Performance-Based Regulation: Considerations for the Washington Utilities and Transportation Commission

Elaine Prause and Jessica Shipley

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Introduction

On May 3, 2021, Washington Governor Jay Inslee signed into law Senate Bill 5295 to transform the regulation of gas and electric utilities to performance-based ratemaking.[1] As part of the implementation, the legislation directs the Washington Utilities and Transportation Commission (UTC or Commission) to provide "clarity and certainty to stakeholders on the details of performance-based regulation" through issuing a policy statement outlining how regulators will consider alternatives to traditional cost of service ratemaking. These alternatives include performance measures or goals, targets, performance incentives, and penalty mechanisms.

Under the law, beginning Jan. 1, 2022, gas and electric investor-owned utilities must include a multiyear rate plan (MYRP) between two and four years in length as part of any general rate case filing. In determining if rates are in the public interest, the commission may also consider factors like "greenhouse gas emissions reductions, health and safety concerns, economic development, and equity, to the extent such factors affect the rates, services, and practices" of gas and electric investor-owned utilities. If the commission approves an MYRP with a duration of three or four years, utilities are bound by the rates approved for the first and second years but can file a new rate plan for years three and four.[2] Utilities must also refund to customers earnings exceeding 0.5% above authorized returns and may refund revenue related to property that is not used and useful by a specific date. The commission must, in approving an MYRP, determine a set of performance measures to assess a company operating under a plan.

When implementing performance-based regulation (PBR), the commission is to consider, yet not be constrained by, multiple factors related to utility operations. These factors include:

- Lowest reasonable cost planning.
- Affordability.
- Increases in energy burden.
- Cost of service.
- Customer satisfaction and engagement.
- Service reliability.
- Clean energy or renewable procurement.
- Conservation acquisition.
- Demand-side management expansion.
- Rate stability.
- Timely execution of competitive procurement practices.
- Attainment of state energy and emissions reduction policies.
- Rapid integration of renewable energy resources.
- Fair compensation of utility employees.

As the Commission prepares to engage with stakeholders in developing the policy statement on performance regulation, this briefing is designed to provide best practices on performance measure development and to assist in its consideration of new regulatory mechanisms that may advance the Commission's objectives.

[1] Laws of 2021, Chapter 188. Codified as RCW 80.28.425.

[2] Electric utilities are required to update power costs as of the rate effective date of the third year of a multiyear rate plan.

Building on Existing Regulatory Foundations

Several performance-based regulatory mechanisms are already in place in Washington through which the UTC regulates outcomes in utility operations that are in the public interest. These mechanisms include the ability for utilities to file MYRPs for cost containment; revenue decoupling to encourage, among other things, end-use energy efficiency; sharing bands for power cost adjustments to fairly distribute risk; and earnings adjustment mechanisms to ensure fair risk sharing between customers and stakeholders.

The commission has also taken steps toward alternatives to its traditional ratemaking by allowing provisional rate recovery of investments before they become used and useful or known and measurable.

Implementation of the new legislation will build upon this foundation by adding a mandate for MYRPs as well as performance measures, allowing the Commission to align utility outcomes more closely with the public interest.

In addition, the Clean Energy Transformation Act (CETA) of 2019 outlines a clear path to 100% clean electricity by 2045. Electric utilities are required to meet clean energy targets and to equitably distribute the benefits of a clean energy transition to all customers. Gas and electric investor-owned utilities are included in an upcoming examination of feasible and practical pathways to reduce greenhouse gas emissions 45% below 1990 levels by 2035.[3] Gas utilities are also required to expedite mitigation of hazardous leaks.[4]

This briefing paper begins by defining PBR and comparing traditional cost of service regulation mechanisms to a PBR approach. We then categorize and describe PBR tools and provide examples for what value these alternative regulation tools are designed to deliver. Finally, we describe potential options for an approach to creating a PBR framework that meets the goals of the Washington Commission. Creation of this summary report relied upon numerous relevant and publicly available reports on the topic, as listed in the Appendix.

Developing a PBR framework is a daunting yet empowering undertaking. The Commission and stakeholders have an opportunity to work together to define desirable outcomes not currently achieved through the energy system and to implement fair and reasonable changes to achieve those outcomes.

Key Takeaways

- PBR includes a suite of tools that, together, can resolve limitations of traditional cost-of-service regulation while encouraging utilities to better serve state policy goals and customer interests.
- Developing an overarching framework of tools that achieves both cost containment and policy outcomes requires an intentional coordinated process, tying commission goals to outcomes.
- MYRPs are typically implemented in PBR for achieving cost containment and are most effective when teamed with performance metrics — to maintain service quality and to focus utility

[3] HB 2311 updated Washington's greenhouse gas emissions reduction goals. https://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/House%20Passed%20Legislature/2311-S2.PL.pdf?q=20211103092020

[4] HB 2518 requires reporting and eliminating leaks in gas transmission and distribution systems. https://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/House%20Passed%20Legislature/2518-S2.PL.pdf?q=20211103092141

performance on certain outcomes, and with revenue decoupling, to focus utility performance away from sales growth.

- Employing an inclusive public process to develop goals, metrics, and mechanisms of PBR increases transparency and meaningful input in defining the public interest, leading to greater stakeholder buy-in and support.
- Examples from other states can help with design of process and mechanisms, but goals and outcomes will be unique to Washington's needs.
- Collecting data on metrics that are relevant to key goals and outcomes is a way to begin determining how PBR might be most effective in Washington.
- Implementation of PBR is an ongoing process of evaluation and adjustment as performance and priorities change over time.
- The overlapping nature of events specified in the statute requires that the resulting framework for PBR will develop and evolve over time.

Basics of PBR

Performance-based regulation is a regulatory approach that more precisely aligns utilities' financial interests with customer and societal interests. It is typically a system of metrics that tracks utility achievement of specified regulatory and public policy goals — and, in many cases, attaches financial rewards and penalties to that performance. PBR provides a regulatory framework to connect goals, targets, and measures to utility performance, executive compensation, and investor returns to strengthen value to customers.

Understanding the implicit and explicit motivations that have evolved over time in the existing institutional arrangement is critical to being able to build a successful performance-based system that can influence utility behavior and achieve preferred outcomes.

Incentives in Cost-of-Service Regulation

The traditional utility regulation approach, called cost-of-service (COS) regulation, conducts oversight of utility operations and pricing through focusing on inputs. This rigorous review of utility capital costs and operating expenses to serve customers takes place in a rate case proceeding that leads to Commission determination of a reasonable annual revenue requirement the utility may collect through rates. The revenue requirement is defined as the total amount of revenue the utility needs to cover its cost of providing service and earn a fair rate of return on its investment. The focus of Commission review is therefore narrow: determining what is a fair rate of return and what expenses are reasonable and necessary to serve customers.

Revenue requirement = rate base x rate of return + operating expenses

Rate base is the net investment of utility property that is used and useful to serve the customers,[5] and rate of return is the percentage the utility is allowed to earn annually on its net investments. Operating

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[5] The net investment includes the original cost net of depreciation, adjusted for working capital, deferred taxes, and various regulatory assets. Lazar, J. (2016). *Electricity Regulation in the US: A Guide (2nd Edition).* Regulatory Assistance Project. https://www.raponline.org/knowledge- center/electricity-regulation-in-the-us-a-guide-2/

expenses include all other costs such as labor, power purchases, fuel, insurance, and other regularly occurring expenses.

This revenue requirement is then allocated across customer classes and transformed into rates based on an expected amount of energy sales. Prices are set primarily on a volumetric basis, based on a historic level of costs and sales, normalized and adjusted for known and measurable changes.

Average customer rate = $/kWh (or therm) = revenue requirement/kWh (or therm)

From this revenue requirement structure, there are two well-recognized ways in which utilities are incentivized to carry out business, which may not align with the customer and societal interests. Simply put, in a traditional cost-of-service framework capital investment and sales growth drive shareholder value.

1. **Averch-Johnson effect[6] or capital bias:** The utility rate of return is a composite percentage applied to the rate base to pay back utility debt with interest and provide a return on equity (ROE) to shareholders. The existence of a Commission-authorized rate of return lowers risk to utility investors, often leading to lower cost of capital where customers see benefit in lower costs, yet the lower risk imbued by setting the rate of return moderates the resulting shareholder return. However, the greater the amount of net investment allowed in the rate base, the larger the earnings for shareholders. Therefore, utilities have an incentive to maintain and increase utility-owned infrastructure because of the traditional cost of service business model. Utilities are also discouraged to promote non-utility investments (e.g., customer-owned distributed generation, power purchase agreements) or non-capitalized operational solutions (e.g., third-party software platforms).
2. **Throughput incentive:** Cost-of-service regulation is merely an exercise in price-setting. Whether the utility generates sufficient revenues with which to cover its costs and earn a return depends on actual sales. Once rates are set, any increases in sales above what was assumed for the revenue requirement determination generally leads to increased utility net income. (This is true because, in the short run, marginal revenue almost always exceeds marginal cost for network industries.) The converse holds as well: Any decrease in sales reduces utility net income. Between rate cases, this incentive to increase sales may discourage utilities from promoting energy efficiency. As energy efficiency is beneficial to customers and the system, the throughput incentive is counter to desired outcomes. There are many reasons why utility sales might vary between rate cases, including those outside of utility control such as the weather being hotter or cooler than expected.

Designing PBR mechanisms to properly motivate utilities to pursue desired outcomes within their control is the key to fair and reasonable rates. In summary, in COS regulation, utilities have the incentive to increase their profits by favoring rate-of-return-based utility capital spending over other options as the method by which to solve identified grid needs, and to increase their revenues by increasing energy sales in the short term.

Additional challenges in COS regulation include cost inefficiencies in regulating rates and service under the revenue requirement construct. The focus in general rate cases is a "line-by-line" review of estimated expenses, which is expensive for utilities to construct and for Commissions, commission staff and stakeholders to evaluate.

