Overview of Performance Metrics

Minnesota Stakeholder Process Webinar

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Performance Metrics and Incentives

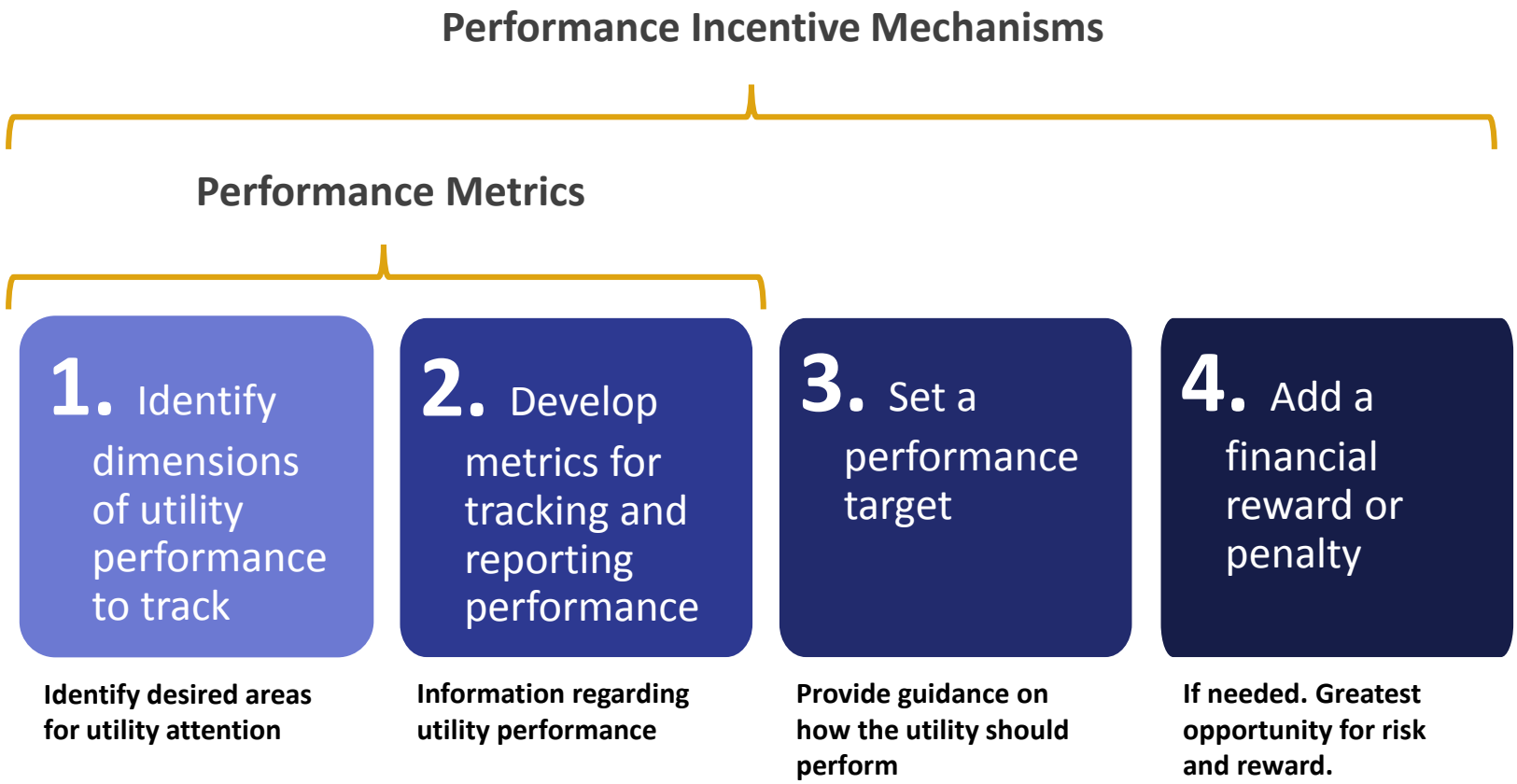
- Performance Incentive Mechanisms (PIMs) are one element of performance-based regulation, intended to achieve specific outcomes
- PIMs include four key elements:
  1. Policy goals
  2. Metrics to measure performance
  3. Performance targets
  4. Rewards and penalties to promote desired outcomes
- Traditionally focused on areas that may experience service degradation due to cost reductions
- Increasingly designed to create incentives to achieve a broad set of desired outcomes.

