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Energy Affordability in the Electricity System Transition:

The Regulator, Utility Ratemaking, and Rate Design

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September 28, 2023

Outline

- Affordability Considerations
- Traditional Role of the Regulator
- Emerging Challenges

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Affordability Considerations

Understand the regulatory mandate

- Legislation: Fair/reasonable or ‘non-discriminatory’
- Ratepayer vs. taxpayer

Not our role to micro-manage utility:

- Main regulatory tool is to deny proposal
- Utility proposed + intervener supported, simpler to accept

What would a competitive company do?

- Vulnerable customer disconnection
- Low-income rates

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I. Traditional Role of the Regulator

History of Utility Regulation

Utility regulation emerged from a need to protect customers from monopolies

Regulators:

1. Ensure utility financial stability
2. Encourage efficient utility managerial practice
3. Ensure utility rates/programs in turn promote efficient customer behaviour
4. Promote stable/predictable rates
5. Ensure fairness to investors

Source: Bonbright (1988) Principles of Public Utility Rates

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Source: Bonbright (1988) Criteria for a Fair Return

1. What does Efficient Utility Managerial Practice Look Like?

- Efficient operation/investment decision; innovation
- Promote efficient customer operation/investments
- Fairness (avoid undue discrimination)
- Reliability/Safety
- Customer satisfaction
- Environment, Social, Governance (ESG)
  - Expect to utility to go beyond minimum of law
    - Expectations can vary by utility and over time
  - Some jurisdictions can empower the regulator to go beyond this (e.g., affordability, GHG)

Have you defined the 'Public Interest'?

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Source: An Energy Regulator's Public Interest Toolkit (2021)

Tools in a Regulator's Toolkit include:

- Cost of Service (COS) Regulation
  - Incents utility to sell more, build more
- PBR / Multi-Year Tariffs
  - Revenue cap can address 'sell more' issue, but discourages electrification & 'build more' issue
- Performance Incentives
  - Additional $ if desired outcomes met
- Rules and Penalties
- Risk Based Framework
- Other:
  - Sunshine regulation
  - Complaints based regulation
  - UK 'Plan and Deliver' (reduced information asymmetry)

No one 'best' approach
Regulator should understand pros/cons of all

2. Utility Rates/Programs that Promote Efficient Behaviour: Rates

Traditional: do they signal marginal costs?

Holistic: would higher/lower energy charges promote efficient customer behaviour?

- Reduce waste
  - Shorten payback period
- Avoid new infrastructure
  - TOU/Congestion pricing
- Promote beneficial fuel switching
- Better match reliability preferences

Mitigate adverse impacts of rate changes

Congestion pricing: Rate Setting for an Electrified World (2022)

Energy Efficiency Programs

1. Is electricity being wasted?
   - Total/societal resource cost test
2. Is it cheaper for the utility to fix the problem, or supply the electricity being wasted?
   - Utility cost test
3. As all customers pay, do they all have opportunities to participate?
   - In particular: low income, renters

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Source: Effectiveness and Balance (2020)

Electrification Programs

1. Should customer switch to electricity?
   - Transportation, buildings, industrial processes
   - Total/societal resource cost test
2. Would the extra load be profitable to the utility?
   - Rate impact measure test
3. If no, could government bridge the gap?
   - GHG benefits accrue to all
   - Social benefits

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Source: Effectiveness and Balance (2020)

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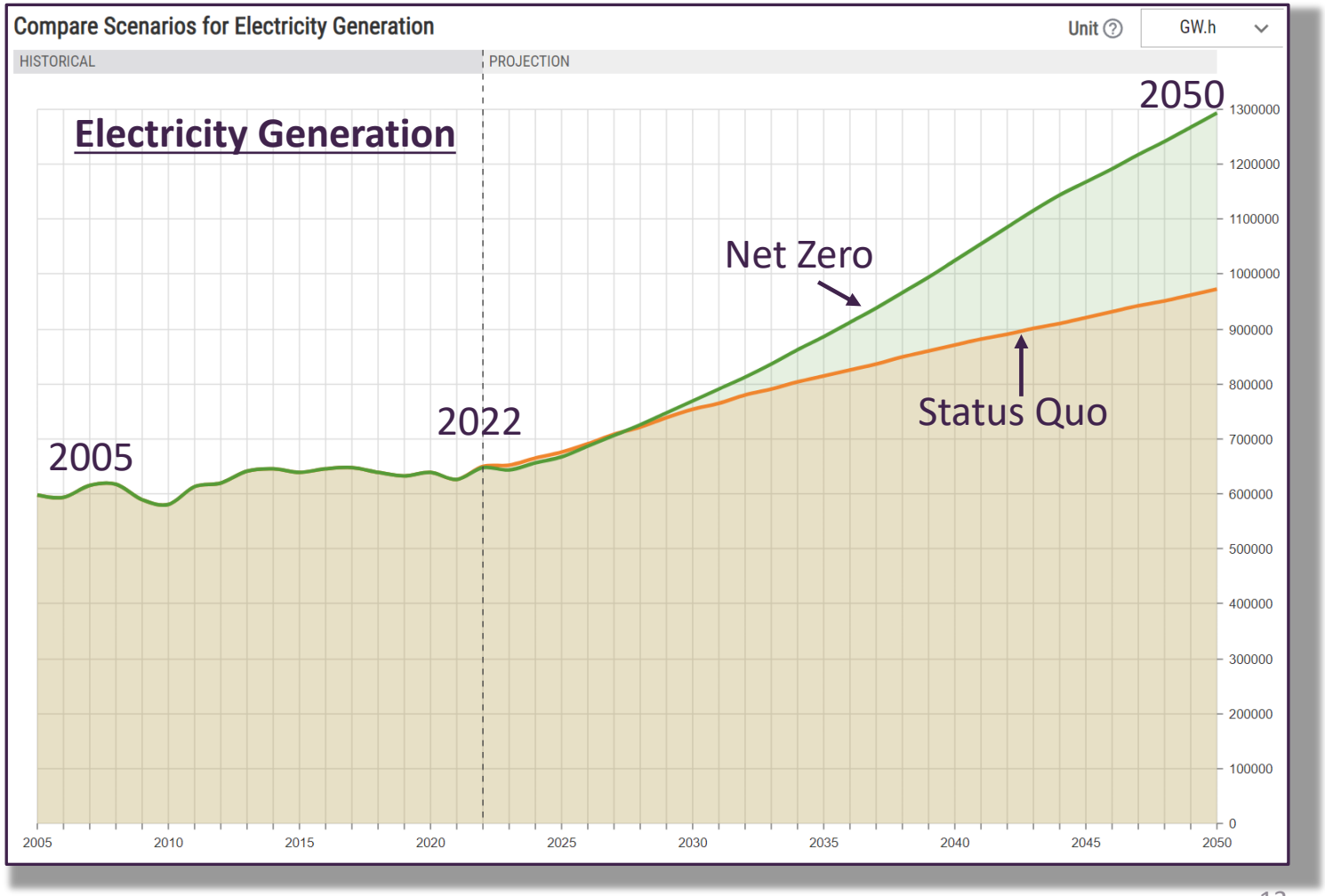
I. Emerging Challenges