[6] This behavior or incentive was documented in Averch, H., & Johnson, L. L. (1962). Behavior of the Firm Under Regulatory Constraint. *The American Economic Review*, *52*(5), 1052–1069. http://www.jstor.org/stable/1812181

Benefits of PBR

Traditional COS regulation was designed in an era when large scale utility investment was needed to build out the grid in the public interest. As our energy system needs are evolving toward more decentralized and clean resources, the types of utility and customer investments are changing. Societal and customer interests have also shifted away from continued growth in utility infrastructure and sales. Energy efficiency, environmental stewardship, and the growth in new technologies to produce and use electricity have, with other things, assumed much greater importance. And these have changed how we think about ownership and operation of components of the system. The utility's role remains central, but the ways in which it provides service to customers has evolved and will continue to evolve. PBR can help contain costs while also supporting more modern goals such as energy efficiency, the equitable distribution of clean energy system benefits, distributed generation, and grid modernization.

All regulation, whether traditional or performance-based, is incentive regulation. PBR differs, however, in that it creates explicit incentives to motivate utilities to accomplish outcomes that customers and society deem desirable. In doing so, PBR can help shift utility focus away from certain outcomes that traditional ratemaking may inadvertently incentivize. Typically, most jurisdictions that follow COS regulation also employ some elements of PBR to assist with balancing out utility motivations, but development of an overarching framework of tools that achieves both cost containment and policy outcomes is an intentional coordinated process tying Commission goals to outcomes.

Characteristics of Successful PBR Frameworks

Jurisdictions with successful PBR frameworks have a common element of starting with a clear articulation of desired outcomes, either from statute or from the regulator's judgment of the public interest.

Other common keys to success in regulators' oversight of a performance system include:

- *Experience with the metrics*: If the regulator is familiar with the output activity andutility performance, a reward system can be set with confidence.
- *Transparent metrics*: Metrics should be clear, and not require subjective analysis to interpret.
- *Periodic reports*: If the regulator stays in touch with utility performance systems overtime, there is less likelihood for surprises or misunderstandings.
- *Openness to change*: PBR is designed to promote innovation, so regulators can expect to see new methods to address updated expectations. PBR also requires a shift of focus from analyzing inputs to measuring outputs and outcomes, which is very new for some commissions.
- *Commitment to timeline*: It can take years to develop goals, metrics and targets plus years to track progress and evaluate effectiveness. Sustained commitment provides time for results.
- *Clear value to public understanding*: Utility communications to customers must explain what services they are paying for and the benefits they are receiving.

Tools of PBR

PBR includes a suite of tools that, together, can resolve limitations of COS ratemaking while encouraging utilities to better serve state policy goals and customer interests. The optimal combination of PBR tools each jurisdiction employs will be unique to the guiding goals of the presiding commission, the legislature, and current circumstances.

Not all of the tools need to be implemented in order to incentivize the desired outcomes. In fact, as in Washington, traditional cost of service regulation often includes some elements of PBR. For example, decoupling is commonly practiced in conjunction with COS regulation to reduce the risks associated with variability in sales (due to weather, changes in the economy, programmatic end-use energy efficiency programs, etc.). In other words, there does not appear to be a bright line between the two regulatory approaches. A primary differentiating factor in describing a regulatory framework as PBR rather than COS is the use of an MYRP in conjunction with one or more performance mechanisms.

PBR encompasses two categories of regulatory mechanisms: revenue adjustment mechanisms and performance mechanisms. Some of the mechanisms within each category also present options for regulators to consider (see Table 1). In this section we will examine these in more detail and address design considerations.

Table 1. Typical PBR mechanisms by category

Revenue adjustment mechanisms	Performance mechanisms
Multiyear rate plans • Attrition relief mechanisms • Earnings sharing mechanism • Efficiency carryover mechanisms Cost trackers Revenue decoupling	Reporting metrics Scorecard metrics Financial incentives Shared savings mechanisms

Revenue Adjustment Mechanisms

Multiyear Rate Plans

The most prominent tool of PBR is the multiyear rate plan. The primary objective of MYRPs is cost containment which is achieved by adding stability to utility revenues over a period of years with some predetermined method for limited revenue growth within that time. The process "sets" allowed revenues, rather than prices, to encourage focus on cost reductions rather than increasing revenues.[7]

The mechanics of MYRPs include a general rate case every three to five years. The rate case test year is typically, but not always, based on a future test year, not historical, as future test years are specifically constructed to better reflect market conditions over the MYRP term.

MYRPs were first used in the 1980s for railroad, telecommunications, and other industries facing competition and changing demand. Electric utilities in the U.S. began considering MYRPs in the 1990s,

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[7] Whited, M., & Roberto, C. (2019). *Multi-year rate plans: Core elements and case studies*. Synapse Energy Economics. https://www.synapse-energy.com/sites/default/files/Synapse-Whitepaper-on-MRPs-and-FRPs.pdf

mainly in California, New York, and the New England states. As of 2017, 18 states were using MYRPs for gas or electric regulation or both.[8] The purpose of these plans was to motivate efficient operations, and thus low-cost service, while maintaining reliability and customer service. Traditional cost-of-service regulation essentially assumes that sales growth is a predictor of cost. To address this, PBR is often explicit in allowing utilities to earn higher revenue if they become more efficient by cutting costs and continuing to provide quality service.

MYRPs can mitigate regulatory lag associated with utility investments and provide greater regulatory guidance and assurance regarding investments in new and innovative technologies to better align utility investments with energy policy goals. Some statistical studies of vertically integrated electric utilities suggest — and the fact that some utilities operate for long periods without rate cases proves — that MYRP can produce superior cost management,[9] which is one of the primary goals of adopting such plans in those jurisdictions.

Typical Characteristics and Components

Although design and review of a utility MYRP filing starts with a similar regulatory process to approve initial rates as traditional COS general rate cases, the frequency of rate cases is reduced. This change ideally leads to more time for commissions, utilities, and other stakeholders to focus on other issues, and lowers regulatory costs related to processing general rate cases. MYRPs include a rate case moratorium of typically three to five years. Additional key components of MYRPs strengthen incentives for utilities to contain costs through optimizing operations and reducing administrative burden. These additional components are the attrition relief mechanism, earnings sharing mechanism and efficiency carryover mechanism. Table 2 summarizes the various elements and their impacts.

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[8] Lowry, M. N., Makos, M., Deason, J., & Schwartz, L. (2017). *State performance-based regulation using multiyear rate plans for U.S. electric utilities.* Grid Modernization Laboratory Consortium. https://gmlc.doe.gov/sites/default/files/resources/multiyear_rate_plan_gmlc_1.4.29_final_report071217.pdf

[9] Lowry, M. N., & Woolf, T. (2016). *Performance-based regulation in a high distributed energy resources future* (L. Schwartz, Ed.), p. 31. Lawrence Berkeley National Laboratory, Future Electric Utility Regulation Report No. 3. https://emp.lbl.gov/publications/performance-based-regulation-high

Table 2. Typical characteristics and components of multiyear rate plans

Characteristic/component	Description	Impact
Rate case moratorium	"Stay-out" provision for set number of years	Rate stability
Attrition relief mechanism	Escalates initial-year revenues for exogenous factors[10], indexed to predetermined factors or forecast – either designed to cap rates or revenue growth	Allow for adequate revenue recovery for exogenous factors
Earnings sharing mechanism	Gains or losses above or below a pre-determined earnings percentage are shared with customers.	Fair distribution of risk between customer and shareholder
Efficiency carryover mechanisms	Sets the extent to which rates in future rate cases reflect benefits of cost savings achieved during an MYRP term, earned savings	Encourage utilities to achieve performance gains that benefit customers beyond the term of the MYRP

Attrition Relief Mechanisms

Between rate cases, attrition relief mechanisms (ARMs) are used to automatically adjust rates to reflect changing conditions such as inflation or population growth without triggering a new rate case. ARMs are designed to permit revenues to grow with predefined cost pressures without linking to specific utility costs.

There are four well-established methods for designing an ARM[11] (Figure 1), which use either an external price index or a cost forecast to adjust rates or hold rates steady with a rate freeze. Commissions have shown a preference for indexed approaches for adjustment due to the asymmetry of information employed in utility cost forecasts.[12]

10 Exogenous factors include weather, inflation, and technological advancements external to utility control.

11 Lowry & Woolf, 2016.

12 Whited & Roberto, 2019.

Figure 1. Attrition relief mechanism models

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 operating expenses are indexed while revenue related to capital expenditures has a stairstep approach	• Provides no rate escalation; growth depends on billing determinants or tracked costs • Can exacerbate the throughput incentive unless combined with revenue regulation

The indexed approach may use multiple factors to adjust the allowed percentage growth in revenue during the rate plan timeframe. For example, the typical equation below factors in three adjustments.

> **Growth revenue % = (index – X) + Y + Z**, where X is a productivity factor benchmarked to peer utilities, Y is an adjustment for variances in costs such as fuel and purchased power expense, and Z is an adjustment for miscellaneous changes in costs outside of the utility control.

Earnings Sharing Mechanisms

Some multiyear rate plans include earnings sharing mechanisms, which define a method to share surplus earnings — or a deficit — between customers and utilities, when actual ROE deviates from the approved target. Typically, a deadband percentage is first defined to allow for some variance in earnings without sharing. Earnings above or below a set level can also be parsed into tiers where the sharing percentages vary. The main use of earnings sharing mechanisms is to ensure that utilities do not over earn during the MYRP timeframe. The vast majority of these mechanisms are one-way adjustments that cap the potential over-earning and require the utility to share with customers.[13]

Efficiency Carryover Mechanisms

These mechanisms further incentivize utilities to improve operational efficiency by allowing them to retain a portion of performance gains even after the term of the multiyear rate plan. In other words, those gains are not required to be folded back into the business as usual, current state of the utility when starting the next MYRP cycle.