The Regulatory Context and PIMs

- Each regulatory model has its own embedded incentives. PIMs can address/offset these incentives.
- What incentives exist in Minnesota under cost-of-service regulation versus a multi-year rate plan?
    - Incentive to increase sales
    - Incentive to build rate base
    - Lack of incentive to innovate
    - Lack of incentive to pursue regulatory goals
- Performance metrics and incentives can help to articulate regulatory goals, track progress, and provide the right incentives

Four Discrete Steps

Performance Incentive Mechanisms can be implemented incrementally, allowing for flexibility



Performance Metrics in Minnesota

Performance Incentive Mechanisms

Performance Metrics

1. Identify dimensions of utility performance to track

1. **Affordability**
2. **Reliability**
3. **Customer service**
4. **Environmental**
5. **Peak load reduction**

2. Develop metrics for tracking and reporting performance

- **Tied to policy goals**
- **Defined clearly**
- **Easily measured, interpreted, and verified**
- **Sufficiently objective**
- **Inform performance reporting requirements**

3. Set a performance target

Provide guidance on how the utility should perform

4. Add a financial reward or penalty

If needed. Greatest opportunity for risk and reward.

Metrics

What is a metric?

- A metric is a standard of measurement.
- Defining a metric typically involves the following:
  - *Specific* data definitions
  - A precise *formula* used to quantify each metric
  - Data collection and analysis practices and techniques, including identification of the entity responsible for collecting and reporting the data
  - Requirements for measurement and reporting
  - Verification techniques and entity responsible for verifying data

Design Principles

Principles for Metric Development

- Ensure the metric is tied to the policy goal and will provide useful information about whether the goal is being attained

Example: EVs in New York

There were 8,029 EVs in operation in the Company's electric service territory ZIP Codes at the end of 2018 according to vehicle registration data provided by R. L. Polk/IHS Markit. Using the estimated annual consumption figures for various types of plug-in electric vehicles (including Battery EVs and Plug-in Hybrid EVs) as established by The California Transportation Electrification Assessment,[7] the total annual consumption of all EVs in operation in the Company's electric service territory ZIP Codes at the end of 2018 was 24,837,810 kWh.

EV Type	EVs in Operation (a)	Annual Consumption (kWh) (b)	Total Annual Consumption (kWh) (c = a * b)
Battery EV	2,100	3,770	7,917,000
Plug-in Hybrid 10 Mile Range	877	1,278	1,120,806
Plug-in Hybrid 20 Mile Range	2,916	2,555	7,450,380
Plug-in Hybrid 40+ Mile Range	2,136	3,909	8,349,624
Total	8,029	-	24,837,810

Is the goal # of EVs? Avoided emissions? Something else?

Principles for Metric Development (cont.)

- Define metrics precisely, using regional or national definitions where possible
  - Helps avoid contention, and facilitates comparisons over time and across jurisdictions
  - Reliability data could be collected in both standardized and Minnesota-specific formats
  - Utilities already report a large amount of data to the EIA, FERC, EPA, NERC, and other entities

Despite a common industry standard for measuring and reporting reliability, few utilities adhere to this standard.

Standard metrics are often reported in different ways, with definitions of "major events" or the length of a "sustained interruption" varying across utilities and jurisdictions.

Example: O&M Costs

Include sales for resale?

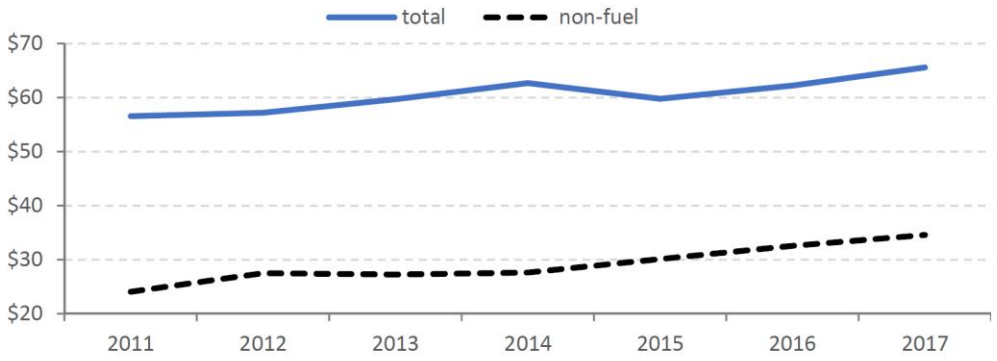
MWh represents total sales, including sales for resale, except for Figure 19, which also expresses non-fuel production O&M expense as a function of MWh generated by the utility.