Canada: Future of Energy Demand



Source: CER Energy Futures 2023

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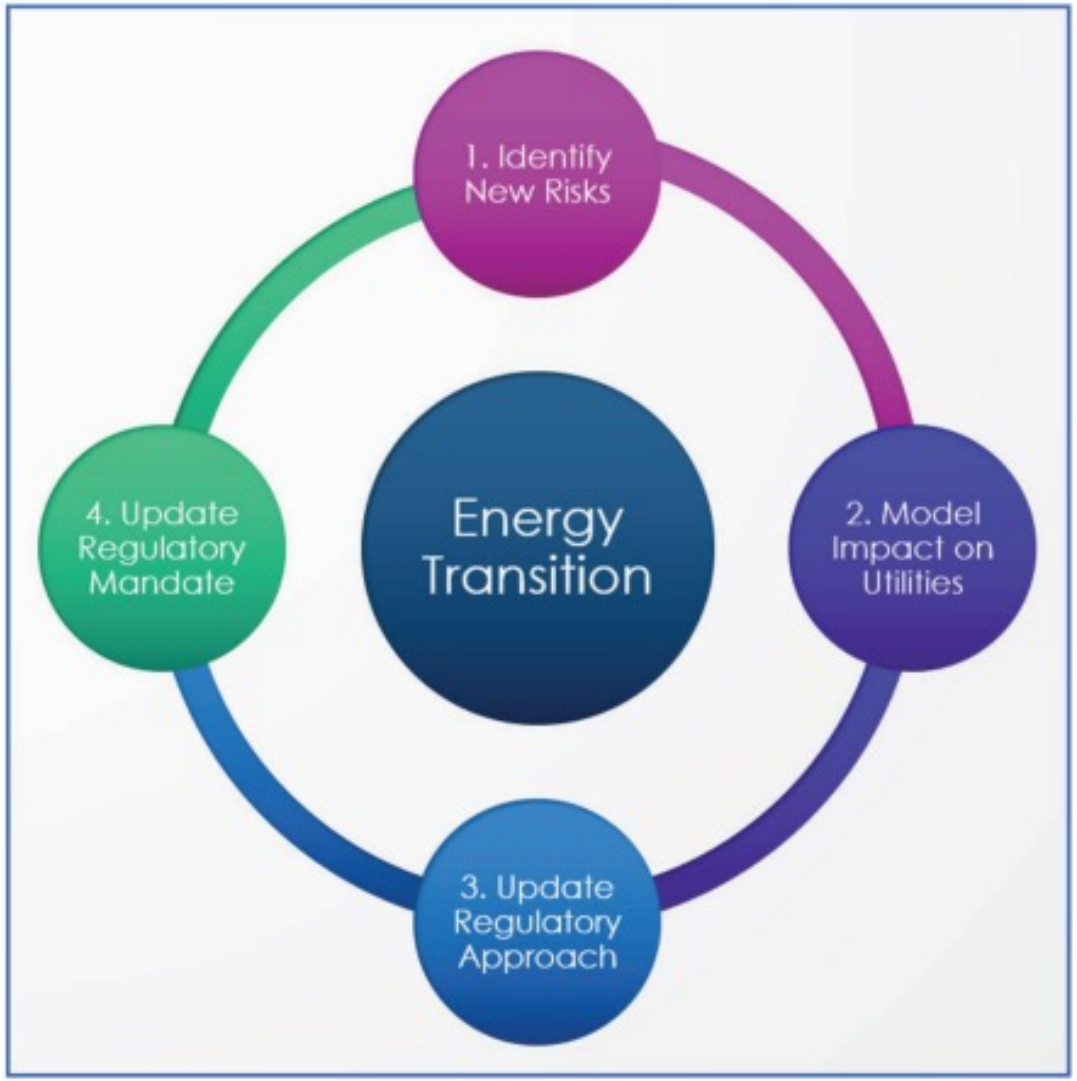
Emerging Issues

- Regulators set up to address ‘Monopoly’ risk
- New risks:
  - Decarbonization
  - Cybersecurity, Extreme Weather, Wildfires
  - Competition at the grid edge
  - Changing generation mix driving need for greater integration



Source: Stuck in the 1950’s (2023)

UK (Ofgem)Example

- A new Future System Operator
  - Energy Future System Operator Consultation
  - Future System Operator Government of Ofgem's response to consultation
- Moving beyond PBR
  - Consultation on frameworks for future systems and network regulation: enabling an energy system for the future
- Local energy institutions and governance
  - Future of local energy institutions and governance
- Creating new market mechanisms to support distributed energy resources
  - The Future of Distributed Flexibility

Questions?

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Ensuring Affordability in the Electricity Transition

The Regulator, Ratemaking, and Rate Design

NATIONAL COUNCIL ON ELECTRICITY POLICY (NCEP)

2023 ANNUAL MEETING SEPTEMBER 27, 2023

RMI

ENERGY. TRANSFORMED.

