Performance Indices

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Outline

- Terminology and context
- Areas of performance that warrant performance indices (aka metrics)
- Types of metrics
- Principles for designing metrics
- Example metrics in other states
- Reporting of metrics
- Performance-based regulation
  - Rationale
  - Comparison to traditional cost of service ratemaking
  - Multi-year rate plans
  - Performance incentive mechanisms
- Resources for further research

Please ask questions at any point

Terminology

Metrics

- Information reported regularly to allow utilities, regulators, and stakeholders to monitor utility performance over time. Utilities regularly report metrics to regulators in many states.
- aka performance indices

Targets

- Goals set by regulators for specific levels of performance to be achieved by utilities
- aka scorecards

Incentives

- Rewards (or penalties) for achieving (or not achieving) targets

Performance incentive mechanisms (PIMs)

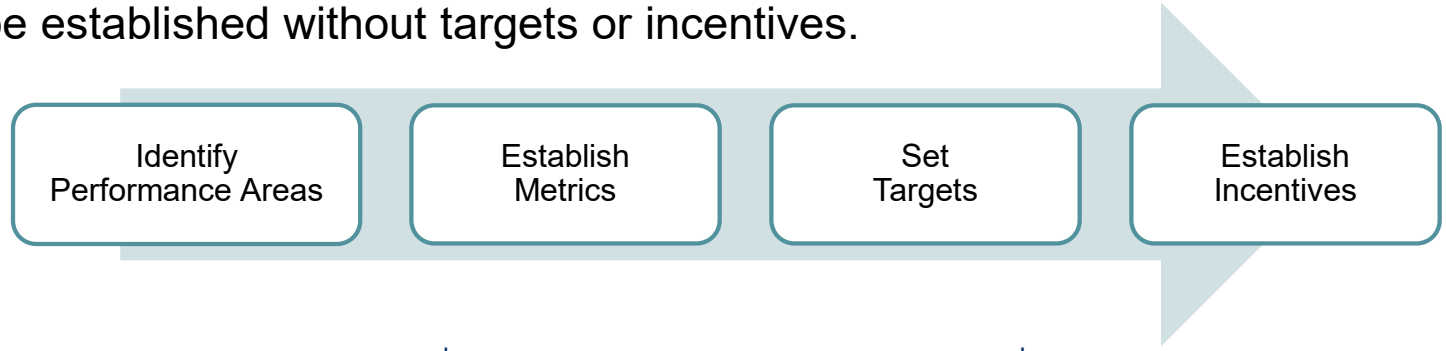
- Typically refers to the set of metrics, targets and incentives applied to utilities

Performance-based regulation

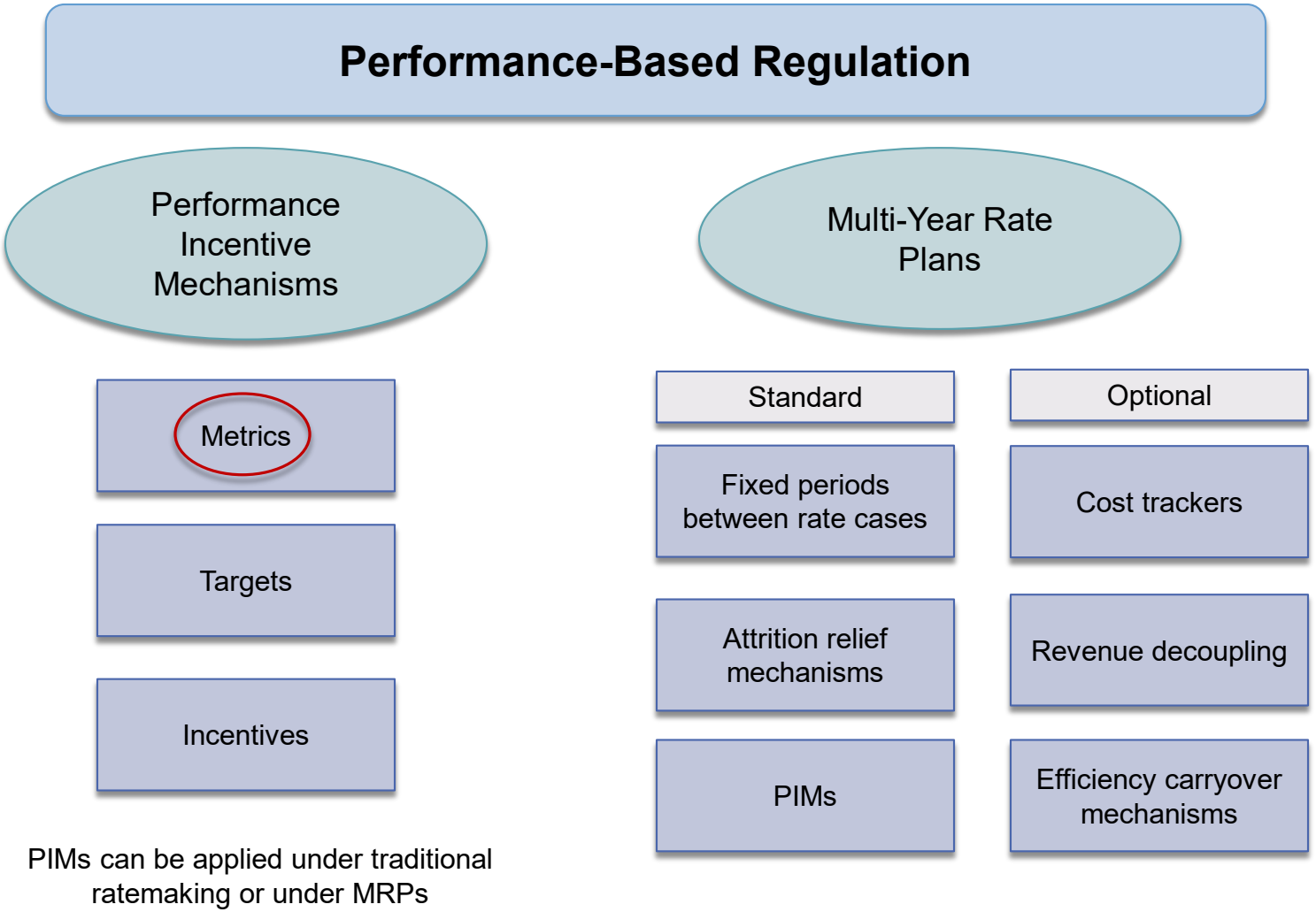
- A holistic approach to providing utilities with incentives aligned with performance goals
- Includes multi-year rate plans (MRP)
- Also includes PIMs

Relationships Between Metrics, Targets, and Incentives

- Performance areas (see slide 8)
- Metrics
  - Provide guidance regarding the areas of performance that warrant monitoring
  - Provide the foundation for targets and incentives
- Targets
  - Provide more regulatory guidance by establishing specific levels of performance
  - Provide the foundation for incentives
- Incentives
  - Provide financial motivation and therefore are more effective at changing utility behavior
  - But can cause greater risks to customers (from rewards) and utilities (from penalties)
- These can be established in sequence, or metrics can be established without targets or incentives.



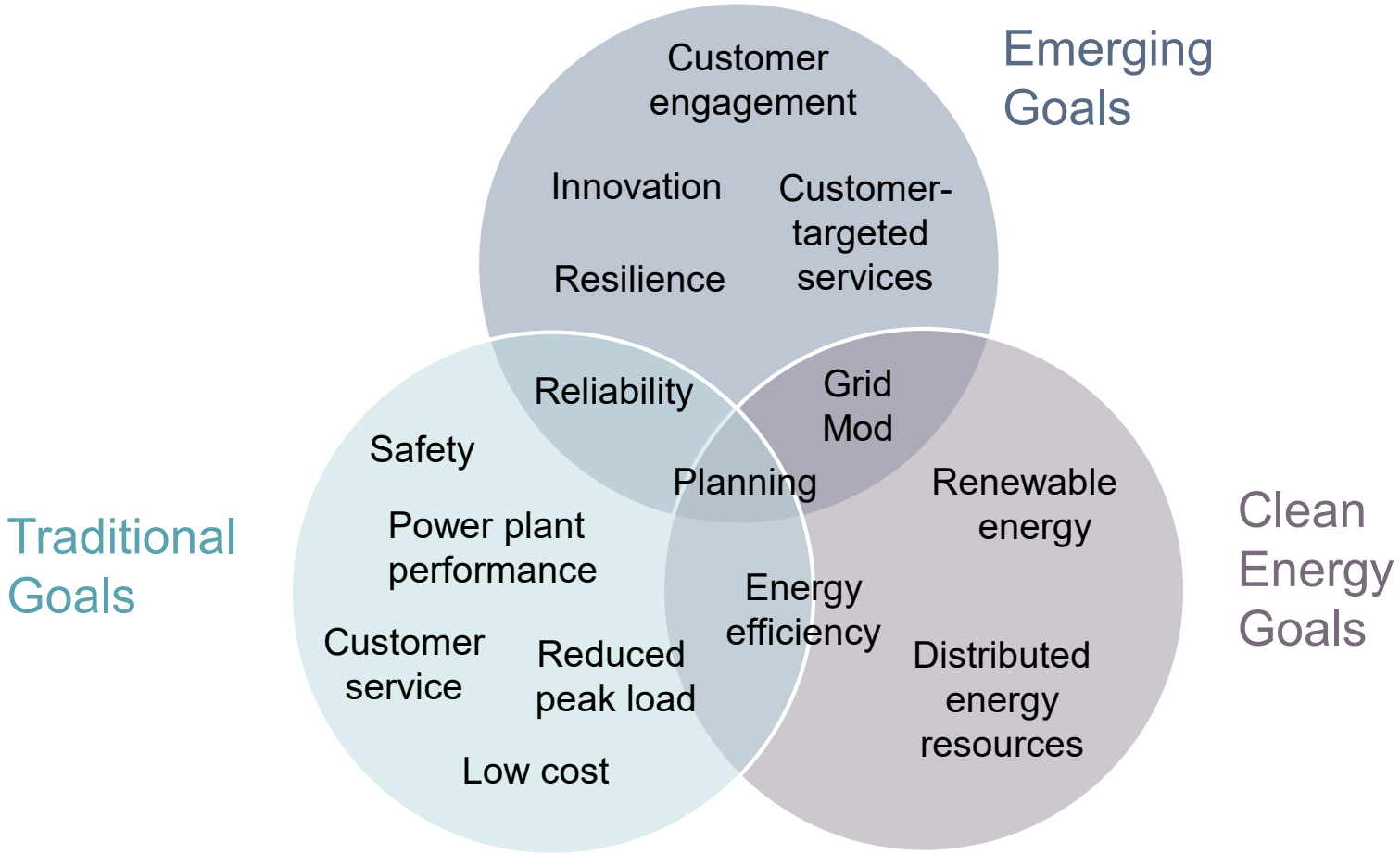
Relationships Between PBR, PIMs, and MRPs



Identifying Areas of Performance That Warrant Attention

Dimensions of Utility Performance

Performance areas that might warrant metrics, depending upon goals



Performance Areas: Existing Regulatory Incentives

Identifying areas of performance that metrics can address should include an assessment of existing regulatory incentives.

- Does the utility have some form of multi-year rate plan?
  - Does it create pressure to reduce customer services? If so, how?
- Does the utility have an incentive to increase sales?
  - In other words, is there a revenue decoupling mechanism to break the link between sales and revenue?
- Does the utility have sufficient incentive to operate power plants efficiently?
- Does the utility have sufficient incentive to meet reliability goals?
- Does the utility have the proper incentive to procure cost-effective power from independent power producers?
- Does the utility have the proper incentive to implement grid modernization?
- Does the utility have the proper incentive to enable distributed energy resources (DERs), including cost-effective non-wires alternatives?

Performance Areas: Recent Utility Performance

Identifying targeted areas of performance for metrics should start with an assessment of recent performance regarding traditional utility responsibilities.

- Have costs and rates been increasing rapidly?
  - What are the causes (e.g., rising fuel costs, peak demand growth, load growth, aging infrastructure)?
- Have there been excessive or increasing outages?
  - Where have they mostly occurred (e.g., generation, transmission, distribution)?
  - What have been the leading causes (e.g., vegetation, animals, equipment failure, storms)?
- Have generators been operating efficiently?
  - Forced outages, excessive maintenance, capacity factors, aging equipment?
- Has the utility been receiving excessive or increasing customer complaints?
  - For which services? What are the complaints about?

Performance Areas: Address Regulatory Goals

Identifying targeted areas of performance for metrics should also include an assessment of current and emerging regulatory goals.