The "non-fuel" numerators exclude Accounts 501 (steam fuel), 547 (other generation fuel), and 555 (purchased power). These accounts can be found on pages 320 and 321 of the FERC Form 1.

Public data sources, standardized definitions

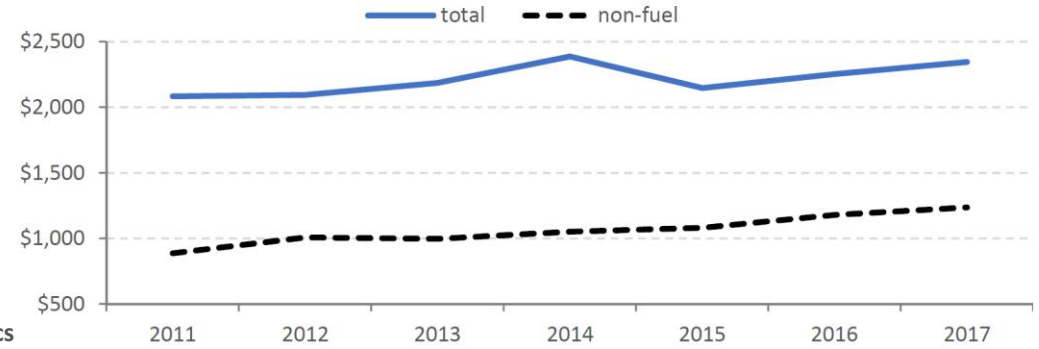
Total O&M

Figure 17. O&M per MWh [3]



What tells you more useful information: O&M spending per MWh or per customer?

Figure 18. O&M per retail customer [4]



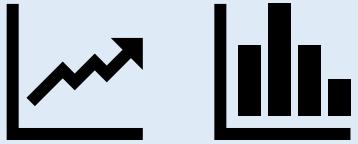
Source: NIPSCO 2017 Performance Metric Report

Principles for Metric Development (cont.)

- Choose metrics that are largely free from arbitrary influence
- Choose metrics that are easily measured and interpreted
  - Complex data analyses reduce transparency
- Use independent parties to collect or verify data
- Present data clearly

A key benefit of metrics is the ability to better understand what is happening on the system and why.

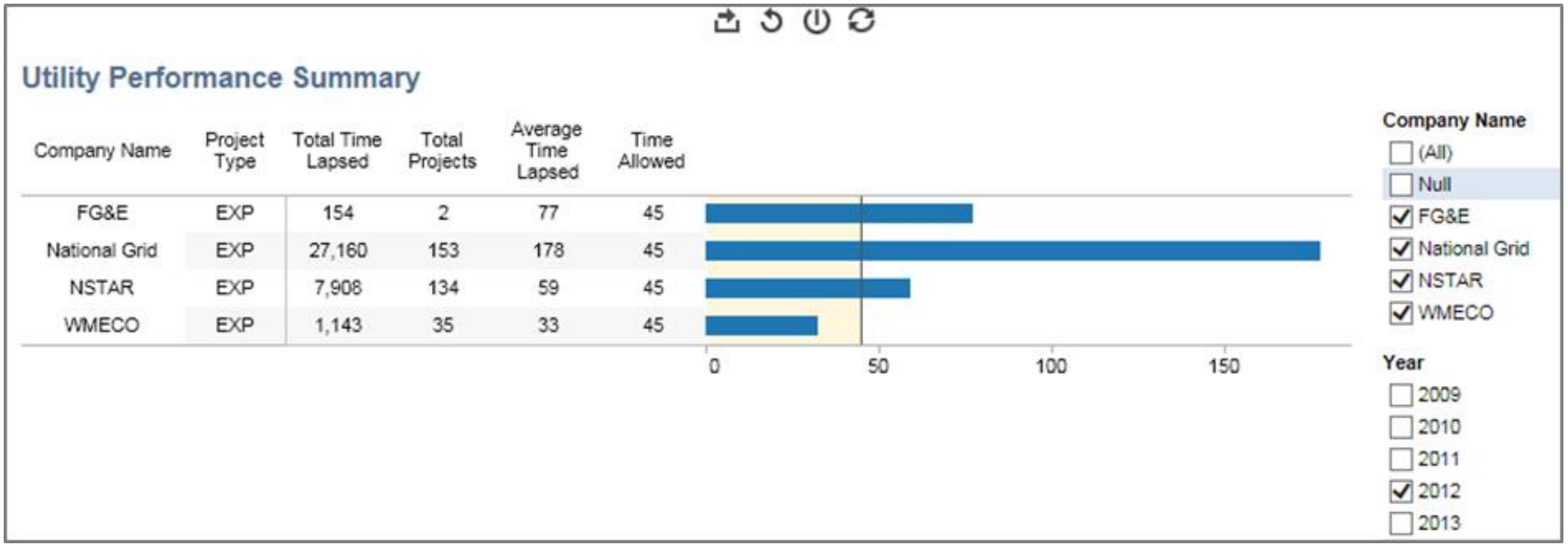
- Metric Choice
- Data Presentation
- Data explanation