GENNELLE WILSON

MANAGER, CARBON-FREE ELECTRICITY

GWILSON@RMI.ORG

What's on deck?

Objective

- Cultivate a deeper understanding of the regulatory interventions (PBR & otherwise) that can support Improved affordability outcomes throughout the course of the energy transition.

On your phone's web browser: PollEV.com/rmi601

Agenda

1. Intro to RMI
2. What does it mean to support equity & affordability?
3. Regulatory interventions that support equity & affordability
    a. Quantify & measure progress
    b. Put downward pressure on rates
    c. Plan for a low-cost future
4. Resources
5. Discussion

About RMI

Transforming the global energy system to secure a clean, prosperous, zero-carbon future for all.

BY Targeting Key Sectors

- Electricity
- Buildings
- Transportation
- Industry

USING Powerful Market Catalysts

- Policy
- Technology
- Climate Aligned Finance
- Climate Intelligence
- Education & Capacity Building
- Communications

RMI and Public Utility Commissions

RMI supports the work of PUCs

- **Direct consultants** to PUCs on specific dockets, including advisory support, regulatory drafting, quantitative and regulatory analysis
- **Peer networks** for Commissioners & staff, like Reg Lab
- **Technical assistance** on PUC modernization, process design, decarbonization topics
- **Expert witnesses** for PUC staff, consumer advocates, environmental advocates, or other parties
- Sources **of data and resources** for PUC staff and parties. In rare cases, offering **public comment** or serving as parties (typically when requested by a PUC).

RMI expertise intersection points

- **Inflation Reduction Act (IRA) implementation**
- **Planning,** including integrated resource planning and distribution system planning
- **All-source procurement**
- **Utility business model reform,** including performance-based regulation, return-on-equity, and fuel cost adjustment
- **Future of natural gas**
- **Building efficiency, electrification, demand flexibility, virtual power plants**
- **EVs and EV infrastructure**
- **Equity** and affordability

What does it mean to achieve affordable electric service?

- **Affordability relates closely to the concept of "cost control".**
  - Cost Control - limiting the total costs of the system
  - Affordability - keeping total costs low and ensuring that all customers can pay for electric service.
- **Affordability = Cost Control + Allocation.**
- **Regulatory mechanisms can contribute to affordability by:**
  - (a) reducing costs to all customers through cost containment,
  - (b) supporting the ability of economically disadvantaged customers to access utility services,
  - (c) ***equitably*** designing rates so that certain customer classes aren't over- or under- paying,
  - (d) creating price signals to encourage efficient customer behavior and decisions, or
  - (e) addressing market barriers or incentives that frustrate adoption of least- or lower-cost customer resources.

Equity and affordability are interrelated.

- The combination of both societal patterns *and* the historical/current regulatory framework has manifested inequity in the energy system.
- Risk of continued harms if historically excluded groups continue to be marginalized in the energy regulatory process.
- PBR offers powerful tools to improve the process of utility decision-making to better serve *all* customers.

A variety of equity dimensions will be important to monitor throughout the energy transition.

Affordability & Access to Service

- Energy burden
- Risk of disconnection
- Rate structure impacts

Reliability & Quality of Service

- Frequency & duration of outages
- Power quality

Health & Safety

- Proximity to infrastructure (e.g., power plants)
- Proximity to resource extraction
- Outdoor air and water pollution
- Indoor air pollution (i.e., from gas stoves)

Economic Opportunity

- Access to utility jobs
- Access to solar/clean jobs
- Access to education/job training
- Level of wages & benefits
- Small-business opportunities/contracts

Just Transition

- Worker dependence on fossil fuels (e.g., miners, plant operators)
- Retraining/retirement opportunities
- Community dependence on fossil fuels (e.g., tax revenue from a coal plant)
- Community dislocation/dissolution risk

DER Access

- DER ownership/access (e.g., solar, EVs)
- Proximity to EV charging infrastructure
- Energy efficiency/weatherization access

Climate Impacts

- Exposure to severe events (e.g., flooding, wildfires)
- Ability to respond to events (e.g., air conditioning, access to transportation)

Participation & Power

- Participation in regulatory proceedings
- Community power over infrastructure siting
- Access to/influence over policymakers

Regulatory mechanisms that can support affordability

Quantify the problem

- ❑ Tracking metrics & scorecards

Create mechanisms that place downward pressure on future rates

- ❑ Multi-year rate plans
- ❑ Capex-opex equalization
- ❑ Revenue Decoupling
- ❑ PIMs
- ❑ Fuel adjustment clauses
- ❑ Tailored customer programs & rates

Plan for a low-cost future

- ❑ Leverage the IRA & IIJA
- ❑ Carve savings out of the revenue requirement
- ❑ Lower the ROE

Tracking metrics & scorecards can illuminate utility performance on affordability & equity

What are they?

A **tracking metric** is a specific, quantifiable measure used to assess a utility's performance in achieving a desired outcome.

A **scorecard** pairs reported metrics with performance targets.

Key Benefits

- Increase visibility and reduce information asymmetry.
- The stakes for getting metrics and scorecards "wrong" are lower than for PIMs.
- Can be used to gather baseline data for later PIMs development.