- What are the critical regulatory goals in your state?
  - Low costs and reasonable rates?
  - Reliability?
  - Resilience?
  - Replacing aging infrastructure?
  - Grid modernization?
  - Quality of service?
  - Customer equity?
  - Customer empowerment?
  - Animating markets for third-party developers or service providers?
  - Distributed energy resources?
  - Others?

Example Goals & Priority Outcomes: Connecticut

The Connecticut Public Utility Regulatory Authority is conducting PBR workshops. These goals and outcomes were developed after lengthy stakeholder discussions.

Goals	Priority Outcomes
Excellent Operational Performance	Efficient business operations
	Comprehensive system planning
	Distribution system utilization
	Reliable and resilient service
Public Policy Achievement	Social equity
	Reduction of greenhouse gases (GHG)
Customer Empowerment and Satisfaction	Customer empowerment
	Quality customer service
Reasonable, Equitable, & Affordable rates	Affordable service

Source: PURA Investigation into PBR, Docket No. 21-05-15, March 17, 2023.

Example Goals & Priority Outcomes: Hawaii

The Hawaii PUC recently conducted PBR workshops. These goals and outcomes were developed after lengthy stakeholder discussions.

Goals	Priority Outcomes
Enhance Customer Experience	Affordability
	Reliability
	Interconnection experience
	Customer engagement
Improve Utility Performance	Cost control
	DER asset effectiveness
	Grid investment efficiency
Advance Social Outcomes	Capital formation
	Customer equity
	GHG reduction
	Electrification of transportation
	Resilience

Source: Hawaii Public Utilities Commission, Instituting a Proceeding to Investigate PBR, Docket No. 2018-0088, Decision and Order No. 36326, May 23, 2019.

Types of Metrics

Three Types of Metrics

1. Outcome-Based Metrics
   - Regulators define a desired outcome (e.g., reduce customer bills).
   - The utility has the responsibility to determine how to achieve the outcome.
   - Regulators do not specify programs or actions to achieve the outcome.
2. Program-Based Metrics
   - Address current or new programs (e.g., energy efficiency programs)
   - Address program designs (e.g., participation in efficiency programs)
3. Action-Based Metrics
   - Address specific actions utilities can take to achieve desired outcome (e.g., improve marketing, outreach, and customer education on energy efficiency programs)

There are advantages and challenges associated with each type.

Outcome-Based Metrics

ADVANTAGES	CHALLENGES	BEST APPLICATIONS
• Directly tie to regulatory goals • Focus on desired outcome • Flexible and promotes utility innovation • Relatively easy to measure • Do not require extensive planning processes or oversight	• Determining appropriate targets can be challenging. • Some outcome-based metrics require establishing counterfactual baselines, which can be contentious. • It may be difficult to determine whether the outcome was the result of utility action or due to other factors. • Costs associated with utility efforts to meet the target may not be readily known, hindering the ability to ensure that utility actions are cost-effective.	• Well-suited for measuring specific, high-level regulatory outcomes • Examples: improved reliability, improved resilience, reduction in peak demand, reduction in energy demand, reduction in criteria air pollutant emissions

Program-Based Metrics

ADVANTAGES	CHALLENGES	BEST APPLICATIONS
• Provide clear regulatory guidance about important programs • Programs typically must pass cost-effectiveness tests, so there is greater certainty regarding net benefits. • Well-established programs provide a wealth of data useful for determining baselines and measuring performance.	• If metrics will apply to a new, rather than an existing program, substantial resources may be needed for program development. • Setting metric targets and baselines might be difficult in cases where there is little experience to draw from. • Many energy efficiency and demand response programs have established measurement and verification practices. Other utility programs may require development of additional methodologies.	• Most appropriate where programmatic processes, regulatory oversight, and measurement and verification protocols already exist or are worth establishing • Examples: energy efficiency and demand response programs, vegetation management programs

Action-Based Metrics

ADVANTAGES	CHALLENGES	BEST APPLICATIONS
• Relatively simple to develop and administer • Performance easily measured • Costs can be estimated and approved in advance	• It can be difficult to determine whether the action helped achieve the desired outcome or broader regulatory goal. • Cost-effectiveness is uncertain when benefits are not quantifiable.	• Best when the ultimate outcome might be beyond the utility's control, but utility action is deemed important for achieving that outcome (e.g., improved consumer consumption patterns) • Examples: Advanced Metering Infrastructure (AMI) deployment along with roll-out of time-varying rates

Principles for Designing Metrics

Principles for Designing Metrics (I)

Principle	Description
Clearly defined	There should be a description of the performance metrics and methodology for quantifying them, including data definitions and formulas. Definitions should be unambiguous to avoid confusion.
Comparable	Metrics should have applicable baselines for measuring performance. Baselines can be relative to past performance, other peer utilities, or future targets.
Available	Metrics should be available, obtainable, and updatable without substantial difficulty. If data are important but not readily available, the utility should start collecting the data so it will be available for use in the future.
Control	Metrics should address outcomes over which the utility has some degree of control. Metrics should avoid performance areas that are heavily influenced by exogenous factors.

Source: Synapse, Utility Performance Incentive Mechanisms: A Handbook for Regulators, for the Western Interstate Energy Board, 2015.

Principles for Designing Metrics (II)

Principle	Description
Easily interpreted	Metrics should be easy for all stakeholders to understand. Naming conventions should be intuitive, calculations should be transparent, and definitions should be memorable. Metrics should be as objective as possible to avoid misinterpretation.
Easily verifiable	Metrics should be designed to allow for easy evaluation and verification. Metrics that require complex data collection or analysis techniques make review and interpretation more difficult, increase costs, and can lead to manipulation.
Tied to goals	Metrics should be designed to help regulators and others understand the degree to which goals are being achieved.
Incentives	Metrics should focus on outcomes that utilities have insufficient or imbalanced incentives for. Metrics can help motivate utilities to attend to performance areas that are insufficiently incentivized by the rest of the regulatory framework.
Benefits	Metrics should focus on outcomes that are expected to result in net benefits for customers.

Source: Synapse, Utility Performance Incentive Mechanisms: A Handbook for Regulators, for the Western Interstate Energy Board, 2015.

Example Metrics

Traditional Performance Areas

Performance Area		Purpose
	**Reliability**	The provision of reliable service to all customers
	**Employee Safety**	Maintaining safety standards for utility employees
	**Public Safety**	Maintaining safety standards for customers and the general public
	**Customer Satisfaction**	The provision of adequate levels of customer service
	**Plant Performance**	The performance of specific generation resources
	**Costs**	The cost of providing energy services to customers

Reliability

Performance Area	Indicator	Metric
Reliability 	System Average Interruption Duration Index (SAIDI)	Total customer minutes of sustained interruptions / total number of customers
	System Average Interruption Frequency Index (SAIFI)	Total number of customer interruptions / total number of customers
	Customer Average Interruption Duration Index (CAIDI)	Total number in customer interruptions / number of customers affected by the interruptions
	Customer Average Interruption Frequency Index (CAIFI)	Total customer minutes of sustained interruptions / number of customers affected by the interruptions
	Average Service Availability Index (ASAI)	Total number of customer hours that service was available during a given time period / the total customer hours demanded.

There are many additional options for reliability indicators.
Reliability indicators can be applied for the whole system or at the circuit level.

Safety

Performance Area	Indicator	Metric
Safety 	Employee work-related deaths, injuries, and illnesses	Number of work-related deaths, days away from work, job transfers or restrictions, and other recordable injuries and illnesses / Employee hours worked
	Time away from work, job transfers, or restrictions due to work-related incidents	Number of work-related days away from work and job transfers or restrictions / Employee hours worked
	Time away from work due to work-related incidents	Number of work-related days away from work / Employee hours worked

Customer Satisfaction

Performance Area	Indicator	Metric
Customer Satisfaction 	Residential customer satisfaction	Electric Utility Residential Customer Satisfaction Index
	Business customer satisfaction	Electric Utility Business Customer Satisfaction Index
	Transaction surveys	% of customers satisfied with recent transaction with the utility
	Customer complaints	Rate of formal complaints to the Commission
	Order fulfillment	Speed with which orders are fulfilled
	Missed appointments	% of appointments met
	Call center answer speed	% of calls answered within 30 seconds

Power Plant Performance & System Costs

Performance Area	Indicator	Metric
Power Plant Performance 	Fuel usage	Quantity of fuel burned
	Heat rate	Average BTU per kWh net generation (heat rate)
System Costs 	Capacity costs	Cost per kW of installed capacity
	O&M costs	O&M expenses per net kWh
	Fuel costs	Average cost of fuel per kWh generation and per Million BTU; total fuel costs
	Effective resource and grid planning	Numerous metrics regarding incorporation of stakeholder input, consideration of all relevant solutions, use of appropriate assumptions and modeling tools, etc.

Emerging Performance Areas

Performance Area		Purpose
	**System Efficiency**	To indicate the extent to which the utility system is being operated efficiently
	**Customer Empowerment**	To indicate the extent to which customers are participating in demand-side programs or installing demand-side technologies
	**Network Support Services**	To indicate the extent to which customers and third-party service providers have access to networks
	**Environmental Goals**	To indicate the extent to which the utility and its customers are reducing environmental impacts

Emerging Areas: System Efficiency

Performance Area	Indicator	Metric
System Efficiency 	Load factor	Sector average load / sector peak load
		Monthly system average load / monthly system peak load
	Power plant efficiency	System average heat rate (system average BTU per kWh net generation)
		Equivalent forced outage rate = Equivalent Forced Outage Hours / (Period Hours – Equivalent Scheduled Outage Hours)
		Equivalent forced outage rate demand. Measures the probability that a unit will not meet its demand periods for generating requirements because of forced outages or deratings*
		Weighted equivalent availability factor*
	Flexible resources	MW of fast ramping capacity (load following resources capable of 15-minute ramping and regulation resources capable of 1-minute ramping)
	System losses	Total energy losses / MWh generation, excluding station use

Emerging Areas: Customer Engagement

Performance Area	Indicator	Metric
Customer Engagement 	Energy efficiency	Number and % of customers enrolled per year, by sector
		Potential and actual energy savings (MWh) and peak demand savings (MW)
	Demand response	Number and % of customers enrolled per year, by sector
		Potential and actual peak demand savings (MW)
	Distributed generation	Number of installations per year, number of customers by sector
		Installed capacity (MW) and energy (MWh) produced
	Storage	Number of installations per year, number of customers
		kWh installed by customer sector (residential, commercial, industrial)
		Percent enrolled in utility programs
	Electric vehicles	Number of customers owning EVs
		Percent enrolled in time-varying rates
	Usage information	Number of customers able to access hourly usage data on a daily basis via the internet
	Time-varying rates	Number of customers on time-varying rates

Emerging Areas: Network Support Services

Performance Area	Indicator	Metric
Network Support Services 	Advanced metering	Number and % of customers with AMI
		Energy served through AMI
	Distributed resource interconnection	Average number of days to interconnect distributed generation and storage
	Interconnection of renewable resources for bulk power system	Speed of turn-around of OATT studies
	Third party devices	Open and interoperable smart grid infrastructure that facilitates third-party devices
	Provision of customer data	Customers able to authorize third-party access electronically
		Percent of customers who have authorized third-party access
		Third-party data access at same granularity and speed as customer data access

Emerging Areas: Environmental Goals

Performance Area	Indicator	Metric
Environmental Goals	Criteria pollutants	Tons SO_2 / MMBtu
		Tons NO_x / MMBtu
	Carbon emissions	Tons CO_2 / MMBtu
	Carbon intensity	Tons CO_2 / customer
	System carbon emission rate	Tons CO_2 / MWh sold
	Fossil carbon emission rate	Tons CO_2 / MWh fossil generation
	Fossil generation	Percent of total generation served by fossil fuels
	Renewable generation	Percent of total generation served by renewable resources

Source: Hawaii Public Utilities Commission, Instituting a Proceeding to Investigate PBR, Docket No. 2018-0088

Example Metrics: Hawaii

Performance Area	Name	PIM	Target	Metric
Affordability	Disconnections			y
	LMI energy burden			y
	Payment arrangement			y
Capital Formation	Credit rating			y
	Third-party generation			y
Cost Control	Annual revenue growth			y
	Conjunctive cost control	y		
	ECRC Fossil Fuel SSM	y		
	EPRM	y		
	Non-ARA components		y	
	O&M cost per customer			y
	Rate base per customer			y
	RFP - Stage 1	y		
	RFP - Stage 2	y		
Customer Engagement	AMI opt-out			y
	Green button connect		y	
	Green button download		y	
	Program participation		y	
	TOU participation		y	
Customer Equity	LMI - participation (metric)			y
	LMI EE – energy	y		
	LMI EE – participation	y		
	LMI EE - peak	y		
Customer service	Call Center Performance	y		
DER Asset Effectiveness	Advanced grid services	y		
	AMI utilization PIM	y		
	Demand Response Launch	y		
	DER curtailment			y
	DER grid services capability			y
	DER grid services enrollment			y
	DER grid services utilization			y
	GSPA penalty	y		

