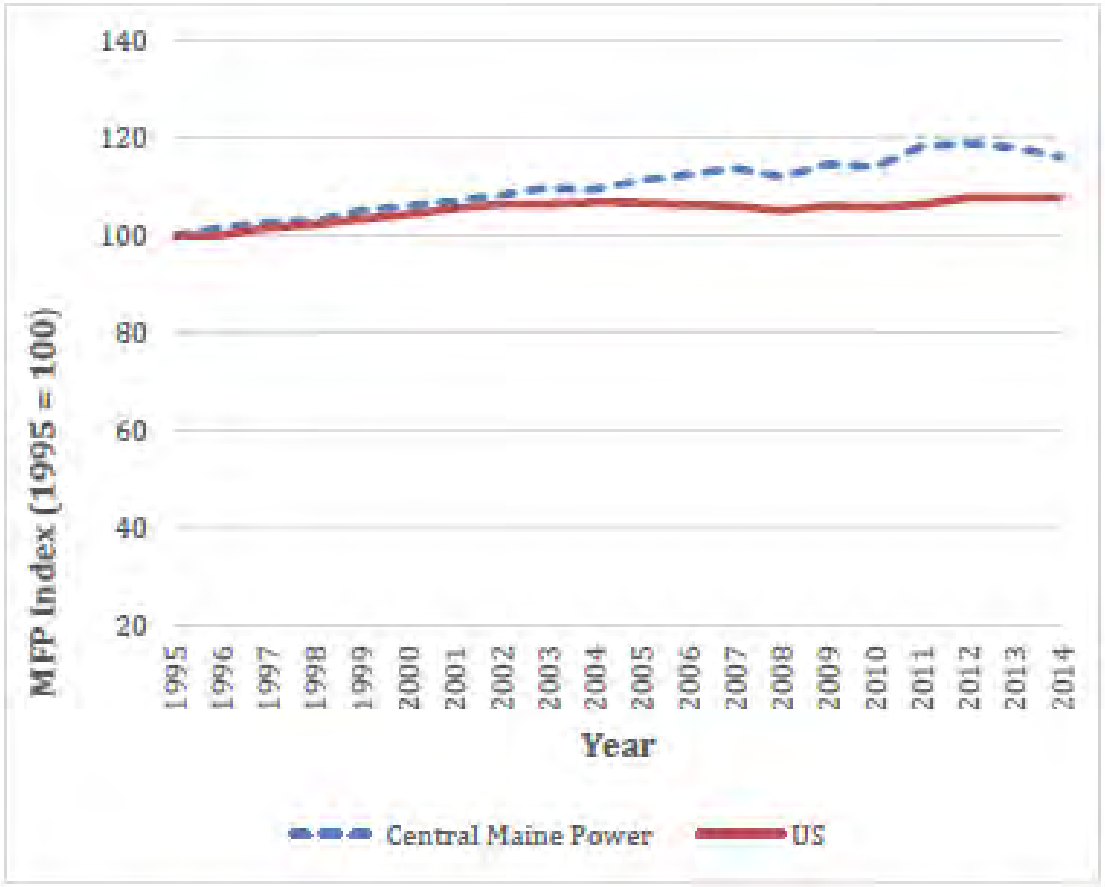


Source: M. Lowry et al. State PBR Using Multi-Year Rate Plans for U.S. Electric Utilities, July 2017.

Multi-Year Rate Plans

- Reduce frequency of rate cases, freeing up regulators and other leaders for other priorities
- Improve culture of utility management
- Improve utility performance and lower utility costs
- Strengthen incentives for utilities to improve performance (Benefits ideally are shared between utilities and their customers)
- Customer service and reliability metrics desireable

Productivity Growth of CMP and Other U.S. Utilities, 1992-2014



Source: M. Lowry et al. State PBR Using Multi-Year Rate Plans for U.S. Electric Utilities, July 2017.

What is a Multi-Year Rate Plan?

Key Components:

Rate case **moratorium** (usually a 3-5 year rate case cycle)

Attrition Relief Mechanism (ARM) allows for automatic relief from cost pressures, but is not linked to actual costs

Incentivizes **cost containment:** allow utility to keep some/all savings if efficient

Earnings Sharing Mechanisms can mitigate **risk**

Performance incentive mechanisms can be linked to MYRPs to ensure service quality

Other components can work simultaneously with a MYRP (e.g., decoupling, cost trackers, additional PIMs)

Source: RAP and Rocky Mountain Institute

Multi-Year Rate Plans Feature Different Types of ARMs

Four Well-Established Methods

Forecasts	Indexing	Hybrids	Rate Freeze
• Rate adjustments during the MYRP period are based on cost forecasts • Adjustments typically increase revenue on predetermined percentage in a stairstep fashion each year	• An indexed ARM uses industry cost trend research to develop a base productivity trend that is then combined with other factors to arrive at a revenue cap index	• Uses a combination of methods • In the U.S., has been used so opex is indexed while revenue related to capex has a stairstep approach	• ARM provides no rate escalation; growth depends on billing determinants or tracked costs • Can exacerbate the throughput incentive unless combined with revenue regulation

Source: Lowry, Woolf. *Performance-based Regulation in a High Distributed Energy Resource Future*, Jan. 2016.