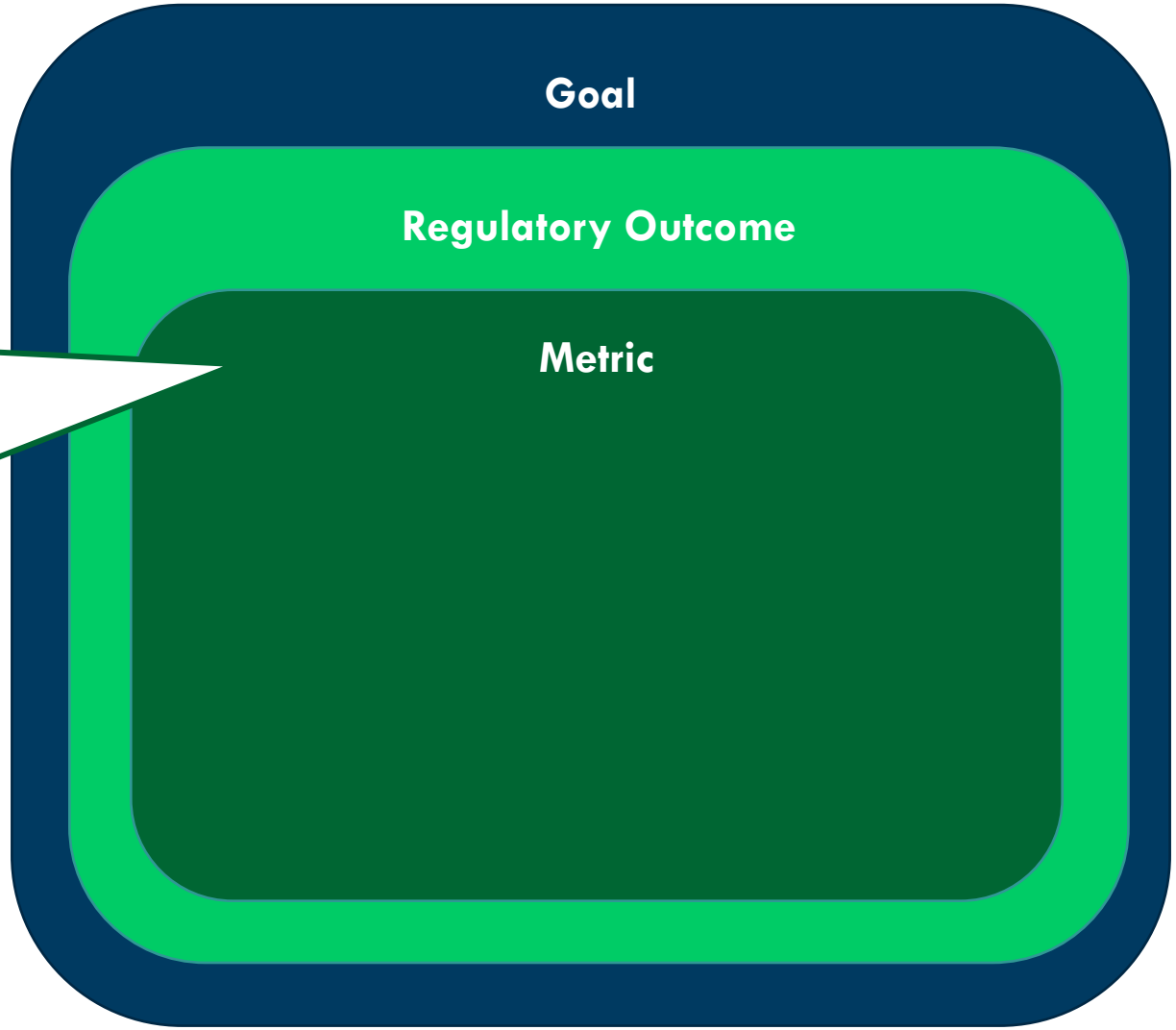
Key Drawbacks

- Do not involve financial incentives and thus may fail to drive desired improvements.
- Collecting data involves some costs.

Tracking metrics & scorecards should be clearly connected to a policy goal and regulatory outcome.

TRACKING METRICS:

- Measurable *and* quantifiable
- Utilize the most appropriate data points for outcome
- Consider what is in and out of utility control