[13] SB 5295 defines a deadband of 0.5% with earnings in excess to be returned to customers.

Important Design Considerations for MYRPs

While there are many benefits to regulating with MYRPs, there are also challenges to consider.

- Design details can be complex with more components to settle and design to balance customer and utility interests.
- Although rate cases happen less frequently, they may require more resources than frequently occurring cases.
- MYRPs typically lead to automatic rate increases, which may be challenging to communicate to stakeholders when the objective is cost containment.
- The multi-year aspect of the process may inadvertently lead to development of excessive proposals for trackers and riders for investments that arise over time but are outside of the revenue cap, which is counter to the intent.
- Designing MYRP components to achieve the envisioned cost containment involves many decisions, including which utility costs should be included.
    - Large, prospective, and discrete investments, such as conventional power plants forecasted to be built in the near future and rate-based by the utility are better handled through a deferral that can be traced and incorporated in rate base in the next rate case or through a separate base rate adjustment.
    - Costs recovered through existing clauses, such as the fuel clause, would not be included in the MYRP.
    - Costs that do fit well within the MYRP are those that are programmatic ongoing grid improvements consisting of many small assets and can be predictable and foreseeable.
- Reliability, service quality, and proper investment in the system and operations are most important to track and potentially design metrics to support. For example, to reduce expenses and increase retained earnings, a utility may fail to undertake necessary tree-trimming expense, which will lead to more severe storm outages from ice, snow and wind related line outages.

As with all PBR mechanisms, it is important to think through potential consequences of the incentives to utilities and to evaluate the mechanism over time to make sure that it is achieving the goals, including stable rates, without big swings when tested against expected revenues and sales. A case study on Minnesota's PBR process from the North Carolina Energy Regulatory Process includes an example of MYRP design considerations.[14]

Revenue Decoupling

Decoupling is a mechanism that removes the link between utility revenue and electricity sales. The throughput incentive described earlier is specifically addressed with design of the decoupling mechanism. The rate setting process determines allowed revenue, allocates it across customer segments and set initial rates. Decoupling then allows price adjustment within the term of the MYRP for

[14] North Carolina Energy Regulatory Process. (2020). *Performance Based Regulation Study Group work products.* https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/PBR-Study-Group-Work-Products-FINAL.pdf

designated customer types for specific variations in sales, to ensure that the actual revenues collected match allowed (or "target") revenues.

Revenue decoupling typically focuses on any reduction in sales from the growth of distributed energy resources beyond what was expected due to utility programs, as well as unanticipated variances due to weather. Important design issues include deciding what's covered, whether and how to adjust utility revenue (either revenue per customer or annual review decoupling), and how to handle refunds or surcharges (refund to all customers or allocated to specific classes, etc.).[15]

It's possible to design a performance-based framework without decoupling. However, the amount of utility financial incentives needed through a performance incentive mechanism to overcome the throughput incentive would be significantly more than if decoupling were incorporated.

Deferrals or Cost Trackers

These mechanisms allow for short-term recovery of specific utility costs within the time horizon of the MYRP. With a cost tracker, the utility creates a balancing account to track unrecovered costs incurred for specific projects such as pilots or programs that the Commission deems prudent. Those costs are then allowed to be recovered in tariff riders.

Cost tracker example: Rhode Island ISR process[16]

Electric and gas utilities in Rhode Island are required to submit a comprehensive spending plan annually to the PUC for cost-effectively achieving goals related to enhancing the safety and reliability of the distribution system. The Infrastructure, Safety and Reliability (ISR) spending plan is designed to reconcile costs for certain anticipated capital investments and other spending with an annual preapproved budget for designated categories relating to distribution system safety and reliability. The utility reviews the "ISR" with the Division of Public Utilities and Carriers prior to submission. It is also an opportunity to potentially develop stakeholder consensus regarding the utilities' needed investments.

The "ISR" addresses spending for utility infrastructure, repairing failed or damaged equipment, load growth/migration, sustaining system viability, continuing a level of feeder hardening and cutout replacement, and operating a cost-effective vegetation management program. To inform the selection of projects proposed for the "ISR," the utility performs distribution planning, which forecasts loads, identifies distribution system needs, and proposed infrastructure or non-wires alternative solutions.

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[15] Migden-Ostrander, J., & Sedano, R. (2016). Decoupling Design: Customizing Revenue Regulation to Your State's Priorities. Regulatory Assistance Project. https://www.raponline.org/knowledge-center/decoupling-design-customizing-revenue-regulation-state-priorities/

[16] Systems Integration Rhode Island Working Group. (2016). Systems Integration Rhode Island vision document. http://www.energy.ri.gov/documents/siri/Systems%20Integration%20Rhode%20Island%20Vision%20Document%20January%202016%20FINAL.pdf

Performance Metrics and Mechanisms

Performance metrics are used to track utility performance within specific areas of interest such as customer equity, reliability, customer service, safety, and adoption of distributed energy resource (DER) programs. With performance metrics, the Commission can motivate utility focus on high-priority issues. As circumstances change and areas of interest or concern change, performance metrics can be adapted.

Metrics translate the desired outcome for an area of interest into very specific things that can be measured transparently and without controversy about their interpretation. For example, for the desired outcome of declining customer bills, average monthly energy bills for residential customers could be tracked. For the outcome of reducing customer outages, traditional reliability metrics like SAIDI and SAIFI[17] could be tracked.

The Minnesota PUC adopted desired outcomes and 36 associated performance metrics for Xcel Energy in 2019. For the full list, see the discussion of Minnesota's development of metrics in the Appendix.

Types of Metrics

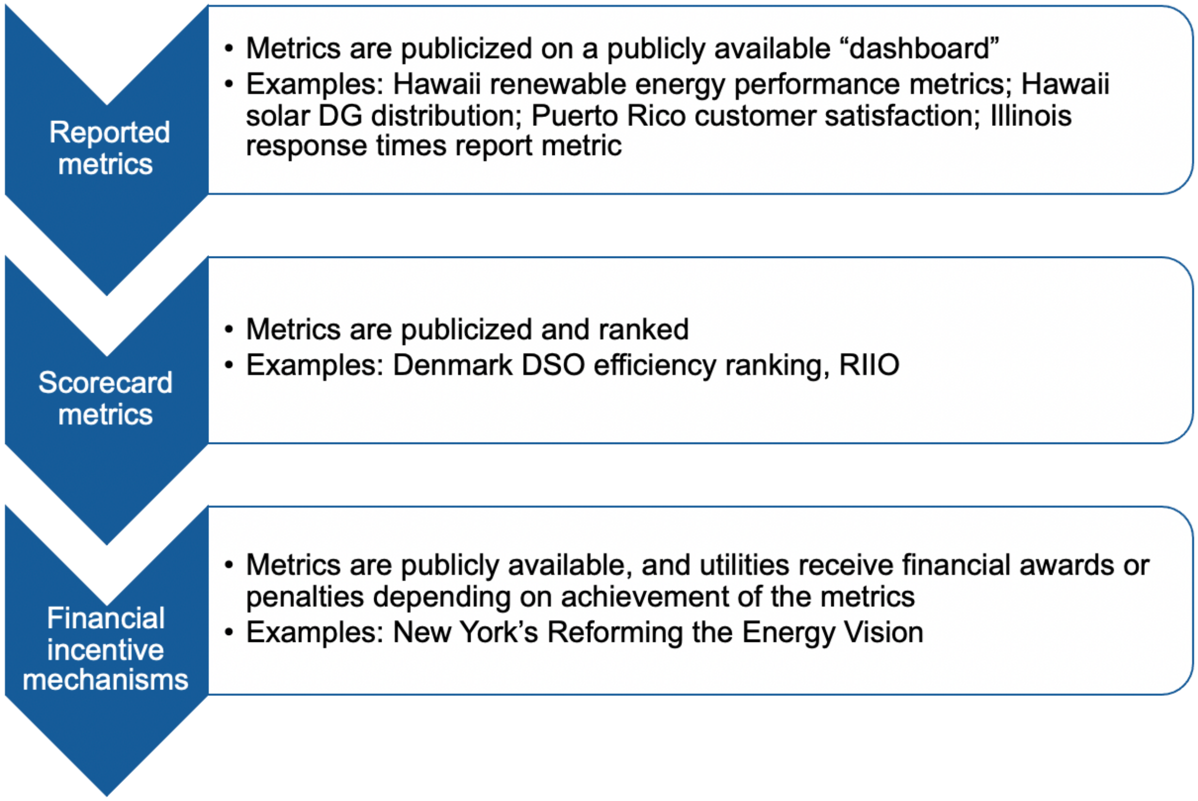
There are three levels for reporting and tracking performance metrics (see with existing historic information or those tied to policy goals lend themselves more easily to benchmarks in scorecards and incentives or penalties compared with other metrics that might be best for tracking.

Figure 2[18]), which advance in complexity and accountability as the metric is better understood and proven to directly link back to guiding goals or outcomes: reported metrics, scorecard metrics, and financial incentive mechanisms, also known as performance incentive mechanisms. Metrics with existing historic information or those tied to policy goals lend themselves more easily to benchmarks in scorecards and incentives or penalties compared with other metrics that might be best for tracking.

[17] System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) are industry standard reliability measures. Institute of Electrical and Electronics Engineers. (2012). *IEEE guide for electric power distribution reliability indices.* https://ieeexplore.ieee.org/document/6209381

[18] Based on Littell, D., Kadoch, C., Baker, P., Bharvirkar, R., Dupuy, M., Hausauer, B., Linvill, C., Migden-Ostrander, J., Rosenow, J., Wang, X., Zinaman, O., & Logan, J. (2017). *Next-generation performance-based regulation: Emphasizing utility performance to unleash power sector innovation,* Figure 6. National Renewable Energy Laboratory (NREL/TP-6A50-68512). https://www.nrel.gov/docs/fy17osti/68512.pdf

Figure 2. Levels of performance metrics



Source: Based on Littell et al. (2017). *Next-Generation Performance-Based Regulation: Emphasizing Utility Performance to Unleash Power Sector Innovation*

Reported Metrics

Metrics that are simply reported are useful to establish baseline information for a specific area and provide transparency into how the utility is operating. Over some period of time of reviewing these metrics, particularly for a new data point, trends may emerge, helping lead to the next level of accountability. Reported metrics do not have financial rewards or penalties but are visible markers of utility performance for the Commission and stakeholders, which may motivate the utility to show positive trends over time.