Cost Trackers in MYRPs

- Cost trackers used for expedited recovery of costs - recovered in riders
- Cost trackers can challenge PBR because they weaken incentives to improve performance
- However, sometimes still used in conjunction with MYRPs to allow for recovery of costs that are **difficult to control**, and that are hard for the ARM to address
- For example, CapEx trackers may be used to compensate to address for annual costs that capex can create, and which are hard to address with an ARM

Off-Ramps Can Provide Option to Avoid Unintended Outcomes

MYRP Term Length

- The term of MYRPs, meaning the period of time between one rate case and the next, largely determines the strength of incentives to control costs
- MYRPs usually range in length from **three to five years**
- The longer the time between rate reviews, the greater the opportunities for the utility to realize additional earnings by performing above expectations

Examples

- PG&E (CA) → 3 years with stair-step ARM
- ATCO Electric and ATCO Gas (Alberta) → 5 years with indexed ARM
- Xcel (MN) → 4 years with stair-step ARM
- Northern Powergrid and Northern Gas Networks (U.K.) → 8 years with indexed ARM*
- Florida Light and Power (FL) → 4 years with stair-step ARM

* This term will be reduced to 5 years in the next phase of RIIO.

Off-Ramps

- Off ramps (or "re-openers") are provisions that allow for a review of a MYRP or for termination
- Most common specified trigger for review or termination are returns falling below or above authorized levels

Examples

- FortisBC's MYRP includes a provision for review when post-sharing returns are either 200 basis points above or below the authorized ROE

Source: RAP and Rocky Mountain Institute

Performance Incentive Mechanisms

PIMs can target positive outcomes

- Timely installation of utility IT system roll-out
- Distributed generation interconnection
- Peak load reduction via demand response
- Increase customers enrolled in time-varying rates
- Water savings
- EV rate education and charging station deployment

Or penalize for negative outcomes

- Poor performing circuits
- Slow service restoration
- Cost overruns
- Customer service complaints
- Long interconnection queues

Basic Steps

- Choose a guiding goal to evaluate
- Understand status quo incentives
- Identify measurable performance criteria
- Identify metrics
- Track outputs and outcomes
- Assess a penalty or provide incentive payment, if desired
- Assess whether PBR is helpful to meeting the guiding goal