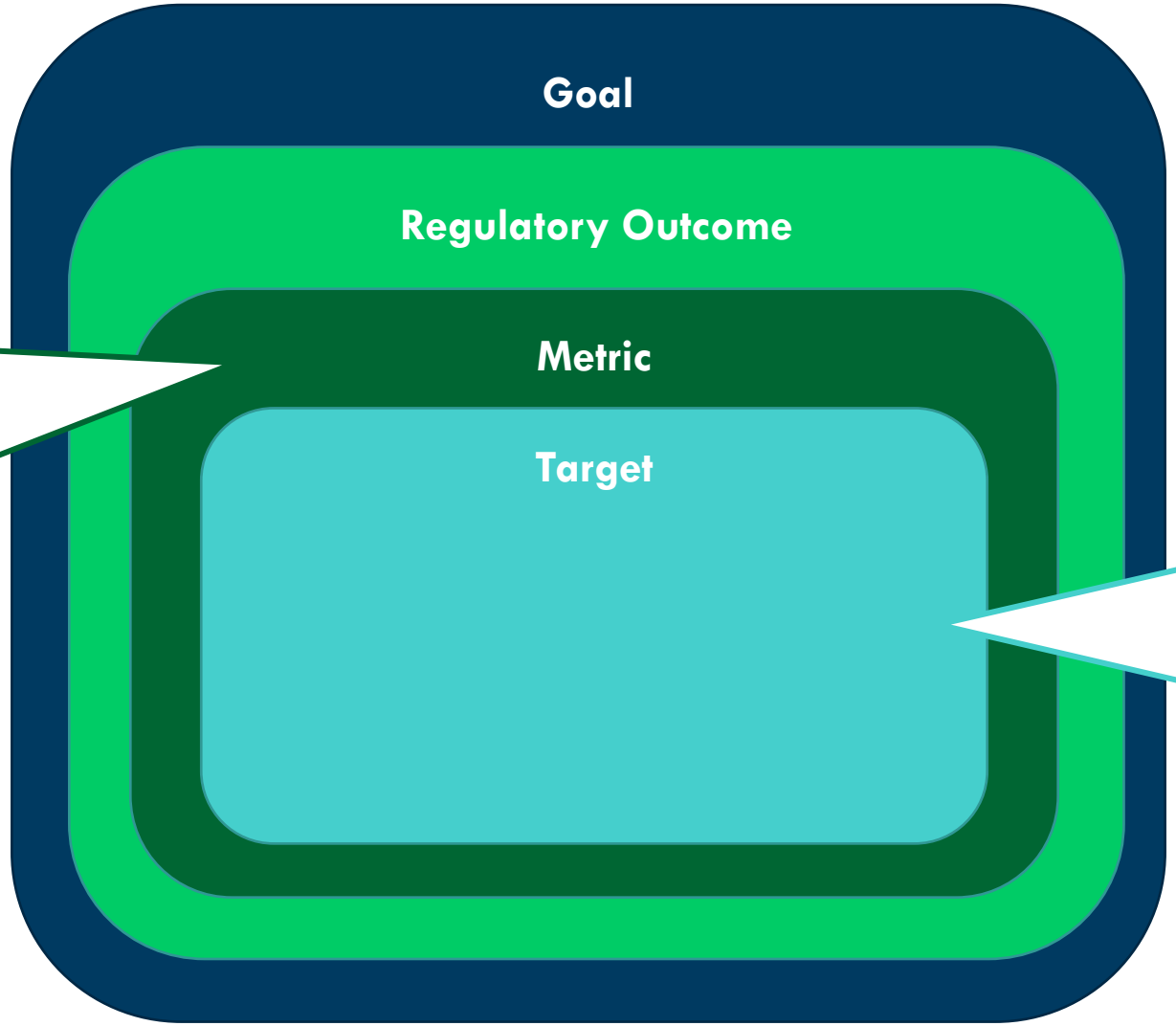


Source: RMI (2020). *PIMs for Progress: Using Performance Incentive Mechanisms to Accelerate Progress on Energy Policy Goals.*

Reported metrics become scorecards with the addition of a target

REPORTED METRICS:

- Measurable *and* quantifiable
- Utilize the most appropriate data points for outcome
- Consider what is in and out of utility control



SCORECARDS:

- Achievable *and* ambitious
- Based on existing data or benchmarks
- Requires appropriate performance period
- May need to be updated over time

Source: RMII (2020). *PIMs for Progress: Using Performance Incentive Mechanisms to Accelerate Progress on Energy Policy Goals.*

Potential metrics focused on affordability and customer equity

Affordability

- **Customer bills**
  - Average monthly residential bill
  - Average total annual residential bill as a percent of annual income from low-income families
    - Average energy burden of LMI customers
  - Average commercial bill as a percent of business operating expenses
- **Payment status**
  - Percent of residential customers by payment status/in arrears/disconnected for non-payment
- **Rate Cost Components**
  - O&M/Rate Base per customer/MWh
  - Energy/capacity costs per customer/MWh/MW

Customer Equity

- **Program participation**
  - Percent of customers participating in DER or EE programs that are LMI
  - EV charging infrastructure installed in LMI communities
- **Energy insecurity**
  - Rate of energy insecurity among residential customers
- **Geographic metrics**
  - Reliability in targeted communities
  - Percent of customers that are LMI that live near power plants

Regulatory mechanisms that can support affordability

Quantify the problem

- ✓ Metrics & scorecards

Create mechanisms that place downward pressure on future rates

- ❑ Multi-year rate plans
- ❑ Capex-opex equalization
- ❑ Revenue Decoupling
- ❑ PIMs
- ❑ Fuel adjustment clauses
- ❑ Tailored customer programs & rates

Plan for a low-cost future

- ❑ Leverage the IRA & IIJA
- ❑ Carve savings out of the revenue requirement
- ❑ Lower the ROE

MRPs incent utility cost containment – when well designed.

What are They?

Multiyear rate plans (MRPs) set the utility's revenue requirement and base rates for longer than one year. They usually include:

1. A **rate-case moratorium**
2. A **mechanism that adjusts revenues** over time to reflect changing conditions

When the mechanism adjusts revenues, it is known as a **"revenue cap."** This adjustment can be based on forecasts, an index-based formula, or a hybrid.

Key Benefits

- Encourage cost efficiency.
- Reduce the number of rate cases.

Key Drawbacks

- MRP proceedings can be complex and contentious.
- Do not automatically share benefits with customers.
- Fewer opportunities to correct course. (This can be partly addressed through an off-ramp provision).

Capex-Opex equalization can reduce capex bias and save ratepayers money.

What is It?

This includes a range of strategies to reduce or eliminate capex bias.

Examples include:

- In **opex capitalization,** a category of opex is amortized and the utility earns a return on it.
- **PIMs or SSMs** that target particular categories of opex.
- An **Earnings Carryover Mechanism calibrated** to equalize the incentive to reduce capex and opex during an MRP.
- Opex and capex can be pooled to form **totex.**

Key Benefits & Drawbacks

- Reduces or eliminates capex bias.
- Narrow approaches are likely to be easier to implement, and the consequences of getting them "wrong" more limited.
- However, more comprehensive approaches can more thoroughly address capex bias.

PBR TOOL

Revenue decoupling creates headroom for meaningful utility energy efficiency.

What is It?

Revenue decoupling delinks revenues from sales.

When we use this term, we specifically mean a **"Revenue Decoupling Mechanism" (RDM).** An RDM involves three steps:

1. Determine the allowed revenue.
2. Compare it to the actual revenue collected from customers.
3. Make an adjustment to "true up" the difference.

Key Benefits

- Removes the throughput incentive.
- Increases utility revenue stability.
- Increases confidence in sales forecasts.
- Removes utility disincentive to meaningfully pursue energy efficiency and demand side management.

Key Drawbacks

- Reduces the "windfall" earnings opportunities associated with beneficial electrification—which could mean additional tools (e.g., PIMs) are needed to motivate the utility.

PIMs can tie utility revenues to performance on desired outcomes.

What are They?

A performance incentive mechanism (PIM) consists of a financial incentive tied to a metric.

PIMs can be structured in many ways. For example:

- Failure to achieve a target triggers a penalty.
- An incremental incentive is applied over a range.
- The utility earns a share of estimated savings. This is known as a **shared-savings mechanism (SSM)**.

PIMs should be designed to deliver **net benefits,** and rewards should not be larger than needed.