Performance Area	Name	PIM	Target	Metric
Electrification of Transport	Estimated EV load (energy)		y	y
	EV count		y	y
	Fleet electrification		y	y
	Measured EV load (demand)		y	y
	Measured EV load (energy)		y	y
	Ride share fueling hubs			y
GHG Reduction	Fossil fuel retirement	y		
	GHG emissions		y	y
	GHG intensity		y	y
	RE Guaranteed COD	y		
	RE Project completion	y		
	RE Project milestone completion	y		
	RPS-A	y		
Grid Investment Efficiency	Avoided T&D investment			y
	NWA total cost			y
Interconnection Experience	Interconnection approval	y	y	y
	Interconnection cost overrun			y
	IPP experience		y	y
	IPP interconnection			y
	Total interconnect time		y	y
	Truck roll response time		y	y
Resilience	Critical load			y
	Emergency response training			y
	NIMs certification			y
Reliability	Generator reliability	y		
	SAIDI	y		
	SAIFI	y		

More Example Metrics

- Residential service installation timeliness (District of Columbia)
- Total arrearages for residential customers (Minnesota)
- O&M costs (Alabama)
- Billing invoice accuracy (Minnesota)
- Power quality complaints received and how addressed (District of Columbia)
- Number of outages lasting more than 24 hours (District of Columbia)
- Customers experiencing multiple interruptions (Minnesota)
- Customers accessing energy usage portals (Illinois)
- Cost reductions through reduced transmission constraints (Connecticut)
- Line loss reductions (Illinois)
- AMI network performance (New Jersey)
- AMI implementation (New York)
- Installed energy storage capacity (Rhode Island)

Source: Synapse internal data base of utility metrics

Reporting of Metrics

Reporting of Metrics

Good reporting practices are essential to enable regulators and others to monitor utility performance and achieve the goals of the metrics.

- Reporting practices should be established as early as possible.
  - Practices should be consistent across regulated utilities.
  - Stakeholder engagement should inform the development of reporting requirements.
- All metrics should be reported at least annually.
  - Some metrics should be reported quarterly or mid-year to allow for more real-time review.
- Regulatory review of metrics
  - The process and goals for regulatory review should be established as early as possible.
  - Review can be streamlined — e.g., reserve detailed review for poor performance.
    - Especially for quarterly or mid-year reviews
  - Annual review of metrics should include opportunities for modifying or updating metrics.
  - Stakeholder input should be allowed as part of the review process.
- Dashboards can be used to make information easily accessible.
  - Especially when there are a lot of metrics and information

Dashboards

Dashboards provide a way for regulators and stakeholders to easily view a large volume of utility performance data. Dashboards should be:

Accessible	• Performance data should be presented on a publicly-accessible website. • Performance data should be downloadable in spreadsheet form.
Clear and concise	• Clear and relevant graphics should be used. • Performance targets should be indicated. • An explanation of how the metric was calculated should be included.
Comprehensive	• Data for all metrics applied to the utility should be included.

Example: Puerto Rico – Metrics Background

The Puerto Rico Electric Power Authority (PREPA) is a publicly-owned utility serving the entire island.

- For many years it had little to no regulatory oversight, leading to very high costs, very high rates, and very poor performance.

The Puerto Rico Electricity Bureau (PREB) was recently created to provide regulatory oversight.

- Because PREPA is publicly-owned, PREB has limited options for influencing performance.
  - There are no shareholders to whom rewards or penalties can be applied.
- Therefore, performance metrics for PREPA are critical for assessing utility operation, measuring progress, and promoting transparency.

PREPA began reporting performance metrics required by PREB in 2019.

- LUMA was hired by PREPA in 2021 to manage and operate the T&D system.
- LUMA will soon be subject to performance metrics, as well.

PREB opened two proceedings on PIMs.

- For creating metrics for PREPA and LUMA (NEPR-MI-2019-0007)
- For setting performance targets and incentives for LUMA (NEPR-AP-2020-0025)

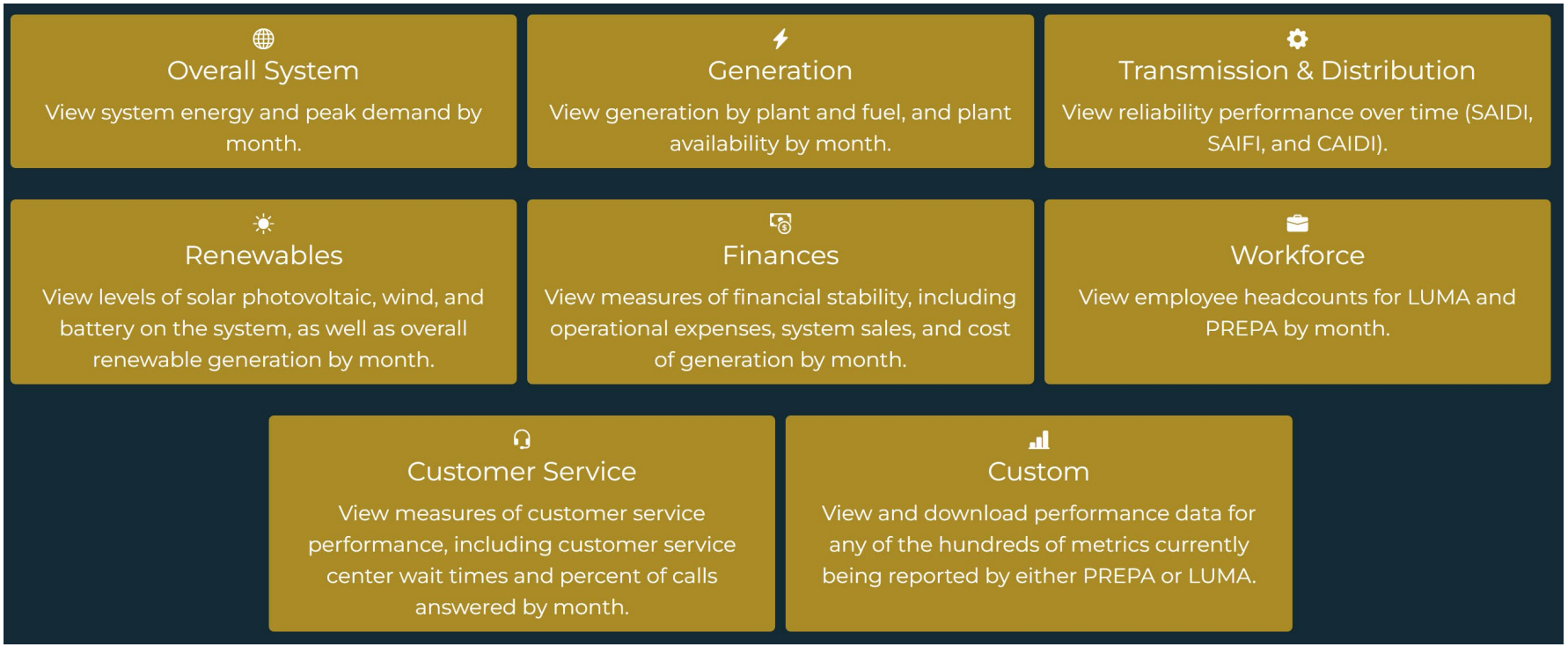
Example: Puerto Rico – Summary of Metrics

Metric Category	Reporting Party	Examples of Metrics
Customer Service	LUMA	Average speed of answer, wait time in customer service centers
Finance	LUMA, PREPA	Capital expenses vs. budget, days sales outstanding
Fleet	LUMA, PREPA	Fleet out of service, total available vehicles in service
Fuel	LUMA, PEPA	MMBTU consumed, average fuel price vs. forecast price
Generation	LUMA, PREPA	Cost of generation per customer, technical losses as % of net generation
Human Resources	LUMA, PREPA	Turnover rate, absenteeism
Overall System	LUMA	Monthly sales peak, percent of customers on AMI
Planning and Environmental	PREPA	Carbon intensity of fossil generation, timeliness of permitting
Reliability	LUMA	SAIDI, SAIFI
Renewable Energy and Demand Side Management	LUMA	Number of curtailed hours from Renewable Portfolio Standard-eligible capacity, total installed BESS capacity
Safety	LUMA, PREPA	OSHA recordable rate, OSHA severity rate
Warehousing	LUMA	Inventory turns, inventory value

Example: Puerto Rico Dashboard – Home Page

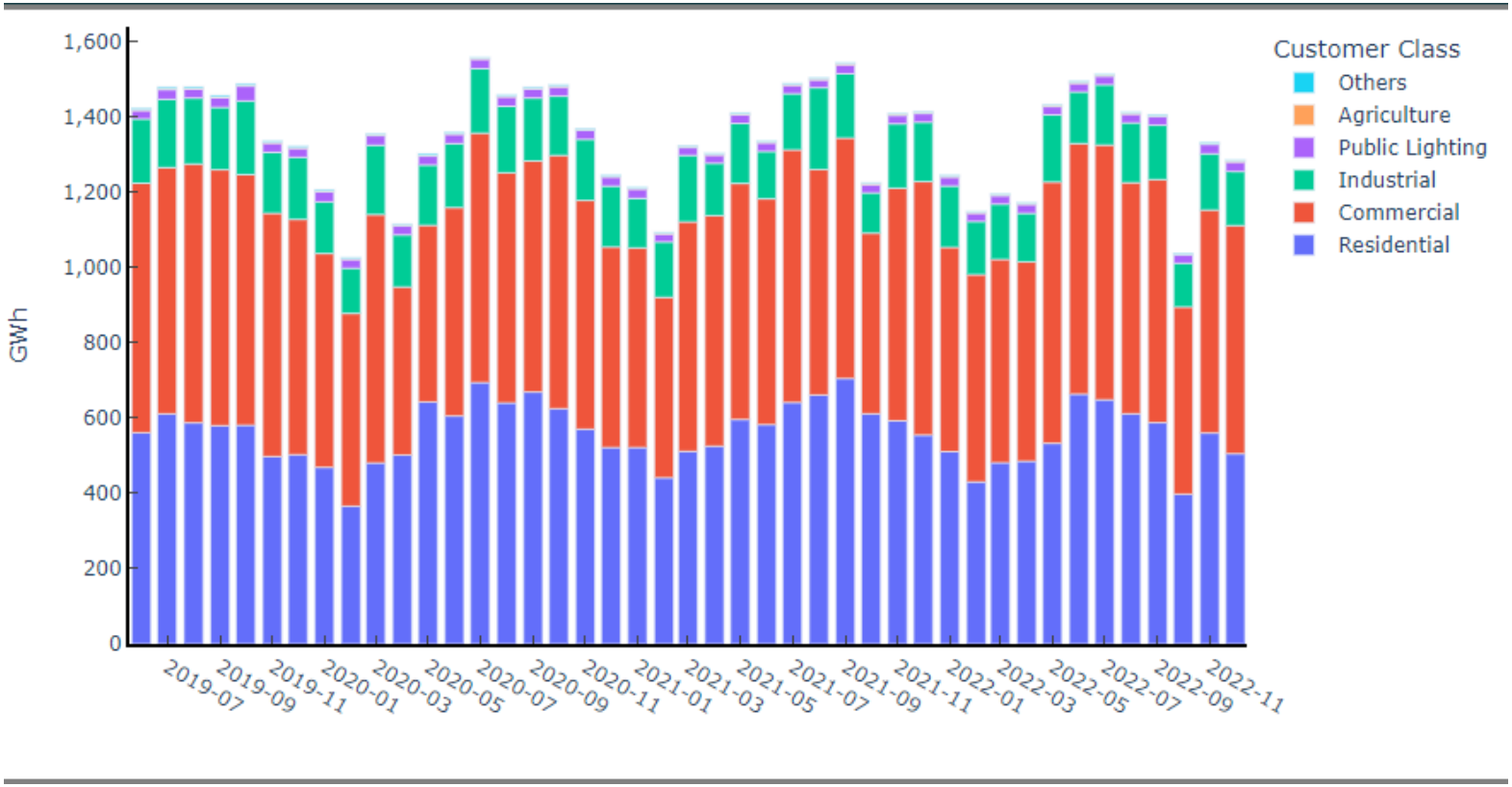
PREB plans to publish its online metrics dashboard in spring 2023.

The dashboard will provide easy access to PREPA's and LUMA's performance data, in graphical format, in both Spanish and English.