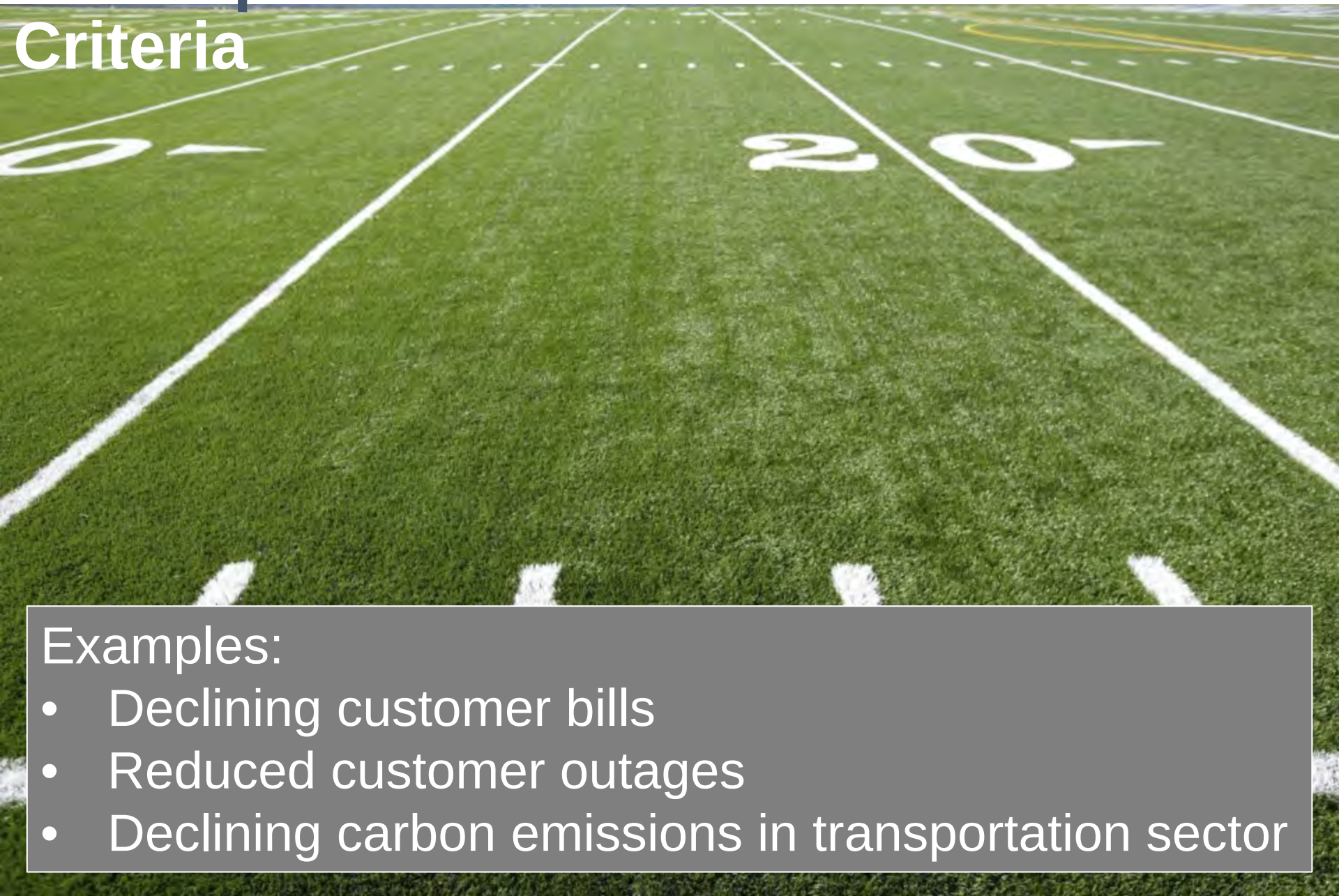
Examples of Guiding Goals

- Make/keep energy affordable for customers
- Improve distribution system reliability
- Reduce GHG emissions
- Increase utilization of zero-emission transportation options

Understand Status Quo Incentives

- Build and own assets to grow rate base
- Increase electricity usage to enhance profits
- Discourage activities that reduce sales
- Limit risk for shareholders
- Cut non-capital expense

Develop Measurable Performance Criteria



Examples:

- Declining customer bills
- Reduced customer outages
- Declining carbon emissions in transportation sector

Create Metrics

Examples:

- Average monthly energy bills for residential customers
- Frequency & duration of customer outages (SAIDI/SAIFI/CAIDI/MAIFI)
- Utilization times of EV charging stations

Importance of Metrics

- Allows Commission to establish and focus on highest priorities
- Creates transparency to measure utility performance
- Enables creation of targets and goals for utility performance

Track Outputs & Outcomes

- Inputs: measurements of effort
  - E.g., hours of labor, dollars of investment
- Outputs: measurements of what was produced or delivered
  - E.g., EE program participation rate, MWh savings
- Outcomes: measurements of impact or achievement (relative to goals)
  - E.g., reduced customer bills, improved reliability

Methodologies for Incentive Mechanisms

- Incentives or penalties added to or subtracted from return on equity
- Lower rate of return (based on cost of debt, for example) with adders based on performance
- Payments for specific milestones instead of increased rate of return
- Shared savings, for example for EE

Design Principles to Consider:

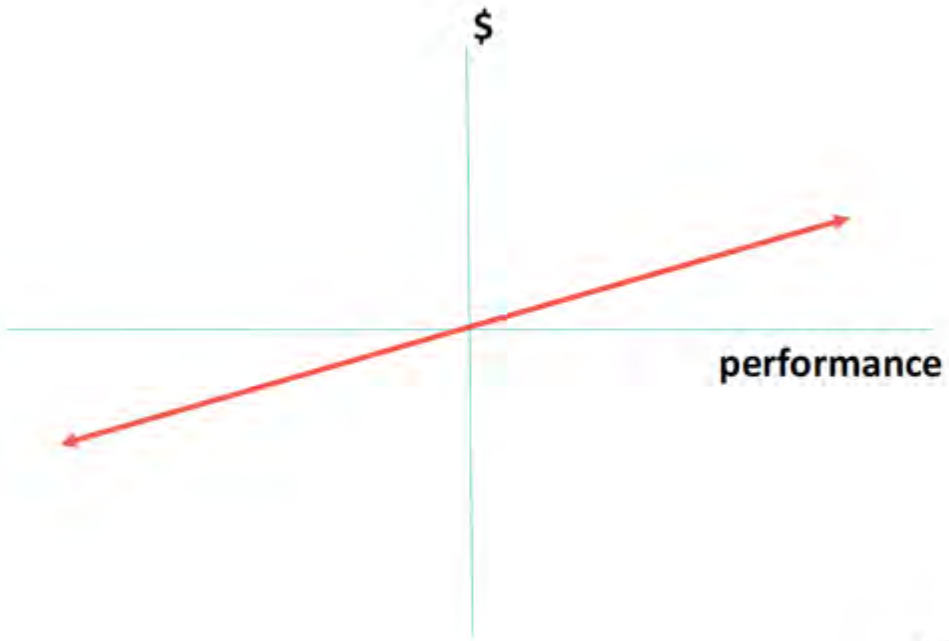
- For every performance measure, ensure that benefits exceed costs (including the incentive)
  - A way to mitigate customer rate impacts is to reward or assign a greater value to performance that lower costs for customers
- Try to find balance between amount of reward that will incentivize utility without over-compensation
- Reflect importance of achievement of policy goal