Key Benefits

- Can be used to motivate improved performance in specific areas.
- Can reduce information asymmetry.

Key Drawbacks

- Getting PIMs "right" can be challenging, especially for emergent outcomes.
- PIMs can exacerbate affordability concerns if they are designed poorly, or if the authorized ROE wasn't adjusted when PIMs were approved.
- PIMs may interact with each other, and with other existing incentives.
- PIM design can be contentious.

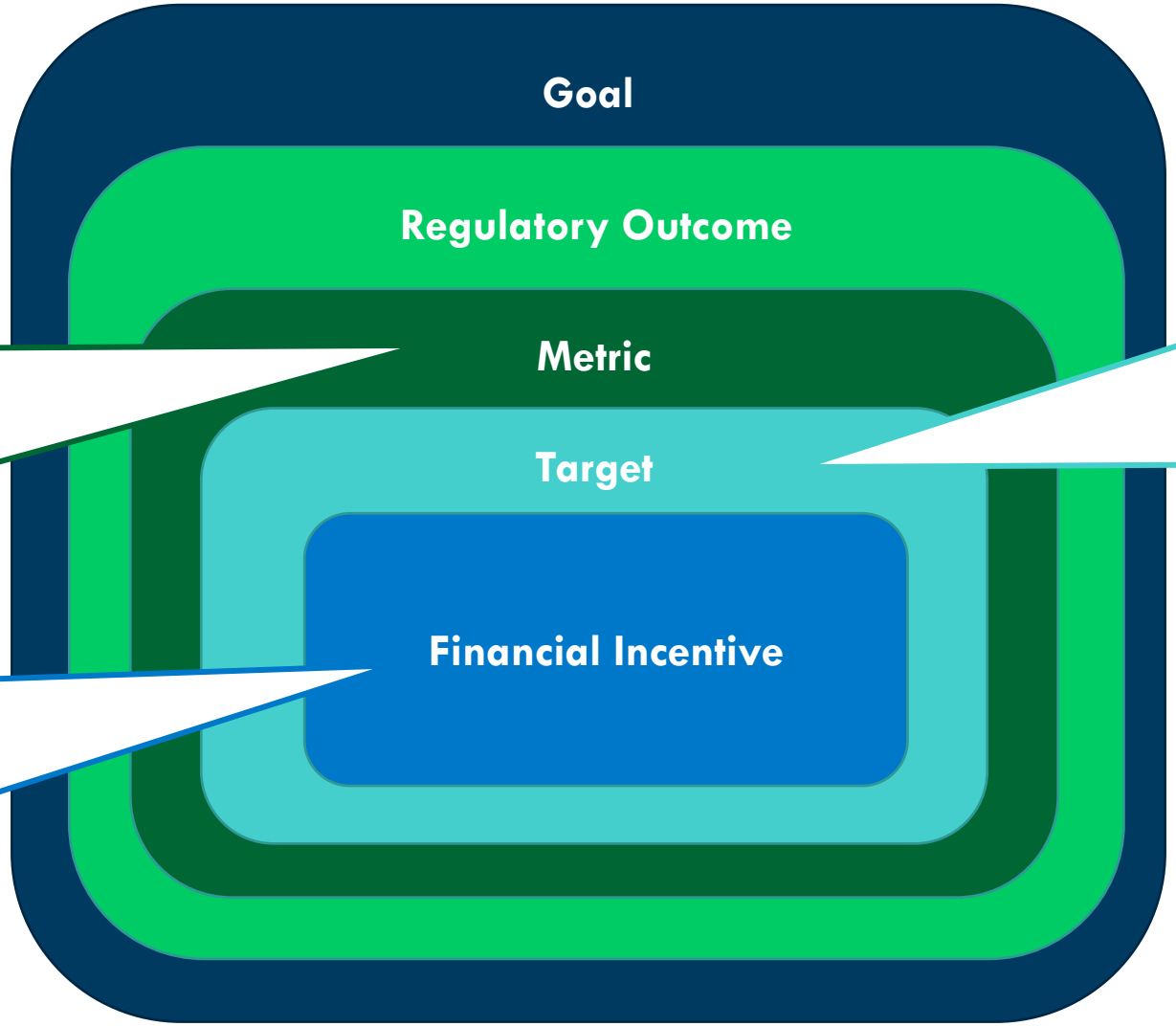
PIMs are close cousins to metrics & scorecards, and must be designed carefully to operate as intended.

REPORTED METRICS:

- Measurable *and* quantifiable
- Utilize the most appropriate data points for outcome
- Consider what is in and out of utility control

PERFORMANCE INCENTIVE MECHANISMS (PIMs):

- Sized appropriately
- Greater than the utility's opportunity cost
- Aligned with other regulatory incentives



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Source: RMII (2020). *PIMs for Progress: Using Performance Incentive Mechanisms to Accelerate Progress on Energy Policy Goals.*

Hawaiian Electric, Hawaii: Low-to-Moderate Income (LMI) Energy Efficiency PIM

Metric:

(1) Energy savings (kWh) for LMI residential customers
(2) Peak demand reduction (kW) for LMI residential customers
(3) Number of LMI customers served

Target:

(1) kWh in excess of the EE administrator's program year target
(2) kW in excess of the EE administrator's program year target
(3) Customers in excess of EE administrator's program year target

Financial Incentive:

upside only; **a $/kWh and $/kW factor** for energy and peak demand savings above the target, calculated as: 50% of projected net program energy-related benefits per targeted kWh and 50% of projected net program demand-related benefits per targeted kW; and **a $/customer factor** calculated as 50% of administrator's targeted first-year bill savings ($) from residential LMI

- Intended to incentivize the utility to more effectively collaborate with the EE administrator to increase energy, demand, and bill savings for LMI customers.
- Capped at $2 million

Not PBR

Fuel adjustment clause (FAC) reform can motivate the utility to rely less on volatile fuels.

What are They?

FACs usually allow utilities to pass through 100% of fuel costs to ratepayers, but this hasn't always been how fuel costs are recovered.