Data Dashboards

- Data dashboards enable regulators and other stakeholders to quickly review utility performance across a large number of performance areas
- Publicly accessible (website)
- Show historical trends, possibly comparison across utilities

Example: Interactive website displaying utility performance



Examples

Example: EFOR

A unit's *equivalent forced outage rate* (EFOR) represents the percentage of time (in hours) the unit was unable to generate power for reasons other than planned maintenance.

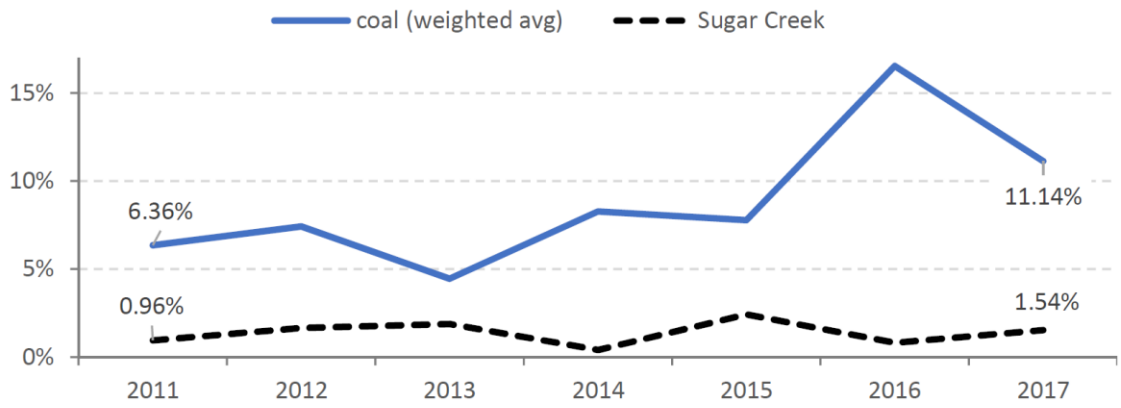
$$EFOR = \frac{FO + EFD}{FO + S + EFDRS} \times 100\%$$

Specific formula and data definitions

These reasons include forced outages (FO) or equivalent forced derates (EFD), which occur if a unit is unable to produce 100% of its typical capacity. The denominator in the equation is the sum of forced outage hours, service hours, and equivalent forced derates when the unit is in reserve shutdown. Figure 9 illustrates NIPSCO's EFOR during the period.