Design Principles to Consider:

- For quantifiable benefits, consider attaching an incentive/penalty.
- For non-quantifiable benefits, consider reporting metrics only or a smaller incentive/penalty.
- Custom-tailor each incentive/penalty based on potential cost and benefit
  - Relies on good baseline data

Challenge to regulators:
Creating a simple, understandable, yet comprehensive set of mechanisms to achieve stated goals

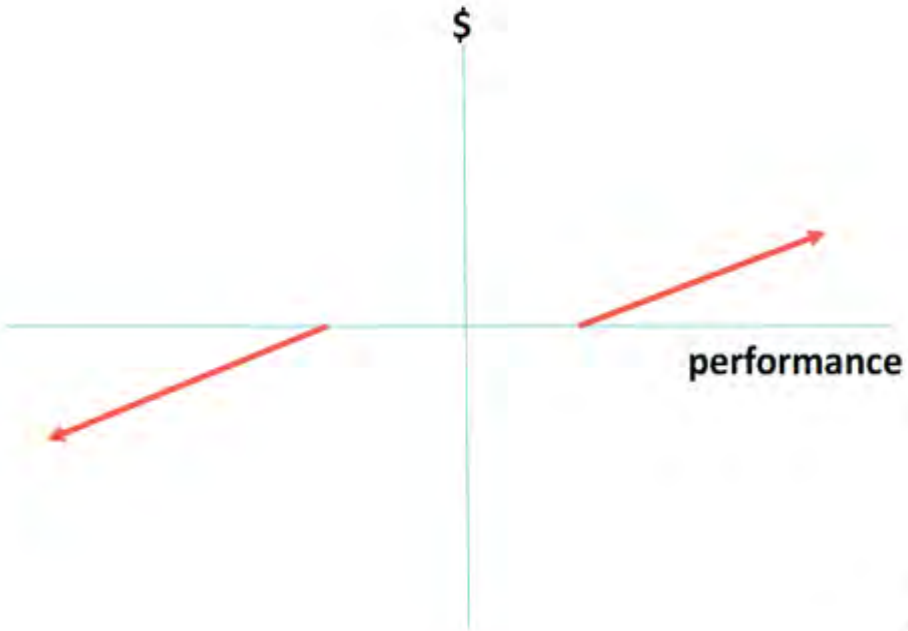
No Deadband, Symmetric Compensation



- Based on a compliant result at the origin
- Utility wins or loses revenue based on performance
- Dollar for unit, no limits