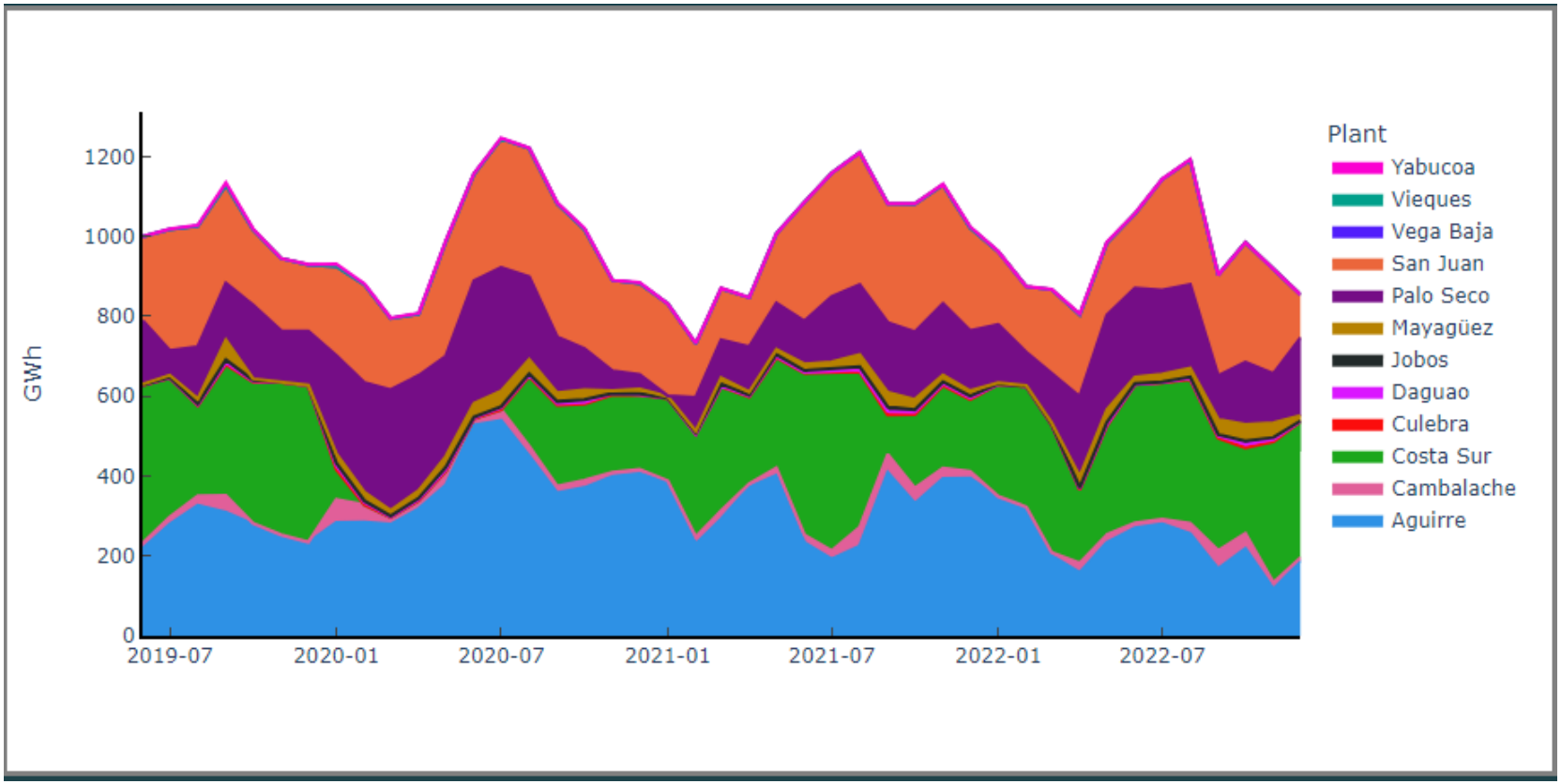
Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – Monthly Sales by Customer Class



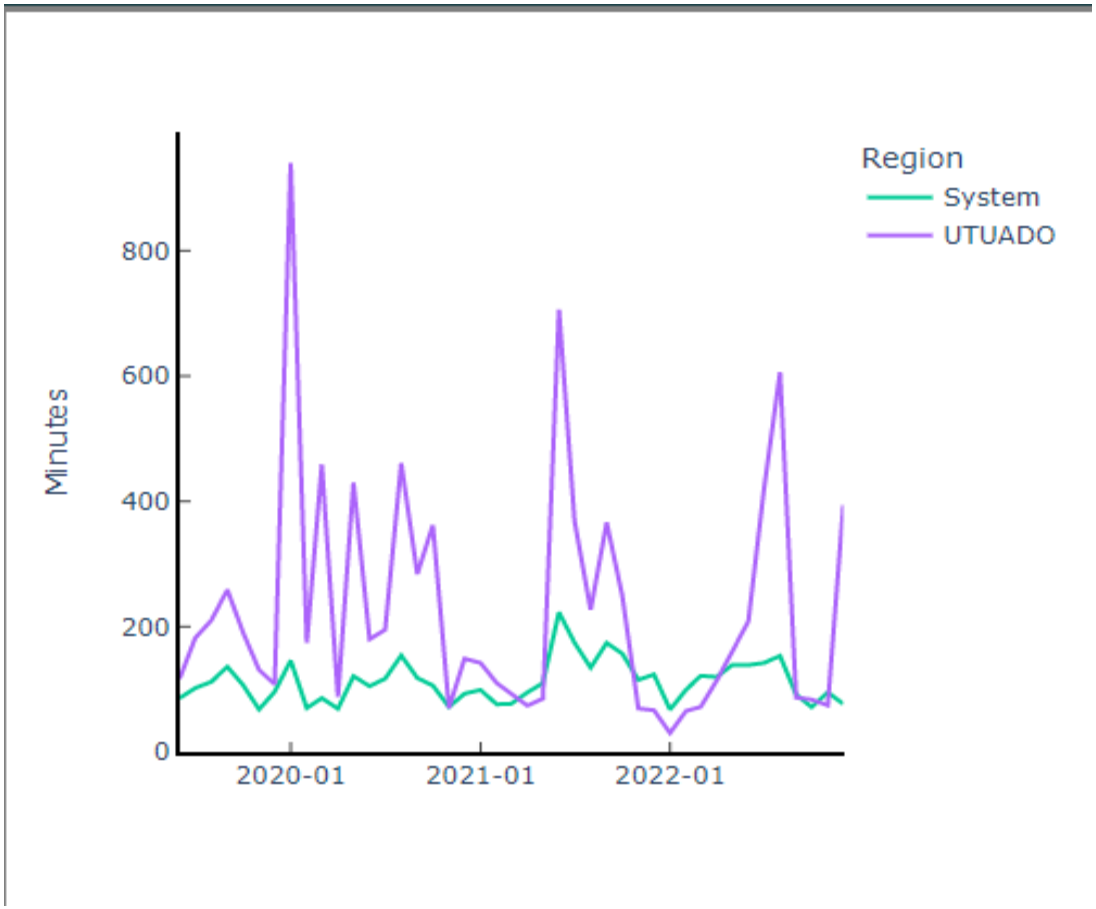
Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – Monthly Thermal Generation



Source: Draft Puerto Rico Metrics Dashboard. The Puerto Rico dashboard is still being developed by Synapse and is not yet publicly available.

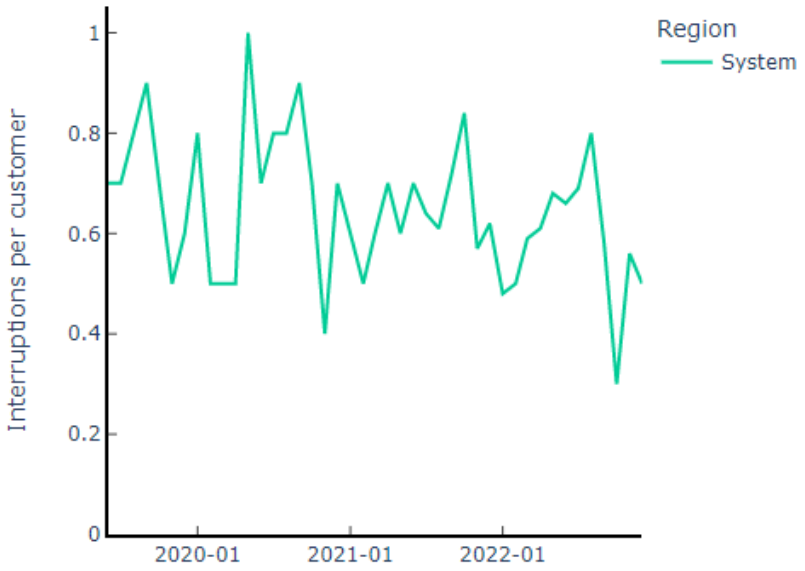
Example: Puerto Rico Dashboard – SAIDI



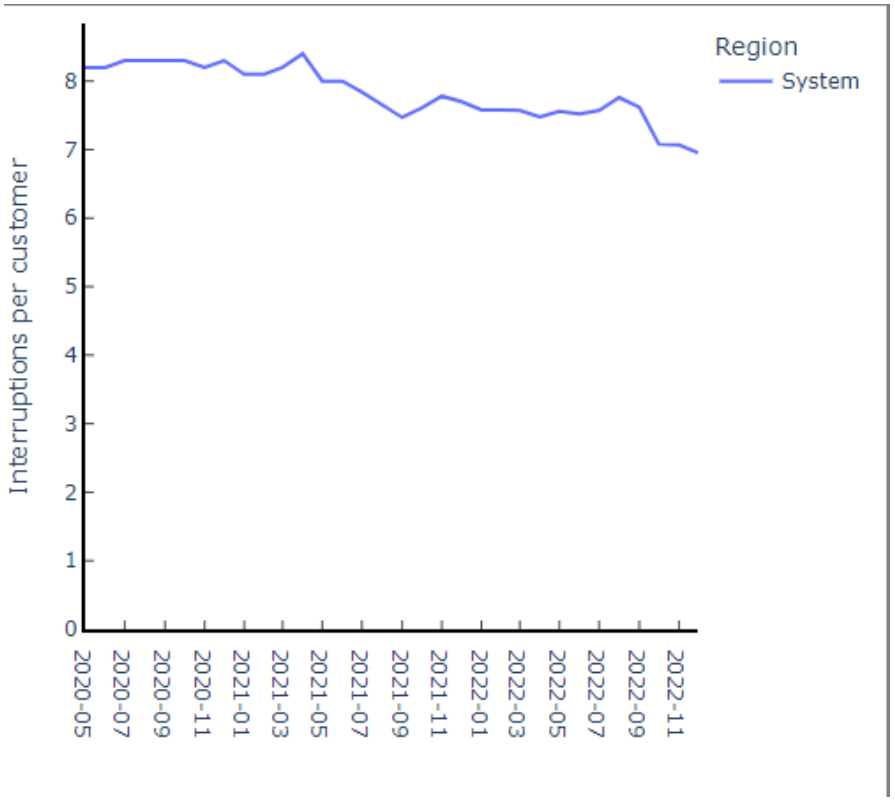
Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – SAIFI