An example of reported metrics is the page on Hawaiian Electric's website[19] where the utility updates a variety of metrics each quarter on a rolling basis across eight categories of operational factors: service reliability, power supply and generation, renewable energy, customer service, financial, safety, rates and revenues, and emerging technologies. The ease of access to this wealth of information helps customers and regulators gain insights and understanding of the operation of the system and gain a better sense for what they are receiving for what they are paying. Having these metrics in place provided a solid foundation upon which the state's recent PBR framework investigation could advance to identify metrics that were ready for setting targets or financial rewards and penalties.

Scorecard Metrics

The next level of performance metric is the scorecard metric. At this point, there is an identified data source that indicates how well the utility is performing in an area of interest and a target can be defined.

[19] Hawaiian Electric. (n.d.) *Key performance metrics*. https://www.hawaiianelectric.com/about-us/key-performance-metrics

At regular time intervals, such as annually or quarterly, actual data can be compared to targets (a specific number that is achieved or not) or goals (which may have varying levels of achievement, not set to achieving one value specifically) within a scorecard. As with simply reported metrics, no financial reward or penalty is associated with how actual performance compares to the target. However, under- or overachievement of the target is made transparent to the Commission and stakeholders, who may be influenced to consider or propose additional measures depending on the results.

The New York State Clean Energy Dashboard[20] displays electric and gas utility clean energy and energy efficiency programs and tracks progress against targets. The New York Public Service Commission, under New York's Reforming the Energy Vision (REV) process, directed that this dashboard be designed through a collaborative stakeholder process and maintained to measure desired outcomes. The dashboard tracks program progress against energy, fuel, emissions, bill, and demand savings targets as well as actual spending against budgeted spending.

Financial Incentive Mechanisms

Finally, financial incentive mechanisms build upon the accrual of data and setting of targets for a specific issue area and assign a financial reward or penalty depending upon utility performance toward that target. If a significant portion of utility revenues is tied to performance through incentives, these mechanisms can be effective in shifting utility investment and management focus away from growing capital and throughput and toward achieving public policy objectives.

A variety of PIM structures have evolved. One approach is a shared savings mechanism, which allows a utility to keep a portion of its savings and return the balance to customers if it is able to spend less than the approved cost for a utility investment such as grid management software.

The calculation of the reward or penalty of a PIM can be either symmetrical or asymmetrical. If the PIM is symmetrical, the utility receives a financial reward for achieving the target and a penalty of equal magnitude for falling equally short of the target. An asymmetrical PIM provides only a reward ("upside only") or only a penalty ("downside only"). Typically, reliability PIMs are designed as penalty only.

In *Next-Generation Performance-Based Regulation*[21] the authors describe multiple design options for PBR frameworks and how PIMs might either be integrated with the ROE or be designed as a separate cash reward or penalty. Returning to the basic revenue requirement equation, these ideas can be illustrated as follows where utility earnings increase or decrease based on performance.

1. Revenue = (rate base x rate of return (+/– performance basis points)) + operating expenses

- Where rate of return = weighted average cost of capital, calculated as the weighted average of utility interest on debt and return on equity (ROE) and ROE is lowered to a base rate yet balanced by performance incentive potential.[22]
- Bonus for capital for projects or programs; does not address the capital bias.

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[20] New York State Energy Research and Development Authority. (n.d.) *Clean Energy Dashboard introduction*. https://www.nyserda.ny.gov/Researchers-and-Policymakers/Clean-Energy-Dashboard

[21] Littell, D., Kadoch, C., Baker, P., Bharvirkar, R., Dupuy, M., Hausauer, B., Linvill, C., Migden-Ostrander, J., Rosenow, J., Wang, X., Zinaman, O., & Logan, J. (2017). *Next-generation performance-based regulation: Emphasizing utility performance to unleash power sector innovation,* p. 48. National Renewable Energy Laboratory (NREL/TP-6A50-68512). https://www.nrel.gov/docs/fy17osti/68512.pdf

[22] For example, if performance mechanisms allow for the potential to earn 0.5%, ROE could be lowered by an equivalent amount, yet the utility could be made whole or exceed total revenues through achieving performance targets.

- Under a base return on equity PBR, the utility earns a base ROE, and then that return increases (or goes down) based on a performance incentive structure that rewards (or penalizes) performance with modifications to the ROE. The utility can increase its return on equity through performance incentive adders up to a maximum PBR payment or set of payments. And poor performance can decrease the ROE potentially as well.

2. Revenue = revenue cap + K (+/– performance)

- Where K = annual growth/change.
- Cash adder/penalty.

For each option, common considerations hold in designing the performance value. Which metrics should be included? What value range to assign to each? What is the maximum ROE or ROE equivalent that is acceptable without overearning? How much reward should be allocated for each metric so that if all metrics are achieved the sum reward is reasonable?

The process of translating metrics into financial incentive mechanisms begins with reaching agreement on underlying principles to follow in designing PIMs to align stakeholders on shared objectives.

For example, in the North Carolina Energy Regulatory Process (NERP[23]), stakeholders agreed on these key principles to consider:

- PIMs should advance public policy goals, effectively drive new areas of utility performance, and incentivize nontraditional methods of operating.
- PIMs should be clearly defined, measurable, preferably using available data, and easily verified.
- PIMs should collectively comprise a financially meaningful portion of the utility's earning opportunities.
- No adopted PIM should duplicate a reward or penalty created by another PIM or other legal or regulatory mechanism.
- PIMs should reward outcomes, not inputs. In other words, the commission should avoid using expenditures as PIM metrics unless the desired outcome is increased spending.
- PIMs with metrics not controllable or minimally controllable by the utility should be upside only. A utility might prefer program-based PIMs, i.e., where incentives are awarded based on measurable actions, programs, and resources deployed or encouraged by the utility, over outcome-based PIMs given the risk that external factors may influence utility performance on the incentivized outcome (and therefore its compensation). Basing incentives on specific program results, e.g., kilowatt-hours saved through enrollment in an LED program, as opposed to outcomes, e.g., MWh saved system-wide, also makes symmetrical PIMs more of an option. However, a program-based PIM runs the risk of not achieving the desired outcome or decreasing the utility's flexibility to choose and amend the portfolio of programs and investments that best produces the desired outcomes.[24]

To minimize the risk of gaming, the best tactic is to design a clear and well-defined incentive and metric(s). If the metric and the corresponding data required to evaluate it are difficult to measure, manipulation can be more difficult to detect.

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[23] North Carolina Energy Regulatory Process, 2020.

[24] North Carolina Energy Regulatory Process, 2020, p. 24. https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/PBR-Study-Group-Work-Products-FINAL.pdf

PIMs example: ConEdison earnings adjustment mechanisms

Perhaps the most ambitious use of PBR in the United States at present is in New York. As a key part of its Reforming the Energy Vision package, the Public Service Commission is directing each of the state's six investor-owned utilities to make proposals on scorecard and performance incentive metrics, also called earnings adjustment mechanism (EAMs). Scorecard metrics will be tracked and reported for use and scrutiny by experts and the public. EAMs are metrics that address broad policy areas the commission identified in a policy order (known as the Track 2 order)[25] and that can earn a financial reward. The commission put a ceiling of 100 basis points over the normally allowed return on equity that can be applied to EAMs. The proposals are embedded in utility rate cases.

ConEdison's outcome-based EAMs for 2018 included distributed energy resource utilization, residential energy intensity, commercial energy intensity, and multifamily and public energy intensity.

Table 3[26] is an example report on results for earnings adjustment mechanisms, or PIMs, for ConEdison. The incentive level for DER utilization is approximately 100 basis points, administered as a cash reward, not an ROE adder, to avoid exacerbating capital bias. ConEdison well exceeded the maximum target of 116,600 MWh, earning the company the maximum payout of $8.335 million.

Table 3. Example from ConEdison 2018 efficiency earnings adjustment mechanism report

OUTCOME-BASED	Minimum Target	Mid-point Target	Maximum Target	Minimum Earnings	Mid-point Earnings	Maximum Earnings	Achievement	EAM Earned
DER Utilization (MWh)[7]	87,600	100,000	116,600	$2.085M	$4.170M	$8.335M	139,132.93	$8.335
Energy Intensity: Residential (kWh sales/residential customer)	4,688	4,649	4,609	$0.546M	$1.092M	$4M	TBD	TBD
Energy Intensity: Commercial (kWh sales/private employment)	6,710	6,663	6,616	$1.149M	$2.298M	$4.593M	TBD	TBD
Energy Intensity: Multifamily & Public (GWh sales)	9,458	9,375	9,292	$0.390M	$0.780M	$1.558M	TBD	TBD

Source: Consolidated Edison Company of New York. (2019, April 1). *Con Edison 2018 Energy Efficiency Earnings Adjustment Mechanism Achievement Report*

Basic Design Principles for Metrics and Performance Mechanisms

Poorly designed mechanisms can lead to unintended consequences, resulting in inappropriate rewards or penalties, increase regulatory burden, and encourage gaming or manipulation. Done well, performance mechanisms can better align the interests of utilities, customers, and society in general. Common principles of PIM design include the following.