Note pressure on measurement and verification of savings

Symmetric Deadband & Compensation

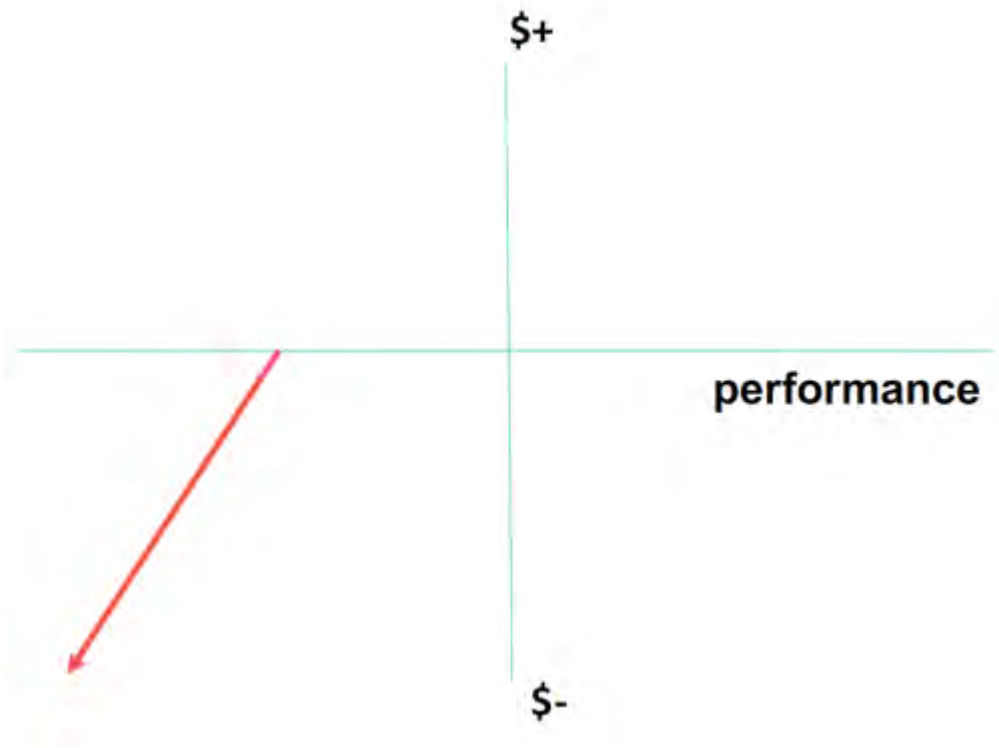


- Based on a compliant result around a deadband at the origin
- Utility wins or loses revenue based on performance
- Dollar for unit
- No limits

Note pressure on measurement and verification of savings

E.g. a range of outcomes around the origin might be expected under normal circumstances

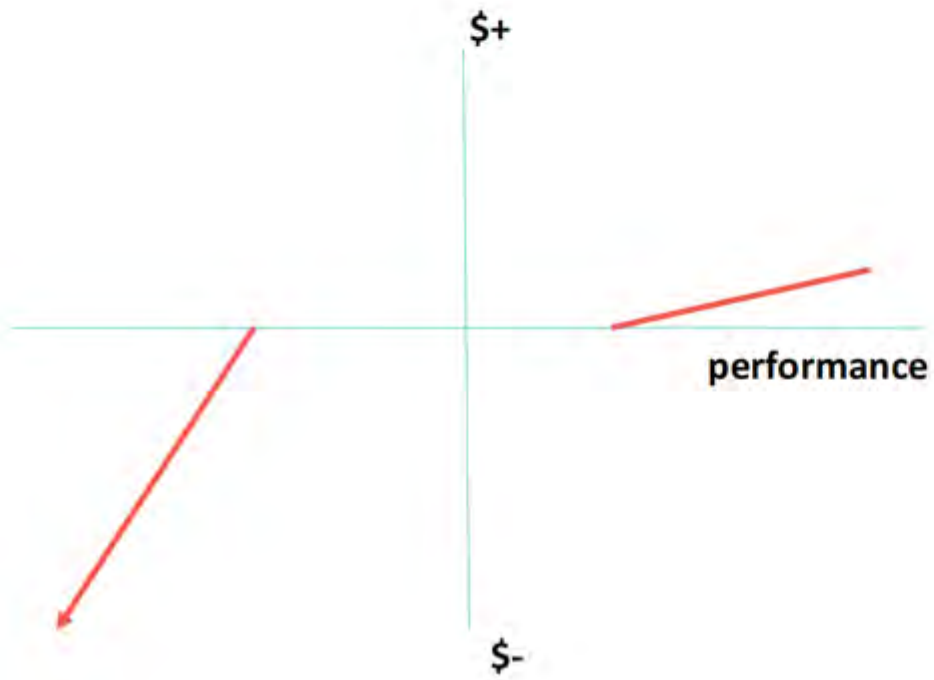
One-sided Penalty



- No upside
- Deadband from adequate performance
- Severe penalty for poor

E.g., something we want to discourage, such as really bad reliability performance