Figure 9. EFOR

Graphical data presentation over time

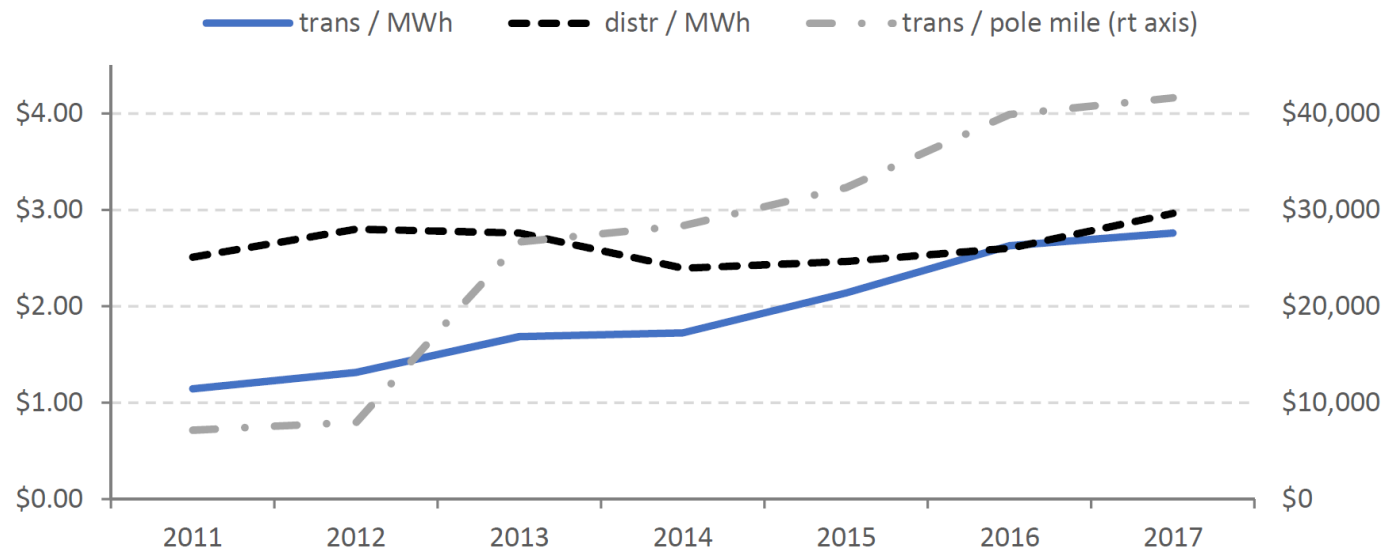


Useful comparisons: one plant vs. fleet

Source: NIPSCO 2017 Performance Metric Report

Example: O&M Costs

Figure 20. Transmission and distribution O&M expense [6]



Metrics may change over time, which hampers ability to draw conclusions.

Figure 20 illustrates transmission and distribution expenses as a function of energy sales. It also shows transmission expense as a function of line miles. In 2013, NIPSCO **reclassified** its 69kV circuit miles from transmission to distribution in accordance with FERC's seven-factor test.

The principal driver of transmission expense during the period has been *Account 561.8, Reliability, Planning, and Standards Development Services*. This account reflects the costs of three regional transmission expansion project types that MISO has billed to NIPSCO through Schedule 26.

Explanations

Source: NIPSCO 2017 Performance Metric Report

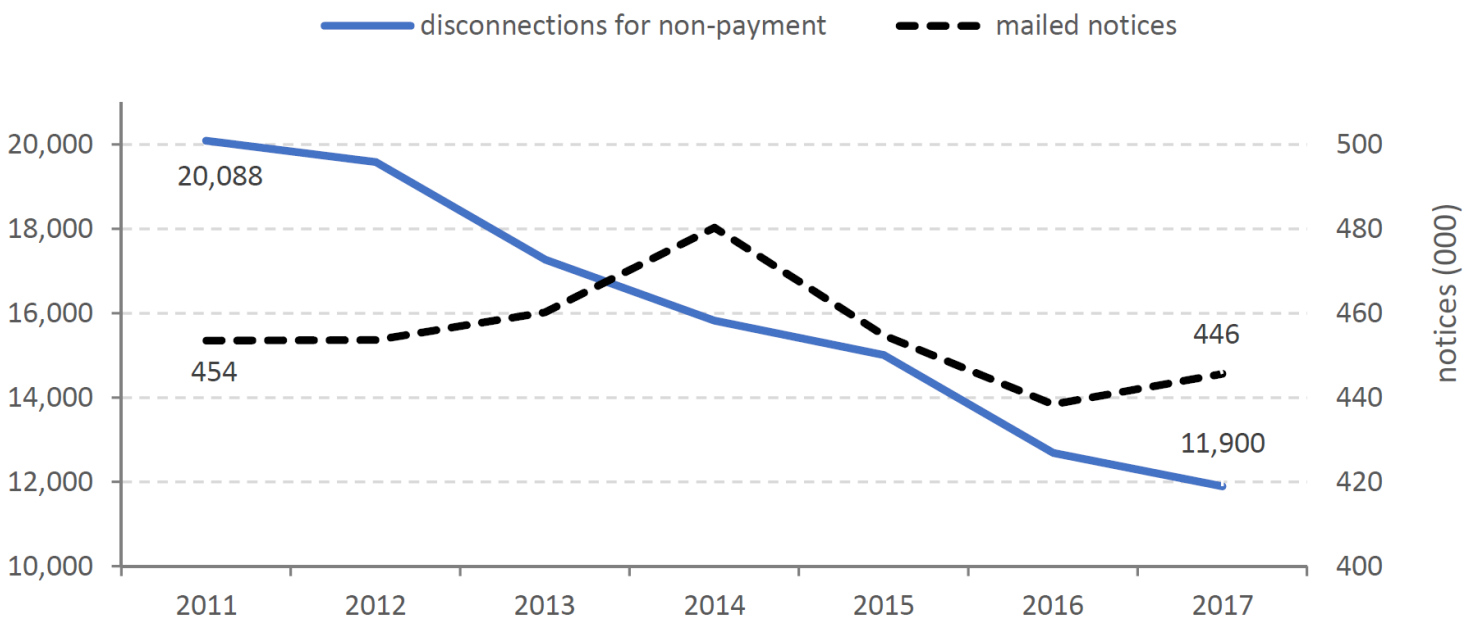
Example: Affordability

Service disconnections

NIPSCO mails a notice of disconnection to a customer twelve days after the customer's bill is due. Colder than normal weather in November and December 2017 led to an increase in residential bills and a corresponding increase in delinquent bills and mailed notices.