Monthly Results

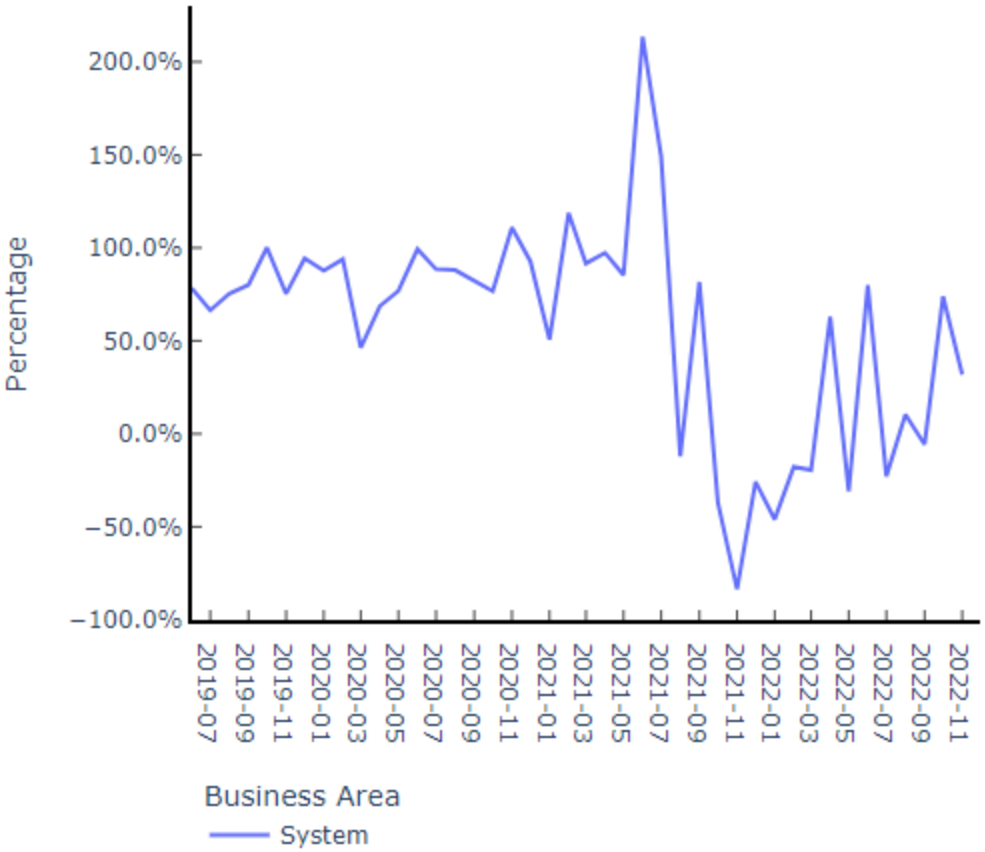


12-Month Rolling Average



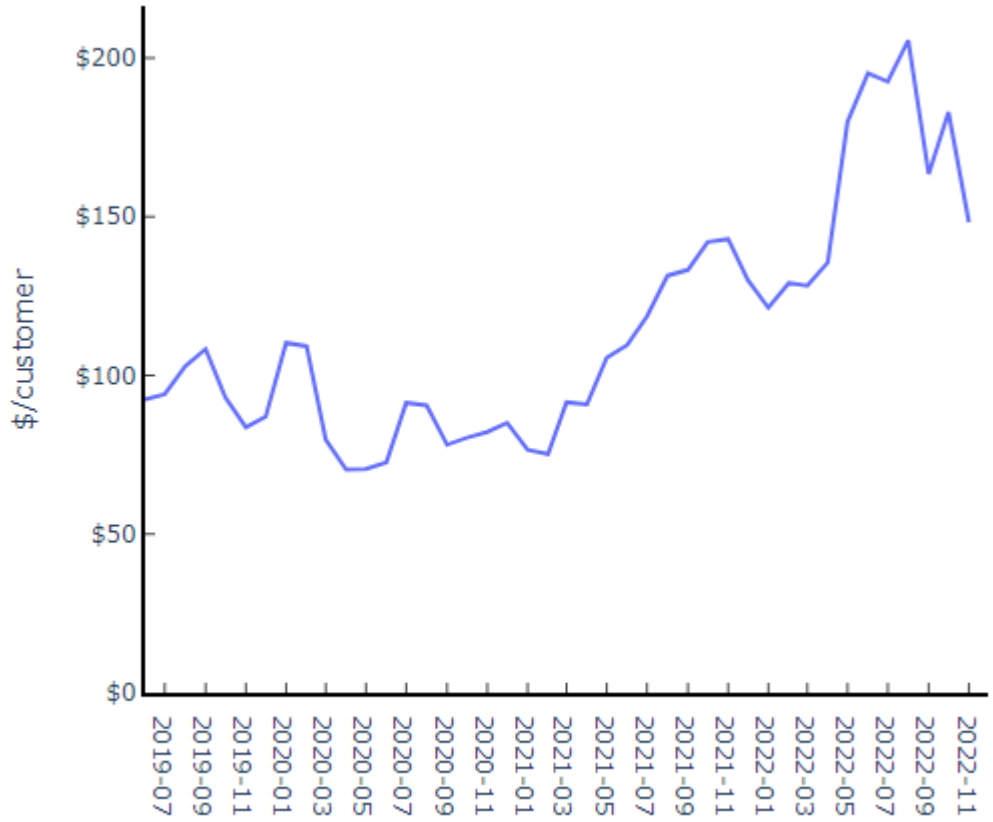
Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – Percent Difference Between Operating Expenses and Budget



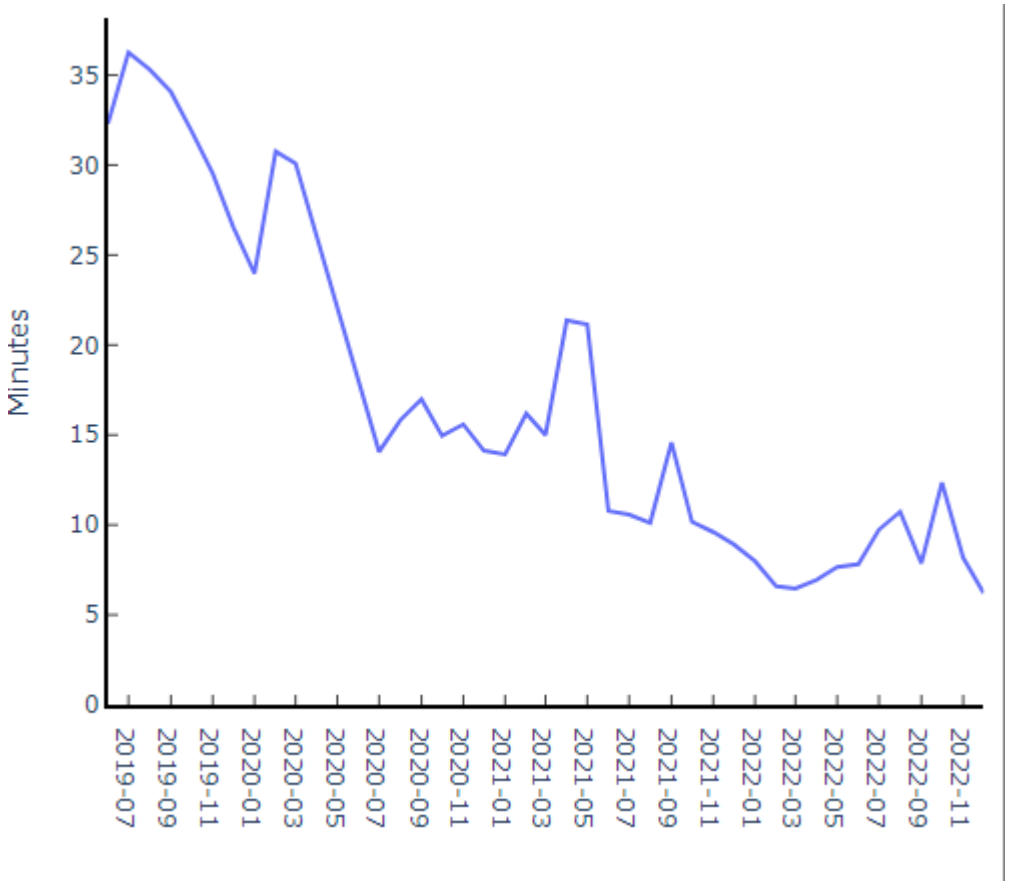
Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – Cost of Generation per Customer



Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Puerto Rico Dashboard – Wait Time in Customer Service Centers



Source: Draft Puerto Rico Metrics Dashboard. The dashboard is still being developed by Synapse and is not yet publicly available.

Example: Hawaii Metrics – Background

In 2018, the Hawaii Commission opened a docket to investigate PBR.

- The docket included a broad range of issues including all aspects of MRPs and all aspects of PIMs (metrics, targets and financial incentives).
- The process included detailed proposals from Commission Staff and a working group that met frequently and included a broad range of stakeholders.

The goals and priorities were established through the working group.

- A summary of the results is included on slide 13.

The process resulted in roughly 60 metrics.

- A summary of the metrics, targets, and incentives is included on slide 33.

The utilities have established a highly accessible and user-friendly set of dashboards to provide metric information.

- Available online: Link to Hawaiian Electric website
- Useful graphics
- Data can be downloaded
- Frequently updated
- Consistent format across utilities

Example: Hawaii Dashboard – Original Metrics Established in 2015

Key Performance Metrics

Since 2015, Hawaiian Electric has provided the following key performance metrics for the PUC, our partners, and our customers.


Service Reliability


Power Supply & Generation


Renewable Energy


Customer Service

Financial


Safety


Rates and Revenues

Emerging Technologies

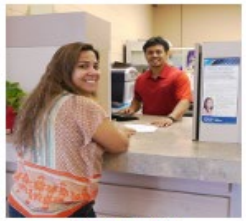
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – New Metrics from PBR Docket

Performance Based Regulation (PBR) Scorecards and Metrics

In 2021, the Hawaii Public Utilities Commission (PUC) approved the following portfolio of PBR scorecards and reported metrics to be available for the PUC, our partners, and our customers.