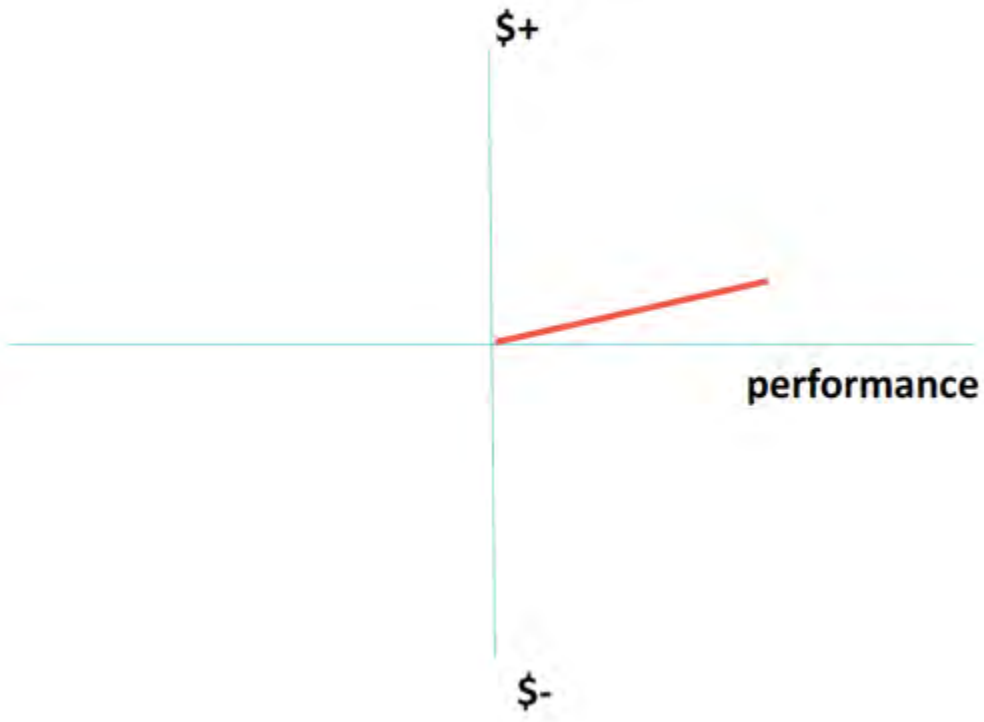
Asymmetric Compensation



- Upside
- Capped, for superior performance
- Deadband from adequate performance
- Severe penalty for poor performance

E.g. for bad outcomes we want to avoid, but where there might be some upside to incent. Interconnection times? Reliability?

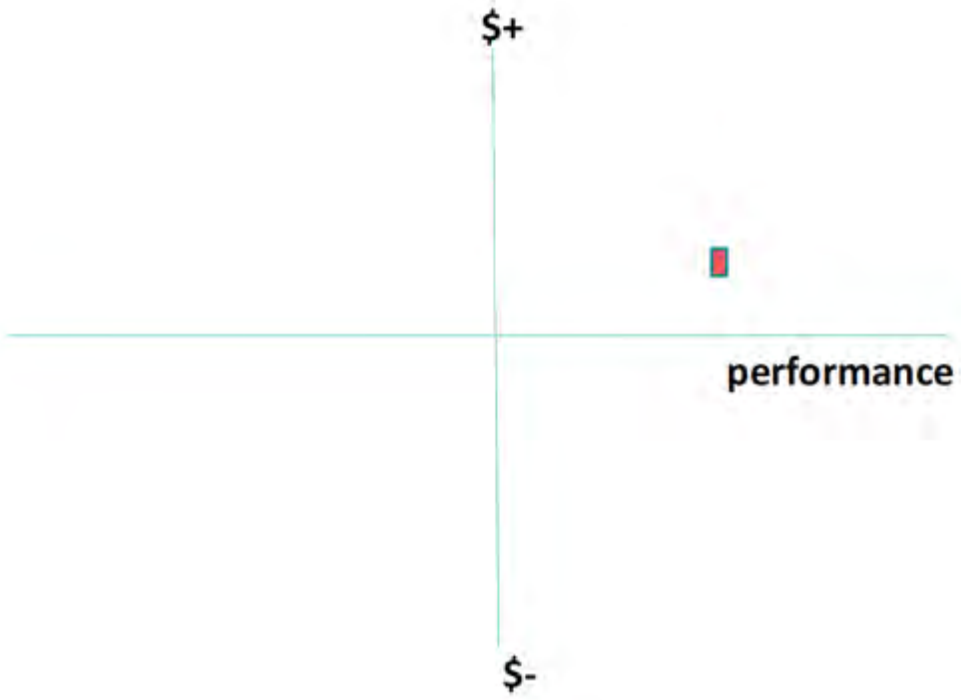
One-sided Reward



- Upside
- Capped for superior performance above present level
- No penalty

E.g., if we want the total incentive to be small, at least for the time being

Hit the Target



- Upside bonus
- Capped for significant specific superior performance
- No penalty

E.g., a particular target we want to achieve, such as a positive benefit-cost ratio for a program

Shared Savings Mechanisms (SSMs)

SSMs Can Lead to Lower Cost Alternatives

- Incentivize utilities to explore alternatives, change thinking about preferred solutions
- Reward utility for reducing expenditures below a baseline (or projection)
- Utility retains some profit, returns remainder to ratepayers = shared savings

SSM for Energy Efficiency

- Create shareholder incentive for EE investments
- ~13 states
- Utilities share a portion of net benefits of successful EE programs with ratepayers
- Example: MN utilities awarded with set percentage of savings
  - Award increases as savings increase
  - At 150% of savings goal, utility would receive 30% of EE budget

SSM in Fuel Adjustment Clauses

- Fuel adjustment clauses pass all fuel price volatility onto customers, reducing utility incentive to operate plants efficiently
- Partial pass-throughs or pass-throughs contingent on plant efficiency can create a shared risk and shared savings opportunity
  - E.G. New York required utilities to absorb part of fuel costs above forecast costs and allowed them to retain savings below forecast
- Utilities with modified FACs operate their plants more efficiently (9% more efficiently in one study)

Source: Knittel, Christopher. 2002. “Alternative Regulatory Methods and Firm Efficiency: Stochastic Frontier Evidence from the U.S. Electricity Industry.” The Review of Economics and Statistics 84 (3).