- Outcomes-based: All performance mechanisms, whether only reported, scorecards, or PIMs, should track outputs or outcomes, not inputs. Inputs measure effort incurred such as hours of labor or dollars invested.
    - Outputs measure what was produced or delivered such as energy efficiency

[25] New York Public Service Commission, Case 14-M-0101, Order on May 19, 2016, adopting a ratemaking and utility revenue model policy framework. https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={D6EC8F0B-6141-4A82-A857-B79CF0A71BF0}

[26] Consolidated Edison Company of New York. (2019, April 1). *Con Edison 2018 energy efficiency earnings adjustment mechanism achievement report [Filing in New York Public Service Commission Case 16-E-0060].* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B32E1A50A-3D29-4100-8331-2CFDCA1BC975%7D

savings.

  - Outcomes measure the impact of the achievement relative to a goal such as improved affordability.
  - Outcomes are the true focus of performance-based regulation although outputs can be closely related to outcomes.

- Non-duplicative: Avoid any overlap of reward or penalty for legal or regulatory requirements.
- Clear, measurable, and meaningful: Metrics that can be evaluated with easy to acquire data and that lead to significant rewards or penalties are most impactful.
- Evaluated regularly: Once established, ongoing evaluation and assessment of performance mechanisms is a key follow-up action. If the mechanism is not helpful toward understanding whether the utility is meeting the Commission's guiding goal, shifting toward another metric that is a better indicator is a more efficient use of resources.

Developing PBR Frameworks

The optimal combination of PBR tools for each jurisdiction to employ will be unique to the guiding goals the commission adopts and the current performance of the utility in meeting those goals. Even once developed, the portfolio of PBR tools should be designed to evolve and adapt over time in concert with the context and goals in each jurisdiction.

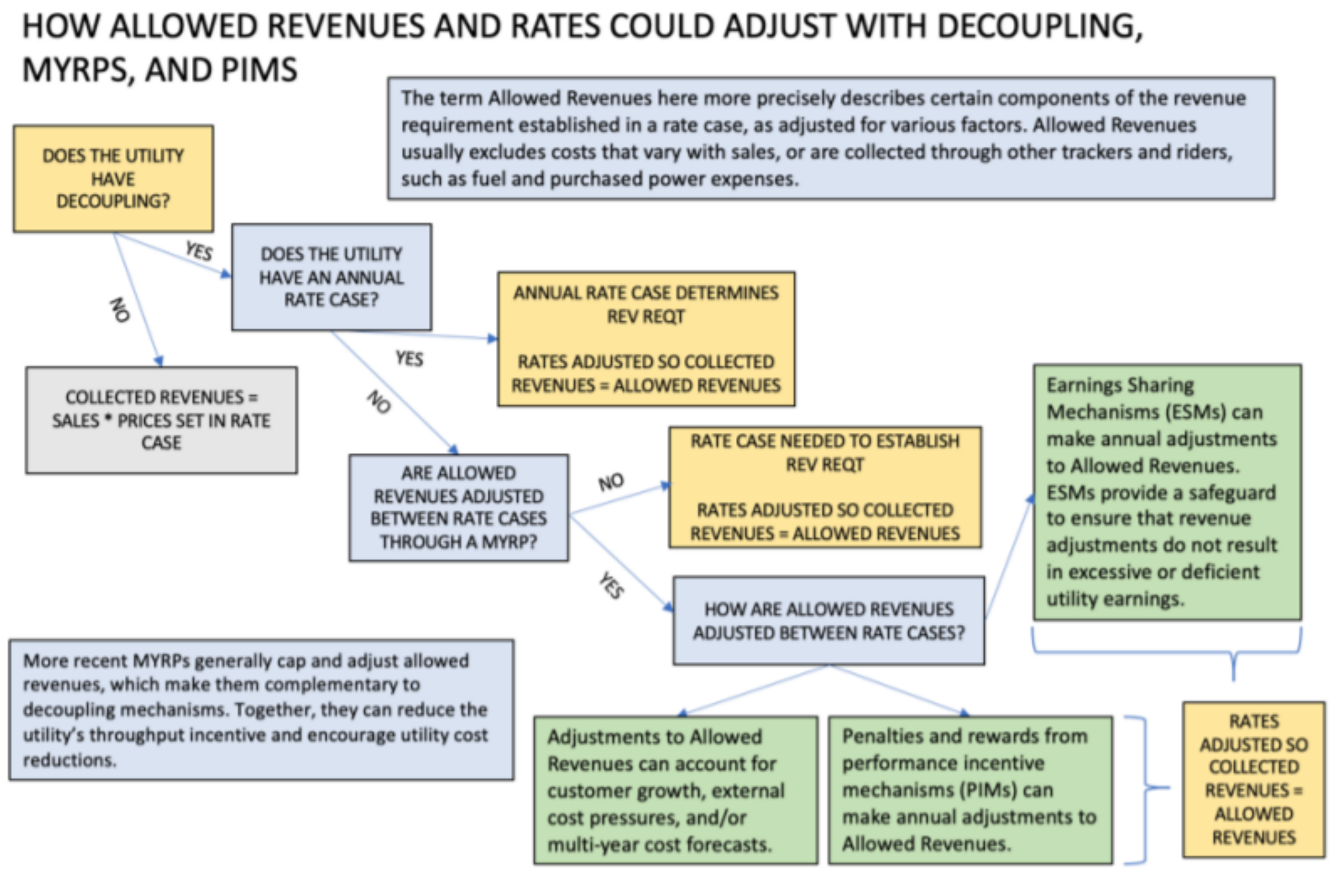
Figure 3 depicts how these tools may work together to adjust utility revenues and customer rates.[27] Decoupling and cost trackers allow for variances in sales and discrete project investments, while other factors and costs are accounted for in the MYRP.

Performance incentives or penalties are accounted for just before actual revenues the utility is allowed to collect are evaluated using an earnings sharing mechanism. It's the combination of decoupling and trackers, MYRPs, and performance incentive mechanisms that can comprehensively define a PBR framework.

PIMs complement both decoupling and MYRPs. Decoupling removes disincentives for DERs, while MYRPs create an incentive for cost containment. PIMs can promote support of DERs and balance out cost containment action by ensuring essential functions remain, such as customer service and reliability.

[27] RMI graphic from North Carolina Energy Regulatory Process, 2020.

Figure 3. Illustration of PBR tools working together



Source: RMI graphic from North Carolina Energy Regulatory Process. (2020). *Performance Based Regulation Study Group Work Products*

Process for Creating a PBR Framework

Although there is not a common recipe for how to implement PBR, best practices related to the process of developing a PBR framework have emerged. Establishing a regulatory proceeding within which a diverse representation of stakeholders can contribute to and shape outcomes is the first common step and can provide a commission with important public interest input. Transparency at each step of the process, including the development of goals, metrics, and incentives, can increase the likelihood of utility, stakeholder, customer and public buy-in. A transparent process also enhances the credibility of targets and reduces the risk of disagreements when rewards or penalties are applied.

The following common steps can guide the public process for developing and evaluating a PBR framework.

1. Clearly articulate goals and objectives.
2. Understand the status quo incentives.[28]
3. Identify measurable performance criteria.
4. Identify performance metrics and revenue adjustment mechanisms (e.g., MYRP components, decoupling, cost trackers).

[28] For example, does the utility earn less revenue with more customer energy efficiency or are revenues decoupled and energy efficiency goals?

a. Establish reporting metrics.

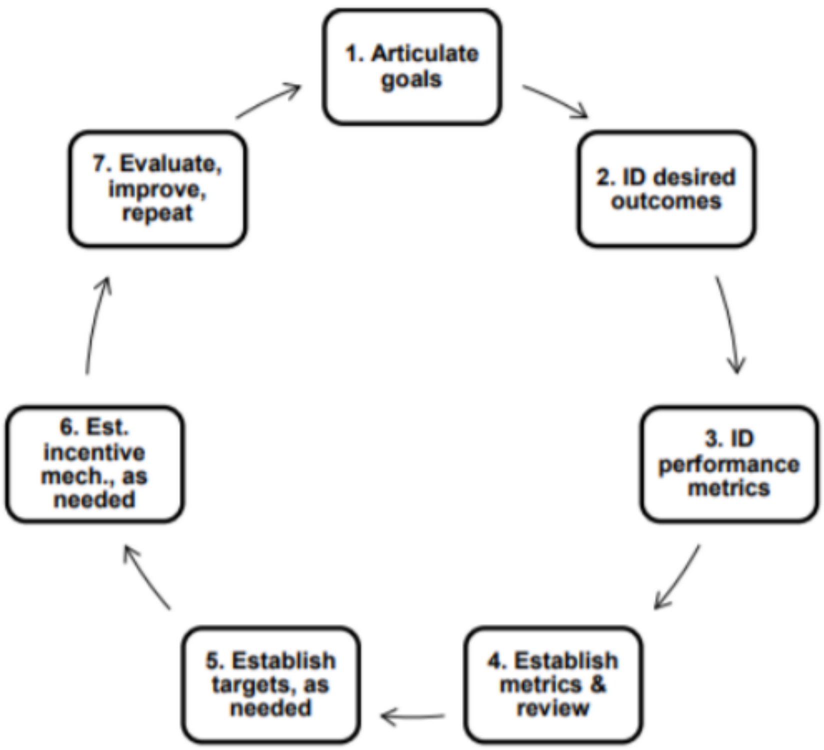
b. Establish metrics with targets / scorecard.

c. Establish performance incentive mechanisms.

5. Assess and adjust framework.
6. Track outputs and outcomes.
7. Evaluate, improve and repeat.

This sequence has much in common with the steps Minnesota used to develop performance metrics (Figure 4).[29] Both start with clear articulation of goals and end with evaluation.

Figure 4. Minnesota process for performance metric development



Source: Minnesota Public Utilities Commission, Docket No. E-002/CI-17-401, Order on January 8, 2019, establishing performance incentive mechanism process

The first steps for developing a PBR framework can use more explanation and emphasis.