LEARN ABOUT PBR


Affordability


Capital Formation


Cost Control


Customer Engagement


Customer Equity


DER Asset Effectiveness


Electrification of Transportation


GHG Reduction

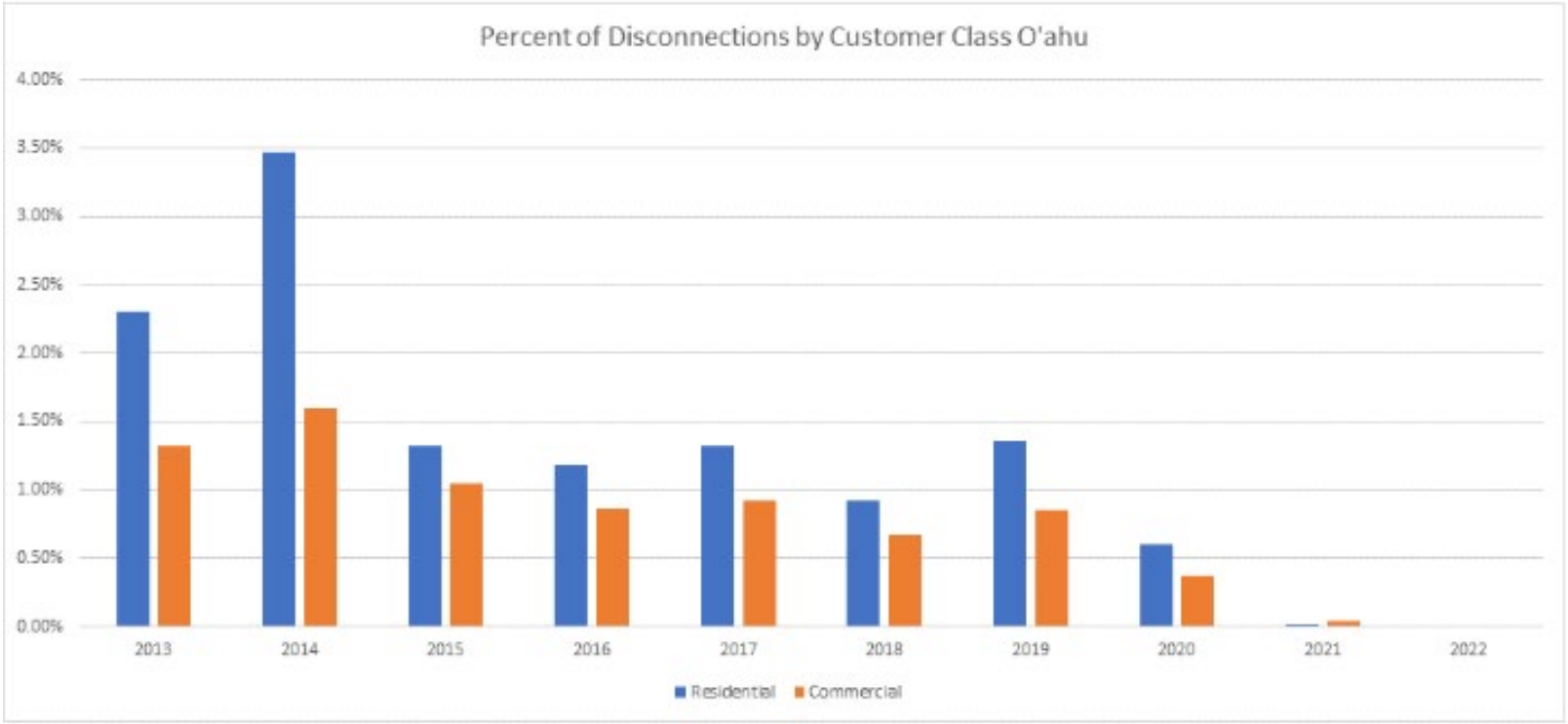

Grid Investment Efficiency


Interconnection Experience


Resilience

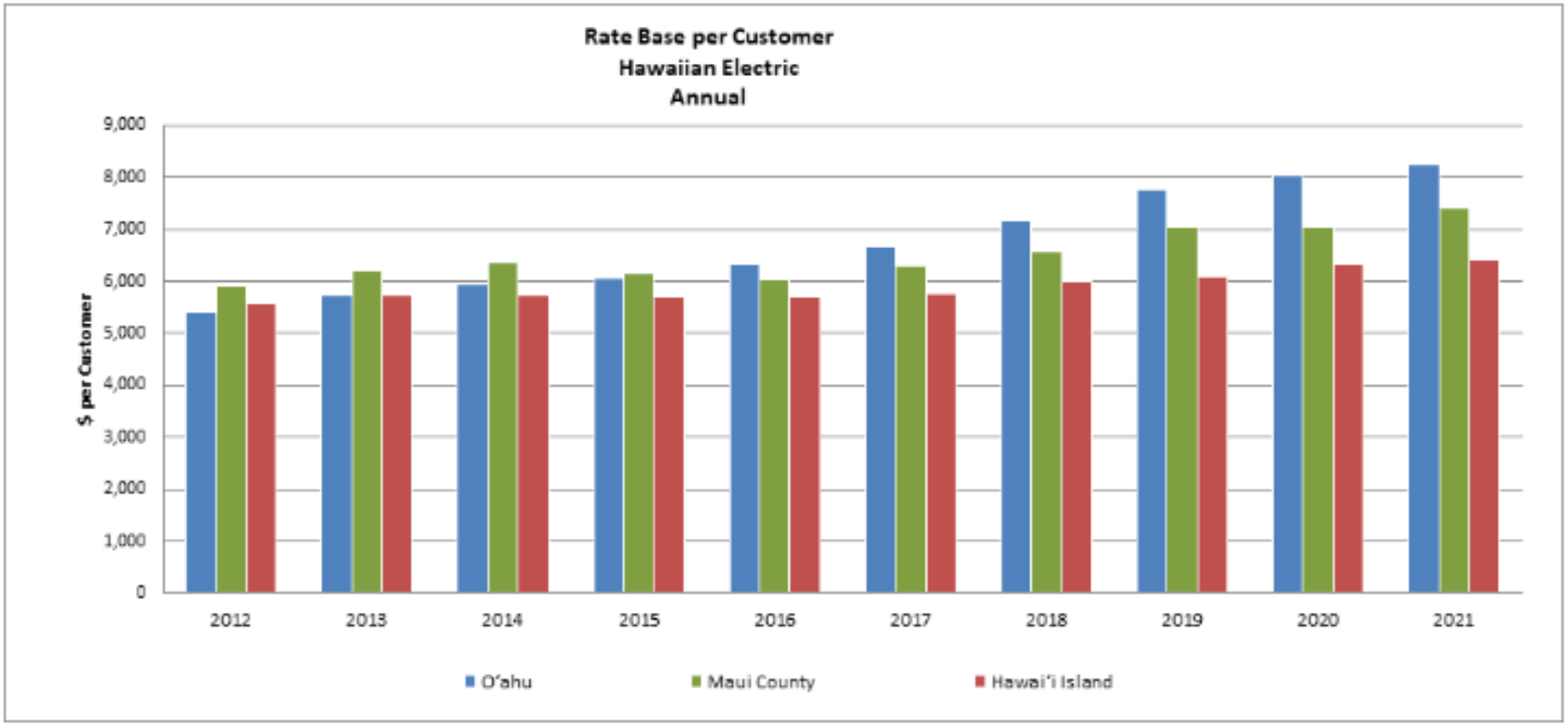
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Customer Disconnections



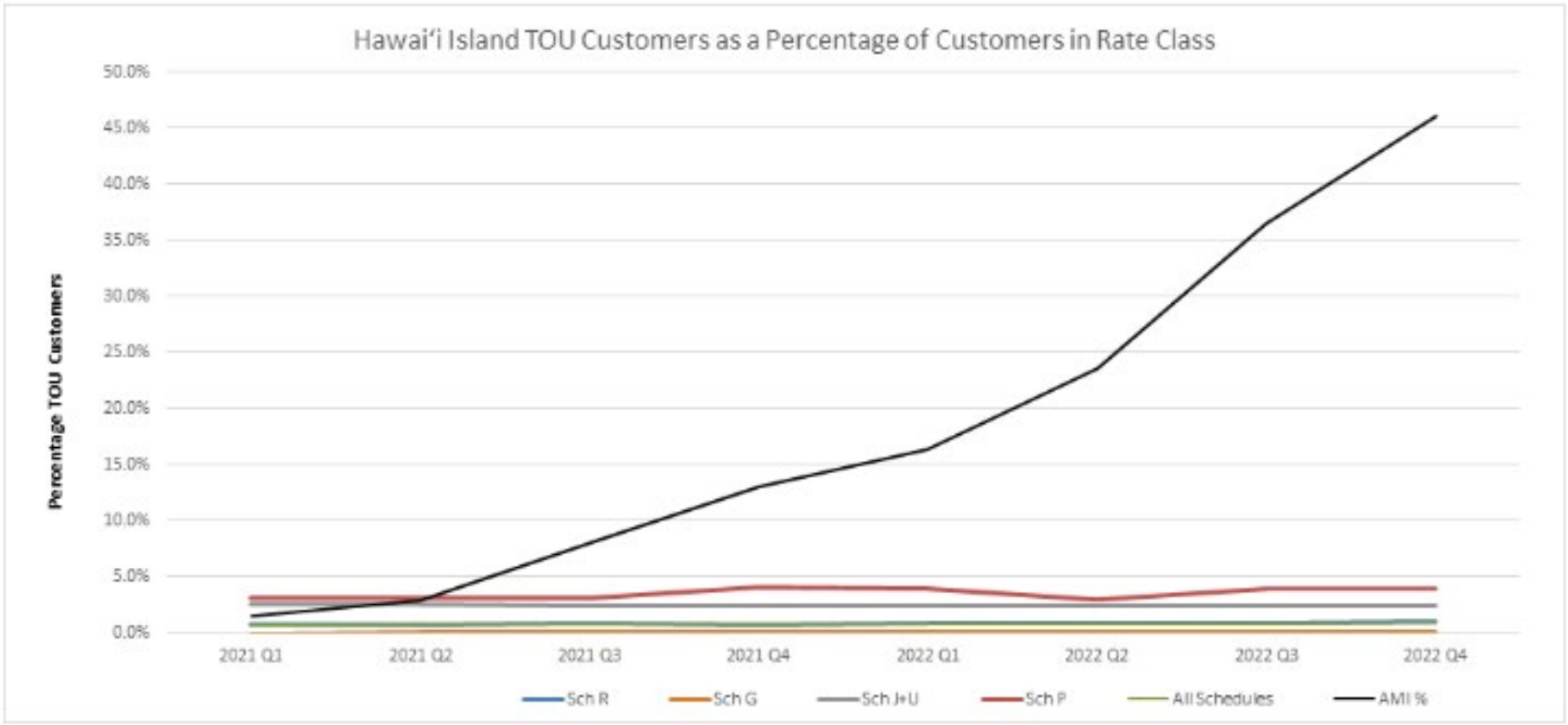
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Rate Base per Customer



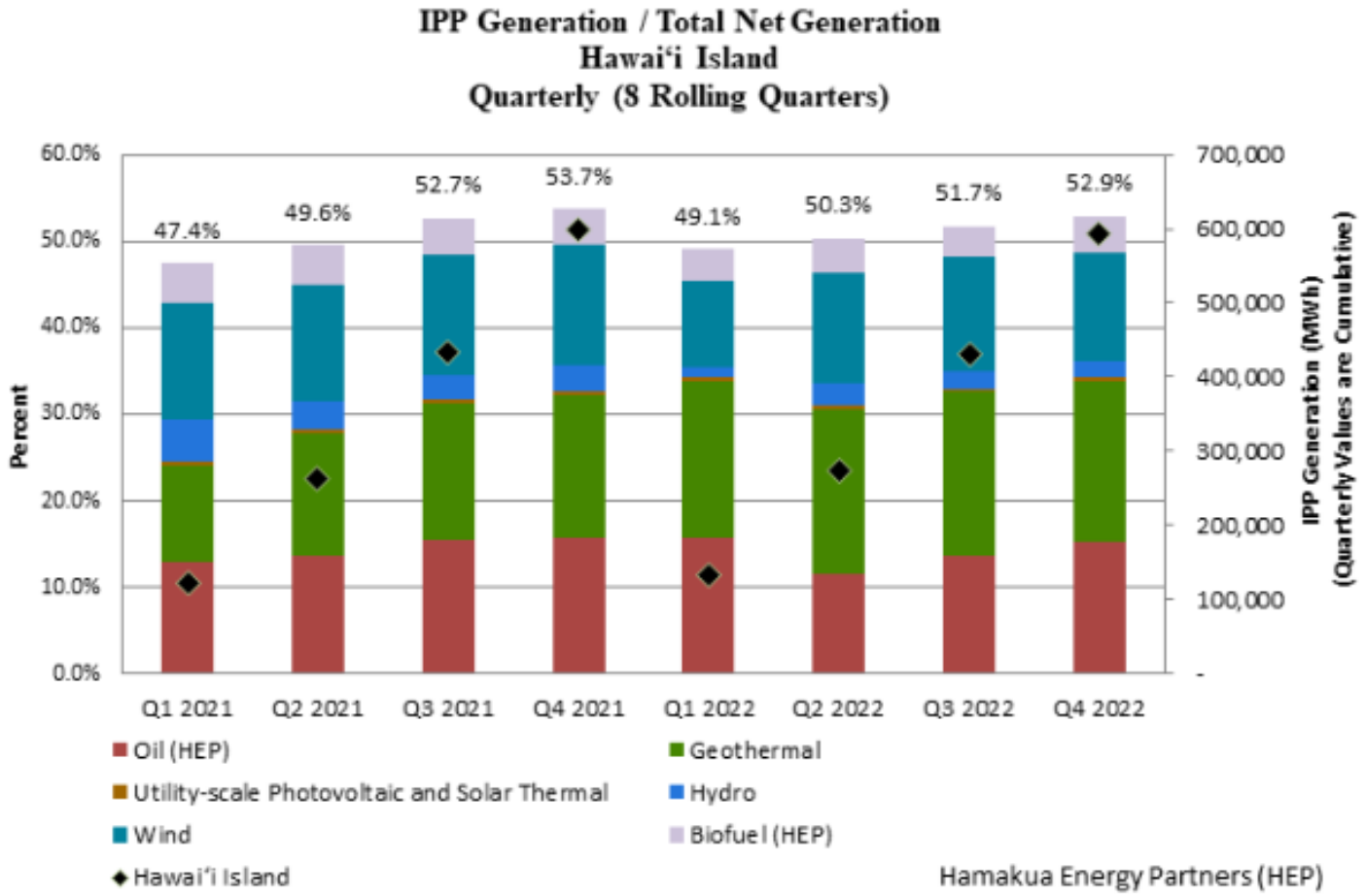
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Time-of-Use Customers