However, in the last few years NIPSCO has increasingly tried to identify customers that, although they carry arrearages, continue to make payments on their accounts. In 2017, this resulted in a 6% decrease in disconnections despite a 2% increase in mailed notices.

Figure 30. Residential service disconnections



Examples of possible metrics

Metric	Purpose	Metric Formula
System load factor	Indication of improvement in system load factor over time	System average load / peak load
Line losses	Indication of reductions in losses over time	Total electricity losses / MWh generation, excluding station use
Demand response (DR)	Indication of participation and actual deployment of DR resources	Potential and actual peak demand savings (MW)
Distributed generation (DG)	Indication of the technologies, capacity, and rate of DG installations, and whether policies are supporting DG growth	Number of customers with DG
		MW installed by type (PV, CHP, small wind, etc.)
Information availability	Indicator of customers' ability to access their usage information	Number of customers able to access daily usage data via a web portal
		Percent of customers with access to hourly or sub-hourly usage data via web
Time-varying rates	Indication of saturation of time-varying rates	Number of customers on time-varying rates

Example: Hawaii (1 of 2)

Outcome	Existing Metrics	New Metrics
Affordability	▪ ¢/kWh, by class ▪ Contributing cost components to customer rates	▪ Average annual bill, by class ▪ Average annual bill as % of income, by class ▪ Average annual bill as % of income for LMI customers ▪ Bill stability: percent change in average annual bill, by class ▪ Percent of res. customers in arrearage plans ▪ Number of disconnections, by month. ▪ Ratio of customers in arrearage plans to customer disconnections, by month
Reliability & Resilience & Cybersecurity	▪ SAIDI ▪ SAIFI ▪ CAIDI ▪ MAIFI ▪ Response time	▪ SAIDI & SAIFI, by worst performing circuit ▪ Resilience: SAIDI, SAIFI, CAIDI, ▪ MW of fast ramping resources ▪ MW of capacity and percent of customers served by microgrids ▪ Percent of critical customers served by microgrids ▪ Percent of critical customers experiencing an outage during a major event ▪ Duration of outages of critical customers ▪ Participation in joint utility-community resilience planning ▪ Cybersecurity: number of attempted breaches ▪ Cybersecurity: percent of breaches successful ▪ Cybersecurity: adoption of EPRIs metrics ▪ Cybersecurity: adherence to NERC standards ▪ Cybersecurity: information sharing with other entities/participation in joint planning

Example: Hawaii (2 of 2)

Interconnection Experience	none	▪ Time in interconnection queue ▪ Results of developer satisfaction survey
Customer Equity & Engagement	▪ Number of NEM program participants ▪ Capacity of all NEM resources (MW) ▪ Total energy (kWh) exported by NEM resources, excluding feed-in tariff and standard interconnection	▪ EE: % participation, by class ▪ DR: % participation, by class ▪ PV: % customers with installation, by class ▪ Community solar: % participation, by class ▪ Other DG: % customers with installation, by class ▪ Storage: % installations, by class ▪ TOU: % participation, by class ▪ TOU: % of all customers participating ▪ Percent of LMI households participating in EE, DR, PV, DG, Storage, or TOU ▪ Customer access to usage hourly or sub-hourly consumption data ▪ Third-party service access to customer data. ▪ Variety, quality, and accessibility of customer data available to customers/third-parties. ▪ Consumer education*
Customer Satisfaction	▪ Customer survey ▪ Complaints ▪ % calls within 30 secs. ▪ Billing accuracy ▪ Meters read ▪ Appointments met ▪ Order intervals	▪ Results of independent surveys, e.g., J.D. Power

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- Synapse Energy Economics is a research and consulting firm specializing in energy, economic, and environmental topics.
- Since its founding in 1996, Synapse has been a leader in providing rigorous analysis of energy, environmental and regulatory issues, for public interest and government clients.