Challenges, and Potential Ways to Address Them

- Determining baseline and Evaluation Measurement & Verification >> create clear expectations for how these will be determined
- Potential for gaming >> Limit potential upside and downside, especially for new mechanisms
- Potential for outside influence to determine penalty or reward >> consider a “deadband” approach

Implications for Implementation

- What alternative regulatory structures and frameworks, if any, make sense for South Carolina?
- Can these mechanisms help address current or future challenges?
- What information would the PSC need in order to evaluate the potential benefits and challenges of these mechanisms?

State Examples

Illinois Tracking Metrics

- More than 60 metrics developed as part of a settlement agreement with ComEd, including:
  - Reduced GHG emissions (as measured through load shifting, peak reduction, reduced truck rolls)
  - Load served by distributed resources
  - Time to connected DERs to grid
  - Peak load reductions (from DR)
  - Customers enrolled in time-varying rates
  - Customer awareness of ComEd's portal for viewing usage data

Rhode Island PUC National Grid Order (Dock. Nos. 4770/4780, Aug. 2018)

Adopted a System Efficiency Incentive

PIM is 45% of the net benefits (the remainder go to ratepayers) from actions that increase system efficiency

- Annual capacity market savings from incremental (more than expected) behind-the-meter solar
- DR not eligible for other incentives,
- Incremental storage,
- Additional peak reductions from non-wires alternatives or partnerships with third parties

Rhode Island PUC National Grid Order

Metrics to be tracked that may become eligible for PIMs:

- Installed energy storage capacity
- CO_2 avoided through EVs
- Light Duty Government and Commercial Fleet Electrification
- Low-income and multi-unit apartment building EV charging sites
- Distributed Generation Interconnection

Dock. Nos. 4770/4780, Aug. 2018

Hawaii Regulatory Goals

Goal	Priority Outcome	
Enhance Customer Experience	Traditional	Affordability
		Reliability
	Emergent	Interconnection Experience
		Customer Engagement
Improve Utility Performance	Traditional	Cost Control
	Emergent	DER Asset Effectiveness
		Grid Investment Efficiency
Advance Societal Outcomes	Traditional	Capital Formation
		Customer Equity
	Emergent	GHG Reduction
		Electrification of Transportation
		Resilience

Source: Hawaii Public Utilities Commission

Many regulatory mechanisms operating simultaneously

Revenue Adjustment Mechanisms	Performance Incentive Mechanisms	Non-Revenue Regulatory Provisions
3 Year Rate Case Cycle	Metrics Reporting Requirements	RPS and EEPS Requirements
Revenue Decoupling (RBA Provision	Backstop PIMs (SAIDI, SAIFI, Customer Service)	ystem Planning Requirements
RAM Attrition Relief Provisions (O&M, Rate Base, Depreciation & Amortization)	Demand Response PIM	ompetitive Bidding Framework
Partial Revenue Cap (RAM Cap)	Renewable Procurement PIMs	pproval of Major Capital Projects, uel Contracts, and Purchased ower Contracts
Major Projects Interim Recovery Mechanism	ECAC/ECRC Fuel Cost Risk Sharing Incentive	pproval of Rules and Standards
Earnings Sharing Mechanism	ECAC Generation Efficiency Incentive	pproval of Accounting Policies and inancing Arrangements
Major Projects and Baseline Projects Credit Mechanisms		
ECAC/ECRC and PPAC fuel and purchased power pass-through		

Source: Hawaii Public Utilities Commission

Maryland's behavioral demand response program

PBR to promote peak demand reduction

- Opt-out peak rebate program - $1.25/kWh rebate for energy reduction on Energy Savings Days with 24-hour notice.
- BGE may capitalize the operating expenses associated with Smart Energy Rebate (SER) program
- BGE could not recover any of the smart meter costs, or earn the 9.75% return on equity on its smart grid program, until the utility proved that the deployment had a positive benefit-cost.
- The SER program was instrumental in maximizing the smart meter business case and ultimately recovering the costs ($687 million capex)

SER Program Summary to Date

Year	# of Energy Savings Days	Eligible Customers	Average Bill Credit	Peak Demand Reduction (MW)	Total Bill Credits to Customers	% Participation
2013	4	315,000	$9.03	96	$7 M	82%
2014	2	860,000	$6.55	209	$5.6 M	76%
2015	4	1,020,000	$6.67	309	$15.5 M	81%
2016	3	1,074,000	$6.73	336	$11 M	71%
2017	2	1,095,000	$6.13	330	$6.1 M	74%