Clearly Articulate Goals and Objectives = Define Desired Outcomes

Clear policy goals lead to clear metrics, incentives, and outputs, which are the basic building blocks of a successful PBR mechanism. Desired outcomes may flow from statute or be discerned from social and political discourse. This step of clear articulation of goals will focus the stakeholder process on priority outcomes and the utility activities that produce outputs that achieve those outcomes. For example,

[29] Minnesota Public Utilities Commission, Docket No. E-002/CI-17-401, Order on January 8, 2019, establishing performance incentive mechanism process. https://www.edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId=%7BF0E82E68-0000-CF1F-93DB-4CE874187020%7D&documentTitle=20191-148970-01

utility performance influences environmental outcomes (i.e., clean air, clean water, sound land use). A state may wish to motivate its utilities with rewards if they achieve certain environmental performance standards (i.e., the outputs).

The important first steps in creating a PBR framework are to identify, articulate and prioritize goals. Guidance in RCW 80.28.425 (1) and the "factors" identified in SB 5295 and here will likely guide the development of the goals or outcomes the Washington Commission is seeking.

- Equity.[30]
- Lowest reasonable cost planning.
- Affordability.
- Increases in energy burden.
- Cost of service.
- Customer satisfaction and engagement.
- Service reliability.
- Clean energy or renewable procurement.
- Conservation acquisition.
- Demand-side management expansion.
- Rate stability.
- Timely execution of competitive procurement practices.
- Attainment of state energy and emissions reduction policies.
- Rapid integration of renewable energy resources.
- Fair compensation of utility employees.

Understand Status Quo Incentives

Next, it's important to understand how well or poorly current or conventional regulation meets those goals in a business-as-usual scenario. An honest assessment is needed and is not trivial since it is a self-assessment of the status quo. Without understanding how the current system or the current state of regulation works, immediate consequences of new tools could be contradictory incentives.

Another way of looking at this step is to ask: How does the utility earn revenues now? What motivations or incentives are in place? Do these motivations support the outcomes and goals of the commission or legislature?

Identify Measurable Outcomes

After setting goals and identifying current incentives, it's important to develop measurable performance criteria that can show if the utility achieved the goals. Performance criteria are expressed as measurable outcomes. If the guiding goal is to make energy more affordable, the performance criterion could be to measure whether customer bills are declining. If the goal is to improve reliability, the performance criterion could be to measure whether customer outages have declined. Defining exactly what will be measured is the next step.

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[30] RCW 80.28.425 (1) ". . . In determining the public interest, the commission may consider such factors including, but not limited to, environmental health and greenhouse gas emissions reductions, health and safety concerns, economic development, and equity, to the extent such factors affect the rates, services, and practices of a gas or electrical company regulated by the commission."

Best practices for defining metrics includes stakeholder processes to bring forward ideas and data sources for metric development. The Minnesota PUC led an effective stakeholder process to develop several metrics listed in the Appendix.

Table 4 provides a few illustrative examples for how the factors identified in SB 5295 may lead to development of goals, outcomes and metrics.

Table 4. Illustrative Goals, Outcomes and Metrics Based on SB 5295

Goal	Outcome	Metric
Ensure equitable customer experience	Affordability	Reduced number of customers in arrears e.g., track number of customers in arrears by ZIP code against declining targets
Improve utility performance	Reliability Resilience	Reduced customer outages e.g., track SAIDI by ZIP code against declining targets
Advance the public interest	DER adoption	Increased adoption of DERs e.g., average total number of days to interconnect DERs

Assess and Adjust Framework

Once the full package of PBR components is determined, taking a holistic view of the range of likely outcomes is the next step. Modeling impacts of inflation, productivity adjustments, non-sales incentives to estimate a range of revenues can reveal any unintended or conflicting motivations. It is important to think through potential unintended consequences of the incentives that utilities are being given and to evaluate the mechanism over time to make sure that it is achieving the goals it has set out to achieve.

PBR framework example: Hawaii two-phase process

In late 2020, the Hawaii Public Utilities Commission approved a PBR framework after a robust multiyear stakeholder process driven by the need to meet two challenges: achieve aggressive clean energy goals and manage high costs. In Phase 1, the Commission established the following guiding principles to inform the development of the PBR framework:

- Customer-centric.
- Administrative efficiency.
- Utility financial integrity.

Phase 1 was also used to establish the Commission's expectations for specific PBR mechanisms that were to be developed in Phase 2. Table 5 shows those mechanisms.[31]

Table 5. Hawaii's comprehensive PBR framework to be developed in Phase 2

Revenue Adjustment Mechanisms	
Multiyear Rate Plan (MRP) with Indexed Revenue Adjustment	**5-Year Control Period** with **Externally-indexed Revenue Adjustment** allowing interim revenue changes pursuant to an indexed formula: **Annual Revenue Adjustment** = **(Inflation)** - **(X-Factor)** + **(Z-Factor)** - **Customer Dividend**
Earnings Sharing Mechanism (ESM)	Apply an **ESM** that provides both "upside" and "downside" sharing of earnings between the utility and customers when earnings fall outside a Commission-approved range
Major Project Interim Recovery (MPIR)	Examine the **MPIR adjustment mechanism** to determine how it can continue to provide relief for appropriate major projects during the MRP consistent with other approved PBR objectives and mechanisms
Revenue Decoupling and Existing Cost Trackers	Continue to utilize **revenue decoupling** (i.e., the Revenue Balancing Account) to true up revenues to an annual revenue target, and existing **cost tracking mechanisms** (e.g. PPAC, ECRC, etc.) to track and recover certain approved costs
Off-Ramps	Develop **off-ramp** mechanisms to provide for review of approved PBR mechanisms, pursuant to specified circumstances or conditions
Performance Mechanisms	
Performance Incentive Mechanisms (PIMs)	Implement a set of **PIMs** designed to help drive achievement of the following priority outcomes: *Interconnection Experience*; *Customer Engagement*; and *DER Asset Effectiveness*
Shared Savings Mechanisms	Develop **shared savings mechanisms** to address priority outcomes including *Grid Investment Efficiency* and *Cost Control*, mitigate capex bias, and reward pursuit of cost effective solutions to meet customer needs
Scorecards and Reported Metrics	Publish **Scorecards** with targeted performance levels to track progress against the priority outcomes of *Interconnection Experience, Customer Engagement, Cost Control,* and *GHG Reduction* and utilize **Reported Metrics** to highlight performance on the priority outcomes of *Affordability, Customer Equity, Electrification of Transportation, Capital Formation,* and *Resilience*

Source: Hawaii Public Utilities Commission. (2019, May 23). *Summary of Phase 1 Decision & Order Establishing a PBR Framework*

The resulting framework included two elements specifically for cost containment: a "customer dividend" that immediately reduced rates in 2021, and MYRPs. The MYRP design increased the interval between rate cases from three years to five years, with an annual revenue adjustment limiting revenue growth to inflation and returns on specially allowed expenditures minus earnings shared with customers. This containment of costs is coupled with PIMs where the utilities have the opportunity to increase earnings.

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31 Hawaii Public Utilities Commission. (2019, May 23). *Summary of Phase 1 decision & order establishing a PBR framework.* https://puc.hawaii.gov/wp-content/uploads/2019/05/PBR-Phase-1-DO-3-Page-Summary.05-23-2019.Final_.pdf

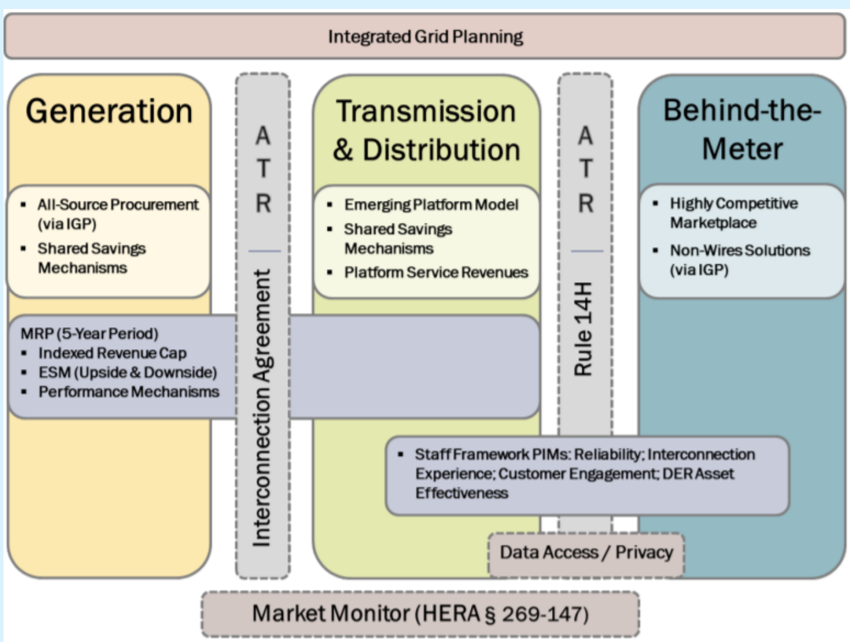
The commission approved a suite of complementary performance mechanisms in May 2021.[32] They include three PIMs with financial rewards and penalties for interconnection approvals, low-income energy efficiency and AMI utilization, and a total of 37 metrics for scorecards or reporting only categorized under 12 outcomes: affordability, capital formation, cost control, customer engagement, customer equity, DER asset effectiveness, electrification of transportation, greenhouse gas reduction, grid investment efficiency, interconnection experience, reliability and resilience.

To begin the metric design process, commission staff recommended five principles and design considerations based upon best practices from literature on the topic as well as input from parties. Staff also had recommendations for how the metrics should be presented, including the importance of using clear visuals to make them easy to understand, centralizing the data in an easy to access location, and keeping information up to date.[33]

The comprehensive nature of the Hawaii example for PBR frameworks is helpful to showing how all the components can fit together to achieve desired outcomes (see Figure 5[34]). The record also serves as a good resource of ideas for discrete components in the process, including:

- Robust stakeholder process.
- Thoughtful, rigorous design of incentives and rewards for PIMs.
- Strong connection between principles and goals and the resulting elements.
- Balance between cost containment and motivating PIMs.
- Inclusion of scenario modeling as final check in the overall design process.
- Visualization of how the existing and prospective regulatory landscapes integrate PBR with other policies and goals.