FAC reform can motivate the utility to rely less on fossil-fueled generation resources, decreasing ratepayer vulnerability to the volatility of fuel price swings.

There are various reform types, which vary in strength:

1. Fuel-cost true-up removal
2. Fuel-cost sharing
3. Efficiency ratio
4. Fuel-risk reduction tariffs
5. Information transparency requirements
6. Planning & procurement reforms

Key Benefits

- Can reduce variable costs, which can improve affordability, especially where gas is a significant resource.
- Can speed the energy transition.
- Can reduce information asymmetry.

Key Drawbacks

- Can be highly contentious to get implemented, depending on the mechanism.
- Vary in strength depending on the reform and how its designed.

Source: RMII (2023). *Strategies for Encouraging Good Fuel-Cost Management: A Handbook for Utility Regulators*, https://rmi.org/insight/strategies-for-encouraging-good-fuel-cost-management/

Not PBR

Tailored customer offerings can remove barriers or provide price signals that lower bills.

What are They?

Customer programs offer discounts, training, or technical assistance to address barriers to energy-saving actions or investments.

- Programs can vary along a variety of dimensions, including customer type, markets, end-uses, grid need, and geography.

Alternative rate designs include price signals that reflect system costs and enable customer response.

- May be differentiated on temporal, locational, or attribute basis, or, may be structured as flat bills or subscriptions paired with customer programs.

Key Benefits

- Can reduce bills for individual or community participants.
- Cost-effective programs should exert long-term downward pressure on rates.

Key Drawbacks

- Rate impacts may increase in the short term; long-term rate decreases require regulatory attention to materialize.
- Utilities may struggle with equitable, robust customer adoption, especially for opt-in programs.

Source: A Review of Alternative Rate Designs, RMI, 2016

Questions?

Regulatory mechanisms that can support affordability

Quantify the problem

- ✓ Metrics & scorecards

Create mechanisms that place downward pressure on future rates

- ✓ Multi-year rate plans
- ✓ Capex-opex equalization
- ✓ Revenue Decoupling
- ✓ PIMs
- ✓ Fuel adjustment clauses
- ✓ Tailored customer programs & rates

Plan for a low-cost future

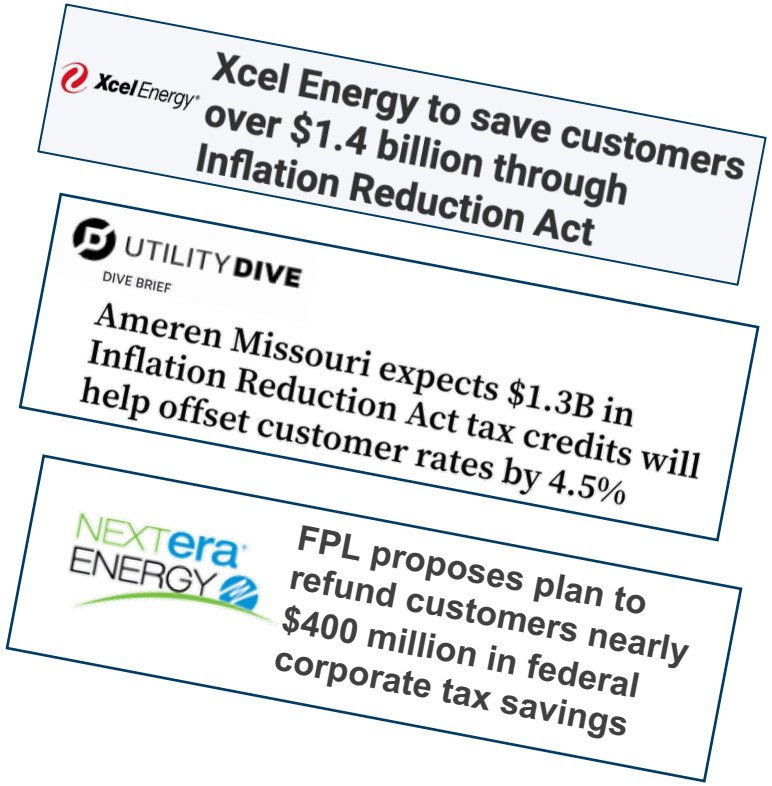
- ❑ Leverage the IRA & IIJA
- ❑ Carve savings out of the revenue requirement
- ❑ Lower the ROE

Not PBR

Planning exercises that consider the IRA will unveil the lower-cost future electric systems.

IRA planning will:

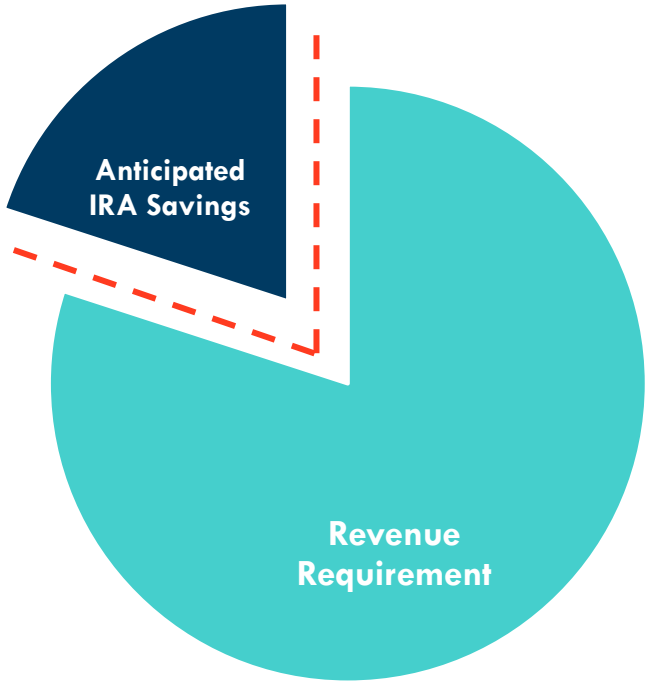
- Change the relative cost-effectiveness of various energy efficiency measures;
- Increase the rate of customer-driven end-use electrification, which will likely:
  - prompt increased need to invest in the distribution grid, and
  - increase the value of (and need for) demand management and flexibility programs;
- Likely enable utilities to secure more generation capacity that they would have before;
- Change the mix of cost-effective investments to ensure reliability (e.g., a different or more diverse set of generation resources;
- Cost-effectively accelerate the retirement and replacement of environmentally burdensome and often uneconomic resources;
- And many more!