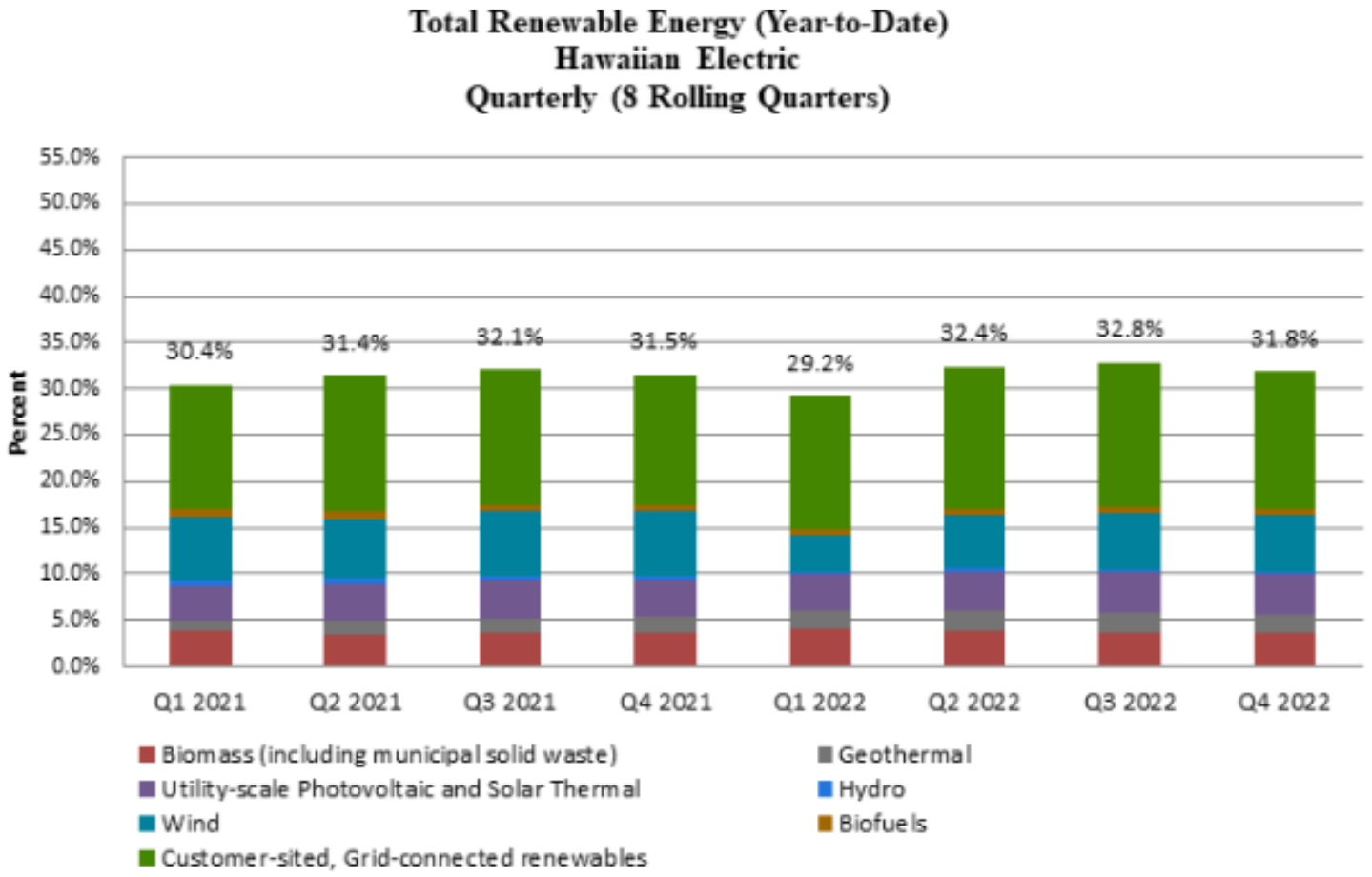
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Independent Power Producer Generation by Fuel Type



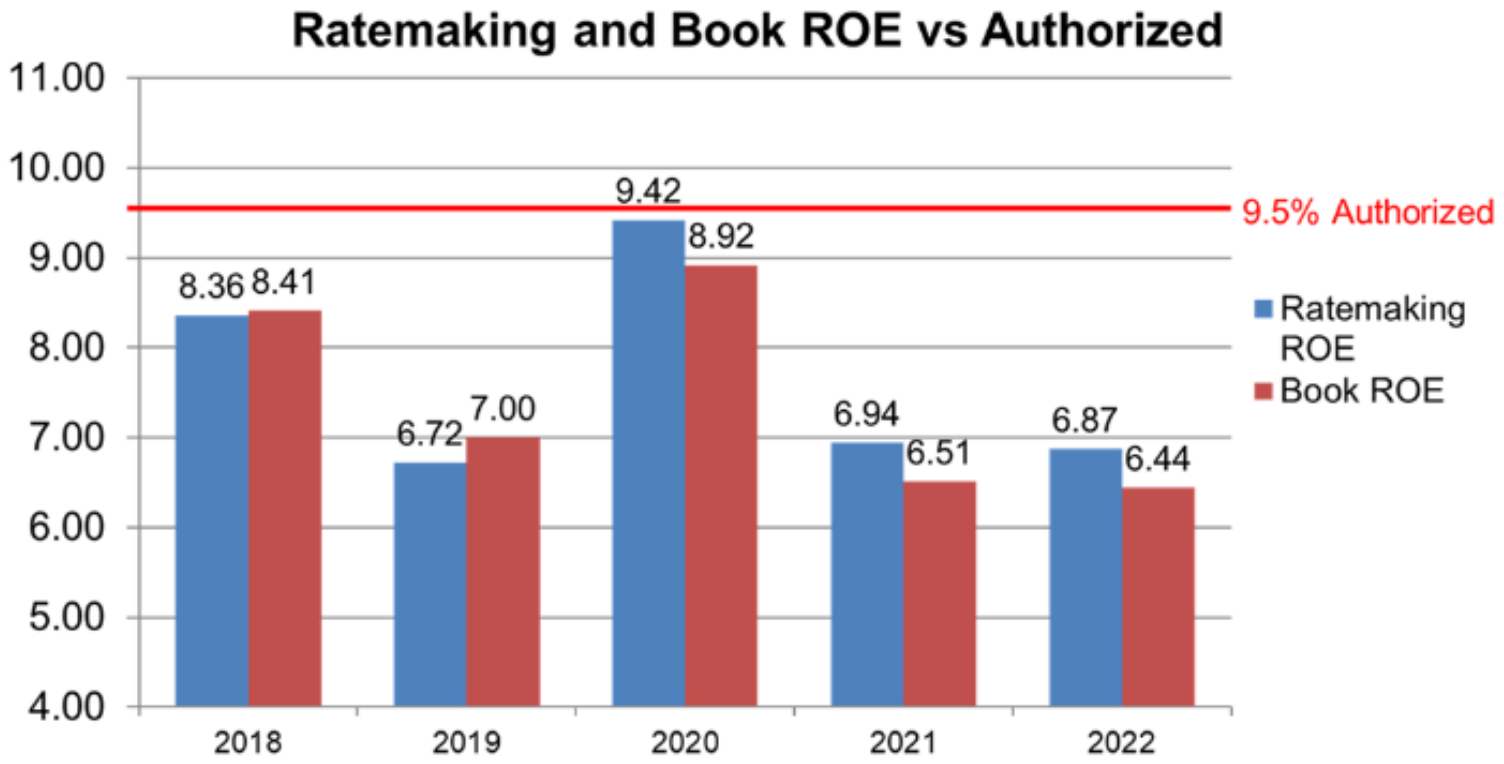
Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Total Renewable Energy

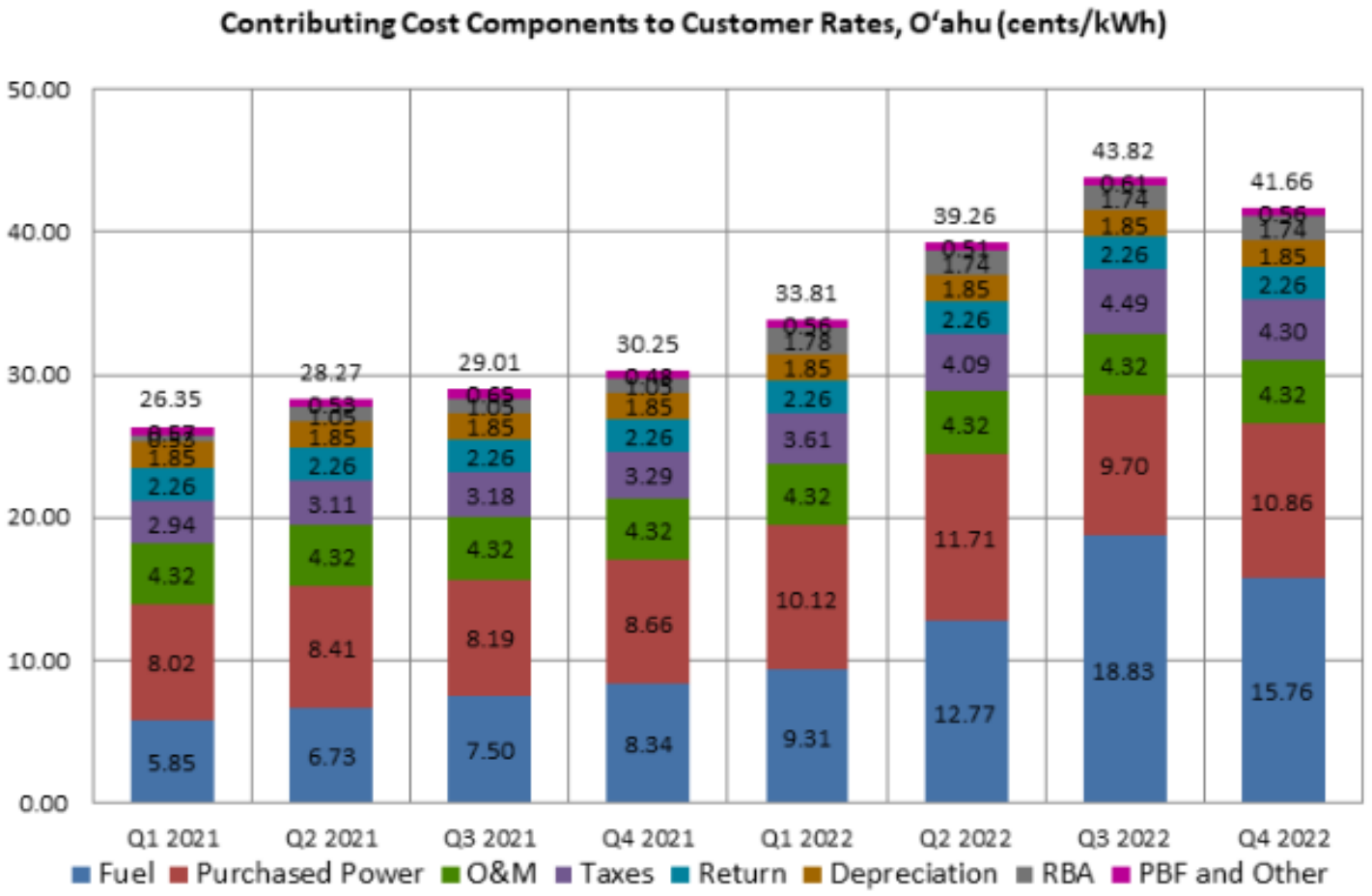


Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Example: Hawaii Dashboard – Return on Equity



Example: Hawaii Dashboard – Contributions to Customer Rates



Source: HECO website: https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

Overview of Performance-Based Ratemaking

Rationale for Performance-Based Regulation (PBR)

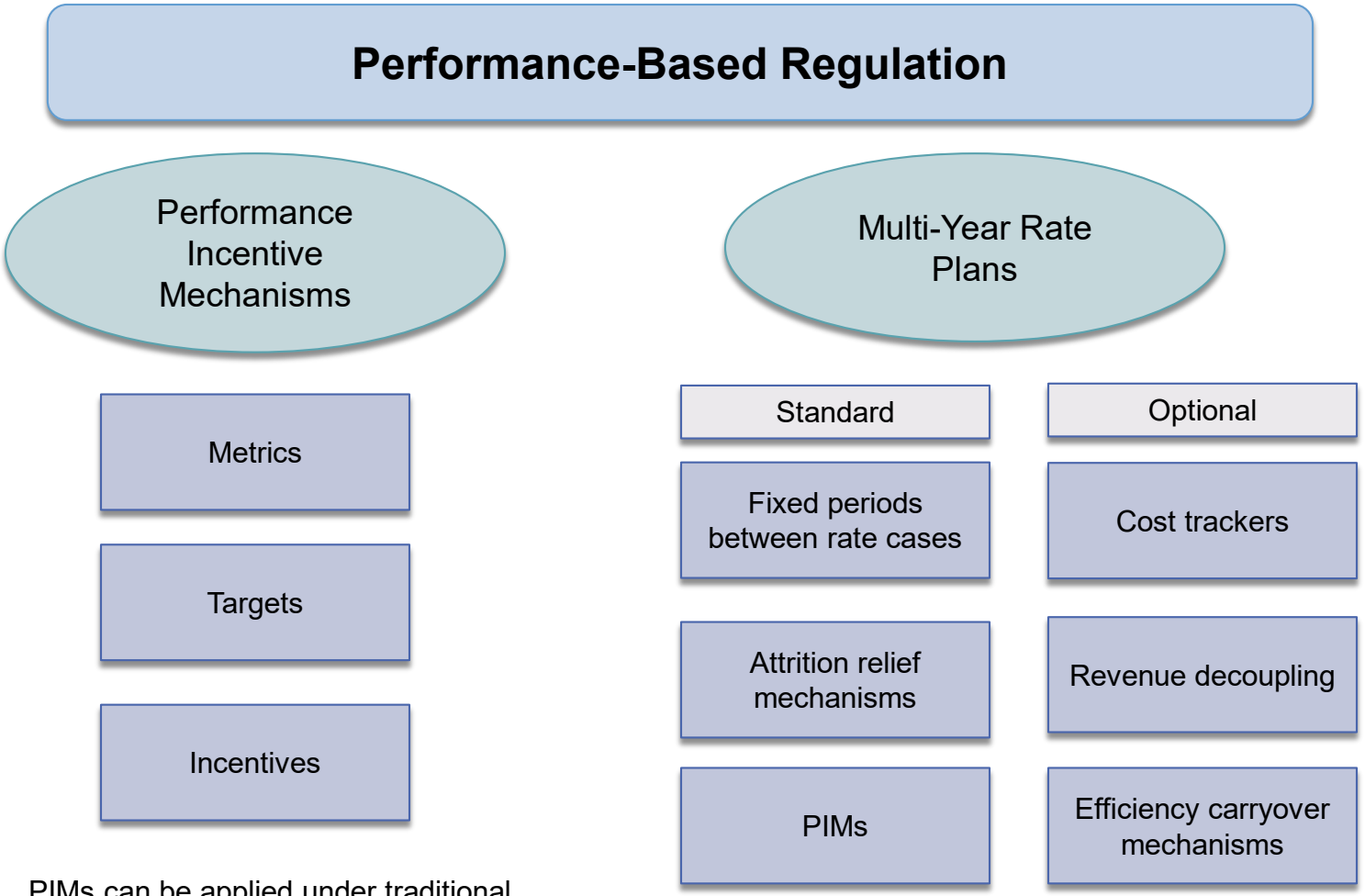
Under traditional cost of service ratemaking:

- Utilities have an incentive to increase rate base to increase earnings.
  - This creates a bias in favor of capital investments and against non-capital expenses.
  - See Averch and Johnson 1962; LBNL 2016.
- Utilities have an incentive to increase retail sales.
  - This creates a bias against investments and programs that can reduce sales, e.g., energy efficiency and customer-hosted distributed generation.
  - Even when those investments and programs can reduce costs
- Utilities have little incentive for innovation (see LBNL 2022).
- Utilities have an incentive to schedule rate cases to fit their needs.
  - When costs are *increasing*, utilities can file rate cases to recover costs.
  - When costs are *declining*, utilities can avoid rate cases.
    - Unless there is a fixed filing cycle
    - Some commissions can call utilities in for a rate case, but this is rare.
- Many regulatory goals cannot be easily addressed through rate cases.
  - For example, improve customer service or improve power plant performance

Traditional Cost of Service Regulation Versus PBR

Regulatory Element	Cost of Service Regulation	Performance-Based Regulation
Basis for initial rates	Cost-of-service studies using a test year	Cost-of-service studies using a test year
Frequency of rate cases	Utilities apply for rate cases as needed or required, typically to recover large capital investments or revenue attrition	Pre-determined, fixed period of time (e.g., five years) to encourage efficient management and operations through regulatory lag
Base rate adjustments between rate cases	Typically, no adjustments are made	Attrition relief mechanism used to automatically change rates or revenue to account for factors such as inflation and productivity — the changes are not linked to utility's actual costs
Cost trackers	Generally limited to costs beyond utility control	May include additional trackers, e.g., for capital costs not easily accounted for in the price cap
Prudency reviews	Generally applied after the fact, when excessive costs become obvious	Generally applied after the fact, when excessive costs become obvious
Resource planning	Option to include integrated resource planning	Option to include integrated resource planning
Revenue regulation	Option to implement a decoupling mechanism to track allowed revenue	Option to include a revenue cap, instead of a price cap, which acts as a decoupling mechanism
Performance incentive mechanisms	Focus on areas of poor performance or opportunities for improvement	Focus on areas that may experience service degradation in response to pressure to reduce costs

Key Elements of PBR



Different Roles of MRPs and PIMs

Multi-year rate plans provide **general incentives** to reduce costs.

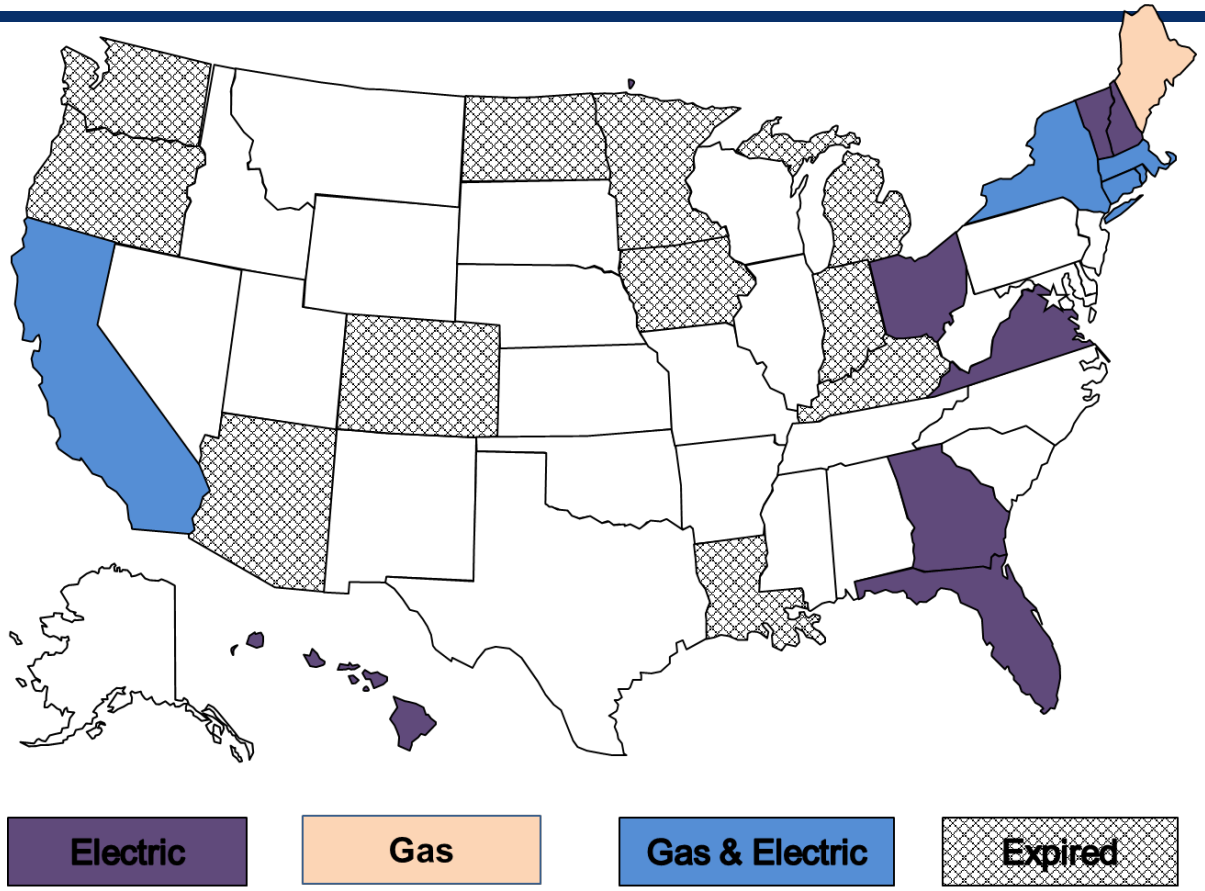
- The fixed period between rate cases should provide utilities with an incentive to reduce overall operating costs due to regulatory lag (i.e., the time between the utility incurring a cost and recovering the cost.)
- The attrition relief mechanism should provide utilities with an incentive to be more productive overall.
- Major capital investments can be addressed separately to provide a general incentive to be more efficient with new capital costs and benefits.

PIMs provide **specific incentives** to achieve a variety of outcomes.

- Regulators can identify specific desired outcomes.
- Desired outcomes might be more than just reduced costs.
- PIMs can be used in combination with MRPs to ensure services are not degraded as a result of the pressure to reduce costs that MRP creates.

When designing MRPs and PIMs, it is important to consider these roles and to ensure that there is a proper balance between general and specific incentives.

MRP Precedents in the United States



Source: Pacific Economics Group Research, LLC

Key Elements of Performance Incentive Mechanisms

Performance Areas	• Identify performance areas that warrant additional attention from the utility.
Metrics	• For performance areas of interest, establish data and reporting requirements to allow regulators and other stakeholders to monitor performance.
Targets	• For the appropriate subset of metrics, establish goals for utilities to achieve.
Financial Incentives	• For the appropriate subset of targets, establish utility financial incentives (penalties and/or rewards).

Advantages of Performance Incentive Mechanisms

- They allow regulators to provide specific guidance on regulatory goals.
- They allow regulators to be more proactive on certain performance areas.
- They can capture utility management attention.
- They can be applied incrementally.
- They allow for flexibility over time.
- They represent a low-risk regulatory option (relative to MRP).
- They can be applied in any regulatory context.
  - Traditional cost of service ratemaking
  - Performance-based regulation

Examples of Existing or Proposed PIMs

Operation and Costs

- Power plant performance (Florida, Hawaii)
- System average energy costs (Washington)
- Cost of renewable generation (California)
- O&M costs (Alabama, Louisiana, Maine, Hawaii)
- Cost reductions through reduced transmission constraints and inefficiencies (Connecticut)
- Cost reductions through off-system sales (numerous jurisdictions)

Specific Resource Goals

- Compliance with renewable portfolio standards (numerous jurisdictions)
- Achieving energy efficiency and demand savings targets (numerous jurisdictions)
- Resource diversity (Nevada)

Adapting to Change

- Customer retail choice (Michigan, New York)
- Grid modernization (Illinois)
- Distributed generation installations (Connecticut, Hawaii)
- Renewable energy curtailments (Hawaii)
- Innovation (United Kingdom)
- Long-term planning (Hawaii)

Key Takeaways

Key Takeaways

- Metrics can be applied in the context of traditional ratemaking or MRP.
  - They become more important if the MRP creates more pressure to reduce costs.
- Metrics are a low-cost way to provide regulatory guidance.
- Metrics provide focused guidance, relative to the general incentives of MRP.
- Metrics can provide the foundation for performance targets and incentives.
- There are many, many metrics to choose from.
  - They should account for, and provide balance to, existing utility incentives.
  - They should account for recent utility performance.
  - They should account for current and emerging regulatory goals.
- Metrics need to be designed carefully to ensure they are useful.
- Regulators should establish processes for reporting and reviewing metrics.
  - Metrics should be revisited annually to reflect recent results and new data.
- Dashboards can be used to make metrics readily available and easy to view.

Resources

Averch and Johnson, 1962, *The Behavior of the Firm Under Regulatory Constraint*. The American Economic Review. 52(5): 1052-1069

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For more information

Download publications from the Electricity Markets & Policy: https://emp.lbl.gov/publications

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Synapse Energy Economics
is a research and consulting firm specializing in technical analyses of energy, economic, and environmental topics. Since 1996 Synapse been a leader in providing rigorous analysis of the electric power and natural gas sectors for public interest and governmental clients.

Extra Slides

Establishing a Performance Target (I)

Tie target to ultimate goal	• Targets should be set in a way that ensure progress toward achieving the goal.
Balance costs and benefits	• The marginal cost of improving performance should not exceed marginal benefits to ratepayers. • Surveys can be used to assess customer willingness to pay for benefits.

Set a realistic target	• Historical data
	  ○ Normalize to account for unusual events
	  ○ Ensure historical business conditions are still relevant
	• Peer groups (normalized)
	  ○ Ensure peer group is adequately similar
	  ○ Econometrics can help control for differences among utilities
	• Utility-specific studies
	  ○ integrated resource plans, engineering studies, potential studies

Establishing a Performance Target (II)

Use deadbands	• Mitigate uncertainty regarding the optimal performance level. • Allow for some variance in utility performance due to factors outside management control.

Allow targets to evolve	• Targets should be adjusted slowly and cautiously in order to provide utilities with regulatory certainty.
	• Targets may need to evolve for two reasons:
	  ○ It may not be possible to immediately achieve the desired level of performance; targets should become more stringent over time.
	  ○ New technologies may lead to new capabilities and new regulatory goals (e.g., smart grid investments).

Incorporate stakeholder input	• Involving stakeholders in setting targets can improve outcomes. • Gives validity, buy-in, and credibility so everyone feels the targets are appropriately set.

Setting a Financial Incentive

Symmetry	• Symmetry (rewards and penalties) is generally preferred. • Asymmetry may be appropriate when performance above the target does not provide significant marginal benefits. ○ Ex: benefits of increased reliability may not warrant the cost
Magnitude	• Maximum rewards paid to the utility should not exceed total benefits to ratepayers.

Units for presentation and comparison	• Magnitude of rewards/penalties should be presented in:
	  ○ Basis points
	  ○ Dollars
	  ○ % of revenues
	• Presenting rewards/penalties in all four units facilitates comparisons and improves understandability.

Units for administration	• Incentives in dollars are generally easiest to administer and avoid an incentive for the utility to increase its rate base to benefit from rewards administered as basis points.