Figure 5. Hawaii PUC staff visualization of prospective regulatory landscape



Source: Hawaii Public Utilities Commission Staff. (2019). *Staff Proposal for Updated Performance-Based Regulations*

[32] Hawaii Public Utilities Commission, Docket No. 2018-0088, Decision and Order No. 37787 on May 17, 2021. https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A21E17B53226E00118

[33] Hawaii Public Utilities Commission Staff. (2019). *Staff proposal for updated performance-based regulations,* p. 40. https://puc.hawaii.gov/wp-content/uploads/2019/02/2018-0088-PBR-Staff-Proposal.pdf

[34] Hawaii Public Utilities Commission Staff, 2019, p. 101.

Options for Development of Washington's PBR Framework

SB 5295 articulates several requirements for approved utility rate cases. Highlights include:

- MYRPs for two-to-four-year duration as of January 1, 2022;
- Performance measures to assess gas and electric utilities operations under the MYRP;
- Earnings sharing mechanism where all revenues in excess of 0.5% greater than the allowed return are to be refunded to customers;
- Property approved in a MYRP is subject to refund if not used and useful by a specific date;
- Initial-year (Year One) used and useful property shall be valued ***as of the rate effective date.***

While these requirements go into effect, the UTC is also directed to develop a policy statement on PBR through a public process in 2022. Specifically, the policy statement must address performance measures and goals, targets, performance incentives, and penalty mechanisms.

The overlapping nature of events requires that the resulting framework for PBR will develop and evolve over time. The UTC has published a proposed work plan and schedule for its PBR proceeding for the purposes of developing the policy statement as well as a longer-term plan for examining PBR mechanisms and alternatives to cost-of-service ratemaking.

As the UTC embarks on the various pieces of its work plan, RAP offers the following general observations from best practices in other states as suggestions for the UTC and stakeholders to consider at various steps in the process.

- Articulate UTC goals and desired outcomes for PBR for gas and electric utilities informed by consideration of the 14 factors of SB 5295 plus any additional factors that stakeholders or commissioners offer. As discussed above, clear policy goals lead to clear metrics, incentives, and outputs, which are the basic building blocks of a successful PBR mechanism.
- Develop UTC and stakeholder understanding of the current state or status quo of incentives that motivate utility focus, including requirements for electric utilities from the Clean Energy Transformation Act and utility performance toward meeting those requirements. Understanding where there may be misalignment between existing incentives and articulated goals will help steer PBR design to the most productive areas. Inventorying the existing policies for each utility would include the following:
    - Fuel adjustment clauses and power costs.
    - Cost trackers.
    - Earnings sharing mechanisms.
    - Decoupling.
    - Shared savings mechanisms.
    - Clean Energy Transformation Act requirements including customer benefit indicators. For example, customer benefits indicators that equity advisory groups and utilities recently developed may inform performance metrics and/or data sources for

additional metrics.

- Any other regularly reported data or metrics.
- Any other policy requirements, such as energy efficiency achievement.

- Develop an understanding of how new SB 5295 prescriptions could interact with existing regulatory mechanisms. Are shortcomings in the existing regulatory approach sufficiently addressed by new SB 5295 requirements? Are new challenges identified that need to be further explored in the PBR proceeding?
- Identify priorities for PBR to address. With an understanding of whether the articulated goals are currently being met and given all the historical and new regulatory mechanisms affecting utility actions, what are the priority areas for performance metrics to address?
- Discuss and adopt some high-level principles for performance metric design. As discussed above, best practice argues that metrics should be:
    - Outcomes-based: track outputs or outcomes, not inputs.
    - Non-duplicative: avoid any overlap of reward or penalty for legal or regulatory requirements
    - Clear, measurable, and verifiable: base metrics on easy-to-acquire data that can be verified — or even collected — by a third party.
    - Evaluated regularly: revisit the effectiveness of metrics and incentives on regular intervals with the expectation that adjustments may be made.

- We offer the following practical advice regarding the development of performance metrics in the UTC's stakeholder process:
    - *Focus on reportable metrics* to start. As greater familiarity with the data grows, develop financial performance incentive mechanisms over time. Having a baseline of relevant data allows for greater confidence when setting utility targets and incentive or penalty levels.
    - Specific areas of focus to start could include *reliability, service quality, and whether the utility is investing properly in its system and operations*. It is important to set a "floor" for these areas, so that in its efforts to keep costs down, the utility doesn't endanger reliability, service quality and system investment. Initial metrics could evolve as the PBR framework development progresses.
    - *Stakeholder input* into performance metrics that measure achievement of the articulated outcomes is critical to a robust process.
    - A key task is to *narrow the list* of potential metrics to a manageable size that addresses Washington needs and where robust data sources are available. As many states have made significant progress in identifying and evaluating traditional as well as emerging metrics, there are many examples of metrics from which to collect ideas. Washington stakeholders will no doubt have additional metric ideas based on their understanding of the energy system and utilities, as well as their priorities for PBR.
    - Where data are currently lacking, develop a list of potential "future metrics" where new data sources are discovered and tracked for future reporting value.
    - For example, creating a list of ideas and data sources to track outside of a formal performance metric which may eventually become incorporated into metrics when better understood and clearly linked to performance.

Literature Review

Stakeholder Engagement and PBR Process Best Practices

Process for Purpose: Reimagining Regulatory Approaches for Power Sector Transformation (2019). RMI published this report to review emerging best practice and lessons learned from regulatory reform and grid modernization activities in states around the U.S., in light of new needs for collaborative approaches to stakeholder engagement and PUC leadership that address complex challenges of the utility and power system. https://rmi.org/insight/process-for-purpose/

Navigating Utility Business Model Reform: A Practical Guide to Regulatory Design (November 2018). RMI's report provides a menu of 10 options to guide policymakers as they work to modernize electric utilities. This guide was released in conjunction with a set of five case studies, which go into additional detail for how some of the reform options have been applied by select states and utilities, providing added insight into design options and lessons from past experience. https://rmi.org/insight/navigating-utility-business-model-reform/

Performance-Based Regulation Overviews

Reimagining the Utility: Evolving the Functions and Business Model of Utilities to Achieve a Low-Carbon Grid (January 2018). In this report, RMI reviews changing utility functions at the distribution level of the grid and associated options for how to evolve the utility market. It identifies key decision variables for regulators and utility reformers to consider and discusses implications of those decisions. https://rmi.org/wp-content/uploads/2018/01/reimagining_the_utility_report.pdf

Performance Incentives for Cost-Effective Distribution System Investments (2020). RAP produced a generic version of advice provided to a state PUC. This policy brief considers starting points for how to apply performance-based regulation and associated performance incentive mechanisms to distribution system investments by utilities. https://www.raponline.org/wp-content/uploads/2020/02/rap-littell-oreilly-shipley-PBR-distribution-system-2020-february.pdf

Protecting Customers from Utility Information System and Technology Failures (2019). RAP produced a policy brief analyzing how PBR can be applied to information systems (IS) and information technology (IT) investments by utilities. PBR for these investments can shift some of the risk to management and company shareholders and thus motivate utilities to deliver functionalities on time and on budget. If the system works well, for example by reducing peak through load shifting more than anticipated there should be room for higher utility earnings.https://www.raponline.org/wp-content/uploads/2019/09/rap_littell_shipley_oreilly_performance_regulation_information_technology_2019_september.pdf

Next Generation Performance Based Regulation (2017). RAP and the National Renewable Energy Laboratory (NREL) produced a three-volume series of reports on performance-based regulation theory and practice in the United States and internationally. The three-volume set has become a standard reference document in all PBR proceedings underway in the United States today. https://www.nrel.gov/docs/fy17osti/68512.pdf

North Carolina Energy Regulatory Process. (2020) This RAP/RMI work (referred to as the NERP report) focuses on how PBR, MYRP, and decoupling interact as a PBR framework. There are five sub-reports that capture the work and resulting recommendations. PBR is one of them: https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/PBR-Study-Group-Work-Products-FINAL.pdf

Performance-Based Regulation in a High Distributed Energy Resources Future (2016). Lawrence Berkeley Lab report reviews the advantages and disadvantages of how performance-based regulation may apply when there is high reliance on energy efficiency, peak load management, distributed generation and storage. https://eta-publications.lbl.gov/sites/default/files/lbnl-1004130.pdf

Performance-Based Regulation for EU Distribution System Operators (2014). This RAP report provides an overview of performance-based regulation (PBR) and addresses mechanisms that may be appropriate for consideration in Europe. Checks and balances are suggested as a mechanism is rolled out to ensure that societal goals are met and gaming of the mechanism is minimized. https://www.raponline.org/knowledge-center/performance-based-regulation-for-eu-distribution-system-operators/

Nevada Alternative Ratemaking Proceeding Concept Papers 1- 4. (2020). This Nevada Public Utilities Commission proceeding was informed by a series of concept papers developed by the PUC staff, RAP and RMI. Paper topics include development of goals and outcomes, reviewing existing regulatory structure, applicable alternative ratemaking mechanism, and minimum requirements, evaluation criteria and metrics for alternative ratemaking in Nevada. Papers and educational slide presentations are available on the Nevada PUC website. https://puc.nv.gov/Utilities/Electric/AlternativeRateMaking/

Performance Incentive Mechanisms

PIMs for Progress (2020). RMI's report reviews a selection of historical PIM examples and provides a simple taxonomy of the results to identify important lessons for future PIM development. Exploring why some PIM proposals are rejected by regulators and others are accepted, as well as what happens to PIMs after acceptance, the report arrives at lessons learned for how these regulatory tools can best be leveraged in a shifting electricity landscape. https://rmi.org/insight/pims-for-progress/