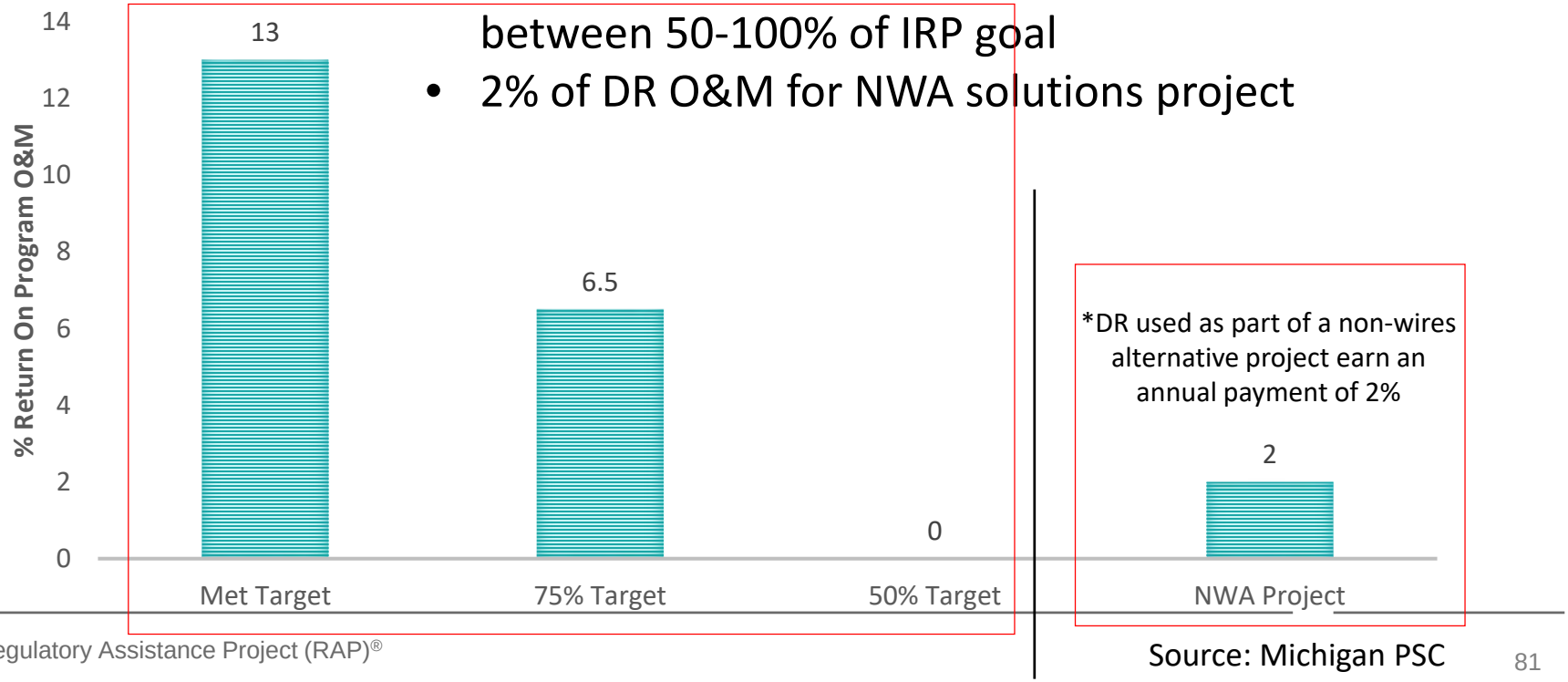
SER Wholesale Market Benefits to Customers, 2013 to 2015[6]

	Benefits from Peak Demand Reductions			Benefits from Energy Reductions			
	Wholesale Capacity Revenue	Avoided Capacity Cost	Capacity Price Mitigation	Wholesale Energy Revenue	Avoided Energy Cost	Wholesale Energy Price Sup-pression	Total
Benefits	$46 M	$87 M	$234 M	$25 M	$9 M	$5 M	$406 M
Share of Total	11%	21%	58%	6%	2%	1%	100%

https://info.aee.net/hubfs/MD%20DR%20Final.pdf

Michigan DR incentives

- Case No. U-18369 (9/15/17): "financial incentive for DR is reasonable and … providers and other interested parties may propose appropriate incentives as part of the DR reconciliation proceeding."
- Consumers Energy DR Reconciliation (Case No. U-20164) (7/18/19) created these incentives:
  - Tied to IRP goal of 49 MW/yr. incremental DR growth
  - Incentive for achievement of each 1% increment between 50-100% of IRP goal
  - 2% of DR O&M for NWA solutions project



Source: Michigan PSC

ConEd's Brooklyn-Queens Demand Management Project

Localized DERs to Achieve Lowest Cost service

- Utilize DERs in a high-cost area
- Utility provided incentives to DER providers or customers, utility allowed to recover costs of DER assets + return on equity (ROE) adder for successful program
- Facilitated competitive procurements among DER providers
- Shared savings = ratepayers avoiding additional distribution costs; Con Edison receiving some of these savings through ROE adder

Treating Cloud Computing Services as Capital Expenditures in Illinois

- Changes to treatment of ”CAPEX” and “OPEX”
- Allows utilities to treat service contracts for cloud computing services like utility-owned IT
- Removes penalties for investments in services inherent in traditional cost-of-service model
- Levels investment playing field between CAPEX and OPEX