Not PBR

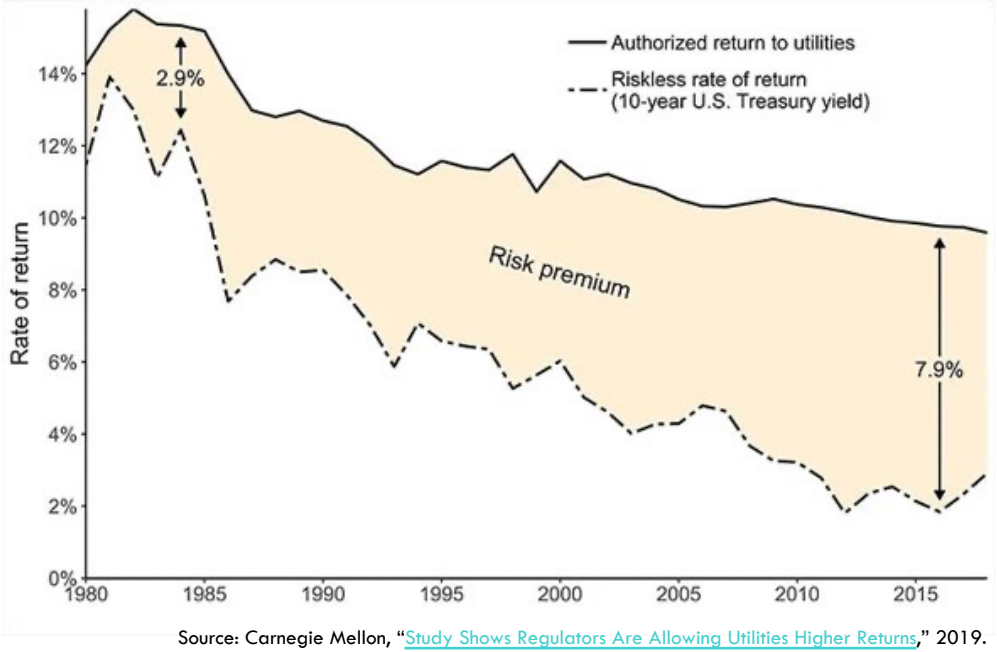
Adjust ratemaking to immediately pass through IRA savings to customers.

- **Ensure the approved revenue requirement immediately passes savings onto ratepayers in rate cases.**
  - Example: The NCUC ordered that the anticipated value of IIJA grants be removed from a water utility's revenue requirement in a rate case. (Docket W-218 Sub 573)
- **Where there is no rate case on the immediate horizon, consider options to instigate a new rate case or a review proceeding.**
- **Consider PIMs that provide**
  - *additional* rewards for utilities that take near-term advantage of IRA cost savings, or
  - penalties for those that fail to meet targets for peak load reduction, customer program enrollment, or clean electricity production.



Not PBR

Lowering authorized utility ROE will save ratepayers hundreds of millions.



Source: Carnegie Mellon, "Study Shows Regulators Are Allowing Utilities Higher Returns," 2019.

Potential increased costs to customers ($ Billions)		
	10yr + 2.9%	30yr + 5.9%
2011	18.58	2.70
2012	19.94	5.81
2013	15.67	7.11
2014	19.43	3.66
2015	19.78	5.59
2016	19.85	6.66
2017	20.74	5.46
2018	20.24	4.40
2019	25.69	8.48
2020	34.29	13.72
	$214.22	**$63.59**

- ROE rates above similarly credit-rated industries could be costing American utility customers up to $214 billion over the last 10 years and $34 billion in 2020 alone.
- The US electric sector faces an unprecedented spending surge as utilities address aging infrastructure, strengthen resilience, and invest in new resources to decarbonize.

Sources: Pearl Street Station Finance Lab, "Electricity Bills Too High? Then, Get The ROE in Line," 2023.
RMI, "Thoughtful and patient capital – unlocking the electrification opportunity," 2022.

Regulatory mechanisms that can support affordability

Quantify the problem

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Create mechanisms that place downward pressure on future rates

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Plan for a low-cost future

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- ✓ Lower the ROE


RESOURCES

There is much more content to support deeper investigation into these topics.

Uncover the comprehensive case for utility business model reform	RMI report Navigating Utility Business Model Reform
Understand why business model reform remains so critical, even after the passage of the IRA	RMI insight For Ratepayers to Realize Savings from Clean Energy, Utility Business Models Need an Update
Dive deeper into fuel cost treatment reform	RMI report Strategies for Encouraging Good Fuel Cost Management
Consider Totex ratemaking -- a form of capex-opex equalization	RMI report Making the Clean Energy Transition Affordable; How Totex Ratemaking Could Address Utility Capex Bias in the United States
Deliberate the lessons learned from PIM design in other jurisdictions	RMI report PIMs for Progress

CHECK OUT MANY OF THESE RESOURCES AND MORE!

Coming soon to a browser near you: RMI's PIMs Database

A forthcoming resource to reference PIMs implemented across the U.S. on a variety of ***emergent topics.*** *The PIMs Database currently features…*

132 PIMs

12 states	17 utilities & program administrators	14 emergent outcomes
CO, CT, DC, HI, IL, MA, NY, NC, RI, VT, WA	Xcel, DCSEU, Hawaiian Electric, Ameren, ComEd, Con Ed, National Grid, Puget Sound Energy, others…	Peak demand reduction, equity, affordability, electrification, grid modernization, others…

Check out **ACEEE's State Policy Database** for information on more traditional energy efficiency PIMs

… and counting!

Questions?

Thank you!

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