Metrics to Measure the Effectiveness of Electric Vehicle Grid Integration (2020). This RAP paper presents a road map for regulators as they integrate EVs. We first outline critical questions that regulators should ask, and then discuss how performance-based regulation can be used to facilitate EV integration. https://www.raponline.org/wp-content/uploads/2020/05/rap_littell_shipley_oreilly_metrics_measure_effectiveness_electric_vehicle_grid_integration_2020_may.pdf

Power Systems Resilience Metrics: A Comprehensive Review of Challenge and Outlook (2020). This journal article in *Sustainability* is a compilation of how resilience in power systems can be measured across categories of economic, social, geographic, and safety and health. This technical report shows the variety of resilience metrics that are used in power systems that may be applicable to measuring utility performance. https://www.mdpi.com/2071-1050/12/22/9698

Performance Metrics to Evaluate Utility Resilience Investment, Designing Resilient Communities: A Consequence-Based Approach for Grid Investment Report Series (2021). Synapse Energy Economics and Sandia National Laboratories provide guidance for development of resilience performance metrics and provide a range of examples and how they might apply to a jurisdiction. https://www.synapse-energy.com/sites/default/files/Performance_Metrics_to_Evaluate_Utility_Resilience_Investments_SAND2021-5919_19-007.pdf

Grid Modernization: Metrics Analysis (GNLEC1.1)- Resilience (2020). This paper is one of the of six papers through the Grid Modernization Laboratory Consortium Metrics Analysis project to focus on the characterization of the US electric grid across topics of reliability, sustainability, resilience, affordability, flexibility and security. Resilience: https://gmlc.doe.gov/sites/default/files/resources/GMLC1.1_Vol3_Resilience.pdf. Affordability: https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-28562.pdf. Reference document covering all six metric areas: https://www.researchgate.net/profile/David-Anderson-22/publication/326132108_Grid_Modernization_Metrics_Analysis_GMLC11_Reference_Document_Version_21/links/5b3aa4f90f7e9b0df5e8270d/Grid-Modernization-Metrics-Analysis-GMLC11-Reference-Document-Version-21.pdf

Multiyear Rate Plans

State Performance-Based Regulation Using Multiyear Rate Plans for U.S Electric Utilities (2017). Lawrence Berkeley Lab report explores multiyear rate plans and potential advantages over traditional rate regulation for strengthening cost containment and streamlining regulation. The report aims to assess regulators and stakeholders by explaining the rationale for MYRPs, critical design issues and presents case studies on their impacts. https://eta.lbl.gov/publications/state-performance-based-regulation

Multi-Year Rate Plans: Core Elements and Case Studies (2019). This Synapse Energy Economics report describes and gives examples of MYRPs, Formula Rate Plans, methods for escalating revenues during the MYRP, reconciling costs and implementing other related components. https://www.synapse-energy.com/sites/default/files/Synapse-Whitepaper-on-MRPs-and-FRPs.pdf

Decoupling

Revenue Regulation and Decoupling: A Guide to Theory and Application (with Case Studies) (2016). RAP produced a definitive guide on decoupling options and practices in the United States in 2016. The volume includes detailed case studies that highlight implementation options pursued in six different states. https://www.raponline.org/wp-content/uploads/2016/11/rap-revenue-regulation-decoupling-guide-second-printing-2016-november.pdf

State-Specific RAP Papers

Performance-Based Regulation Options: Published Paper for the Michigan Public Service Commission (2017). This paper, produced for the Michigan Public Service Commission, examines the characteristics of a well-designed PBR mechanism. A stable program time frame, robust oversight, clear goals and metrics, a transparent process, simple design, and effective evaluation and verification are key elements of a successful approach. The paper also explores lessons learned from the United Kingdom's RIIO (Revenues = Incentives + Innovation + Outputs) approach; outlines key considerations in designing a system of cost cap regulation; examines the relationship between performance incentive mechanisms and energy efficiency; and offers examples of how PBR can promote utility and customer innovation. https://www.raponline.org/knowledge-center/performance-based-regulation-options-white-paper-for-the-michigan-public-service-commission/

Recommendations for Ohio's Power Forward Inquiry (2018). This paper, written to inform the Public Utilities Commission of Ohio's "Power Forward" inquiry, is intended to examine options for modernizing the electricity grid and improving customer engagement. It explores some of the technological and regulatory innovations that could help Ohio achieve this grid modernization, particularly within the framework of performance-based regulation and alternative approaches to cost recovery and rate design. https://www.raponline.org/knowledge-center/recommendations-ohios-power-forward-inquiry/

Appendix A: Additional Examples

PIMs example: Hawaii performance metrics for reliability

Hawaii recently completed a multiyear and phased investigation into PBR where several new metrics and tools were designed, but the state also retained two reliability PIMs for System Average Interruptions Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI).[35]

SAIFI is a measure of the average frequency of outages, defined as the annual total number of customer interruptions divided by the total number of customers served. SAIDI is a measure of the average duration of outage, defined as the sum of all customer interruption durations (in minutes) divided by the total number of customers served.[36] For each measure, a 10-year performance baseline, target, deadband and penalty value were assigned. For example, for SAIFI, the 2009-2018 record of historical performance data was used to establish the performance target of 1.435 interruptions per customer during one year with a deadband of ± 0.212 interruptions (1 standard deviation). Penalties for greater than 1.647 interruptions per customer were set at 0.20% of the common equity share of approved average test year rate base, authorized from the most recent rate case for each company.

Equity metrics example: Minnesota performance metrics development process

A greater focus on equity in energy is emerging, and the design of performance metrics can help track measurable progress. Table 6 lists all the outcomes and metrics the Minnesota PUC adopted for Xcel Energy in 2019.[37] Equity is not a separate outcome category, but it is embedded within outcome areas and was specifically discussed within the order adopting these measures[38] starting with affordability. The Commission noted that "affordability is a key indicator of equity" and the four metrics adopted under affordability were thought to collectively address equity. Additionally, the Commission also addressed equity by directing Xcel and stakeholders to propose metrics for reliability and customer service quality, which could include geography, income, or other benchmarks relevant to reliability. During development of the metrics, lack of appropriate data was raised as a barrier to implementing metrics and further collaboration was needed. The Commission also directed parties to develop a metric to measure workforce and community development impact.

In April 2020, the Commission approved three equity metrics. Two address equity in reliability by 1) location, and 2) income by mapping SAIFI by ZIP code, overlayed with

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[35] Hawaiian Electric. (2021). *Performance incentive mechanism provision: Maui, Lanai, and Molokai Divisions.* https://www.hawaiianelectric.com/documents/billing_and_payment/rates/maui_electric_rates_molokai/molokai_rates_pim.pdf

[36] SAIFI and SAIDI measured performance and performance targets are based on transmission and distribution outages and are determined using the IEEE Standard 1366 methodology as adjusted to normalize events.

[37] Minnesota Public Utilities Commission, Docket No. E-002/CI-17-401, Order on September 18, 2019, establishing performance metrics. https://www.edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId=%7B0082456D-0000-CA1F-9241-23A4FFF7C2FB%7D&documentTitle=20199-155917-01

[38] Minnesota Public Utilities Commission, September 18, 2019.

census income data. The third equity metric is customer service quality by geography, income, or other relevant benchmarks. This metric also overlays census income data with geographic data to provide the number of customer complaints.[39]

Table 6. Desired outcomes and associated metrics for Xcel Energy

OUTCOME	METRIC CALCULATION
Affordability	• Rates per kWh based on total revenue, reported (1) by customer class and (2) with all classes aggregated • Average monthly bills for residential customers • Total arrearages for residential customers • Total disconnections for nonpayment for residential customers
Reliability	• System Average Interruption Duration Index (SAIDI) • System Average Interruption Frequency Index (SAIFI) • Customer Average Interruption Duration Index (CAIDI) • Customers Experiencing Long Interruption Duration (CELID) • Customers Experiencing Multiple Interruptions (CEMI) • Average Service Availability Index (ASAI) • Momentary Average Interruption Frequency Index (MAIFI) • Locational reliability • Power quality • Equity — reliability by geography, income, or other relevant benchmarks
Customer service quality	• Existing multi-sector metrics, including ACSI [American Customer Satisfaction Index] and J.D. Power • Commission-approved utility-specific survey • Subscription to third-party customer satisfaction metrics • Call center response time • Billing invoice accuracy • Number of customer complaints • Equity metric — customer service quality by geography, income, or other relevant benchmarks

[39] Xcel Energy. (2021, April 30). *Annual report.* Compliance filing in Minnesota Public Utilities Commission Docket No. E002/CI-17-401. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={D05E2479-0000-C71A-9A90-2F3283EF01A6}&documentTitle=20214-173702-01

Environmental performance	• Total carbon emissions by (1) utility-owned facilities and PPAs [power purchase agreements] and (2) all sources • Carbon intensity (emissions per MWh) by (1) utility-owned facilities and PPAs and (2) all sources • Total criteria pollutant emissions • Criteria pollutant emission intensity (criteria pollutant emissions per MWh) • CO_2 emissions avoided by electrification of transportation • CO_2 emissions avoided by electrification of buildings, agriculture, and other sectors
Cost-effective alignment of generation and load	• Demand response, including (1) capacity available (MWh) and (2) amount called (MW, MWh per year) • Integration of customer loads with utility supply, including: 1. Amount of demand response that shapes customer load profiles through price response, time varying rates, or behavior campaigns 2. Amount of demand response that shifts energy consumption from times of high demand to times when there is a surplus of renewable generation 3. Amount of demand response that sheds loads that can be curtailed to provide peak capacity and supports the system in contingency events 4. Metrics that measure the effectiveness and success of items 1 to 3, individually and in aggregate