2020 Utility Energy Efficiency Scorecard

Grace Relf, Emma Cooper, Rachel Gold, Akanksha Goyal, and Corri Waters

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529 14th Street NW, Suite 600, Washington, DC 20045

Phone: (202) 507-4000 • Twitter: @ACEEEDC

Facebook.com/myACEEE • aceee.org

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About the Authors

Grace Relf is a senior research analyst for ACEEE's Utilities Program, focusing on utility-sector energy efficiency programs and initiatives such as rate design and resource planning. Prior to joining ACEEE, she worked at Karbone, Inc. as an energy and environmental markets analyst and broker. Grace earned a master of public administration in environmental science and policy from Columbia University. She also holds an honors bachelor of science with distinction in energy and environmental policy and an honors bachelor of arts in French from the University of Delaware.

Emma Cooper assists with research on the State and Local Policy teams and contributes to the *State Scorecard* and *City Scorecard*. Prior to joining ACEEE, she worked on policy and research at the Alliance to Save Energy, and as a consultant at SB Works, she helped small businesses with sustainable business practices. Emma holds a master of science in climate change and policy from Bard Center for Environmental Policy and a bachelor of arts in earth science and psychology from DePauw University.

Rachel Gold leads ACEEE's Utilities Program. Her research focuses on energy efficiency programs and policy and on utility regulation and ratemaking. She also provides technical assistance to utilities, state regulators, and efficiency program administrators. Rachel was previously in the electricity practice at Rocky Mountain Institute and on the regulatory affairs and market development team at Opower. She holds a master of public policy from the University of California, Berkeley, and a bachelor of science in biology and environmental studies from Brandeis University.

Akanksha Goyal was an intern with ACEEE's Utilities Program, where she researched electric vehicles, utility business models, and energy efficiency program performance. She holds a master of arts in sociology from Indira Gandhi National Open University and a bachelor of engineering from Thapar Institute of Engineering and Technology. She is pursuing a master of arts with a concentration in international economics and energy, resources, and environment at Johns Hopkins University.

Corri Waters was a research assistant for ACEEE's Utilities Program, where she conducted research on energy efficiency program design and cost effectiveness. She is currently an analyst at AECOM and the project manager for Pittsburgh's Black Environmental Collective. She interned at the Maryland Clean Energy Center, coordinating events to promote clean energy policies, programs, and technologies. Corri earned a bachelor of science in mathematics with a minor in environmental and sustainability studies from Loyola University Maryland in 2018.

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Executive Summary

KEY FINDINGS

This report ranks US electric utilities on their policy and program efforts to save energy.

- **Eversource Massachusetts and National Grid Massachusetts tied for first place** and led the *Utility Scorecard* for the second time. Both utilities operate under a strong policy framework and respectively achieved 3.1% and 3.7% energy savings as a percentage of sales in 2018. These utilities also offer a broad range of programs that reach a large customer base and target a diversity of end uses.
- Rounding out the top 10 were **San Diego Gas & Electric**, **Commonwealth Edison, Baltimore Gas & Electric**, **Pacific Gas & Electric, Los Angeles Department of Power and Water, DTE**, **Portland General Electric**, **and Eversource CT**.
- **LADWP and Consumers Energy** were the most improved utilities relative to 2017. LADWP increased savings by 0.6% of sales, spending by 1.3% of revenue, and its savings target by almost 0.5% of sales. Consumers Energy responded to Michigan's recent laws requiring increased energy efficiency targets and the consideration of efficiency in resource planning. Thanks to leadership from top management, Consumers Energy scored well in nearly every category.
- Total energy savings by this group of utilities increased by 20% over 2015. The 52 utilities in the *Utility Scorecard* saved almost 20 TWh of energy in 2018 through more than 900 programs.
- Utilities are dedicating more resources and seeing greater energy savings in low-income communities. Average low-income energy savings (in MWhs) have increased by more than 60% since 2015. Thirty-one utilities offer comprehensive programs for low-income customers.
- No utilities have changed their business models, including by adopting revenue decoupling or reworking their performance incentives, despite more proceedings considering changes to cost recovery and incentive models.
- Data provision, including standardized reporting for participation in energy efficiency programs and provision of energy usage data to customers, remains inconsistent and limited.
- Utilities are increasingly promoting electric vehicles. Sixteen utilities are offering a financial incentive for electric vehicle service equipment (EVSE, or charging equipment), and six offer make-ready programs that allow other organizations to deploy EVSE quickly and economically.[1] Twenty-five utilities are using rate design to promote EV charging at off-peak times, six more than in 2015.

Energy efficiency plays a key role in meeting the needs of electric customers throughout the United States. Relative to other energy resources, it is a low-cost, low-risk option that

[1] In make-ready programs, utilities prepare sites for the installation of EVSE by another party through electric infrastructure upgrades or installation.

delivers high levels of customer satisfaction by reducing customer bills. Energy efficiency provides system value by avoiding additional generation and distribution costs, increasing grid reliability, and reducing congestion in targeted areas, and it can complement other renewable resources to make the grid cleaner and more flexible. Electric utilities play a critical role in delivering energy efficiency programs to customers, enabling an energy efficiency marketplace, and valuing energy efficiency in system investment. *The 2020 Utility Energy Efficiency Scorecard* ranks the 52 largest US electric utilities on utility-sector energy efficiency programs and policies in 2018. The report covers 20 metrics (two unscored) that we developed to reflect utility performance and allocates 50 total possible points across three categories:

- Quantitative energy efficiency savings and spending performance: 26 points
- Energy efficiency program offerings: 12.5 points
- Enabling mechanisms for energy efficiency: 11.5 points

The 52 utilities presented in the *Scorecard* operate within various state and regulatory environments, which are strong drivers of high performance in utility-sector energy efficiency. In this context, the utilities face constraints in decision making as regulated entities. Our ranking assesses energy efficiency programs, policies, and performance within the framework of these state and regulatory environments. Utilities have opportunities to deliver energy efficiency savings to customers in every state and regulatory context.

SCORES

Table ES1 shows the overall scores for utilities in the *2020 Utility Energy Efficiency Scorecard.*

Table ES1. Summary of scores

Rank	Utility	Program performance (26 pts)	Program offerings (12.5 pts)	Enabling mechanisms (11.5 pts)	Total (50 pts)	% of total points
1	Eversource MA	26	11.5	8.5	46	92%
1	NG MA	26.5*	11	8.5	46	92%
3	SDG&E	18.5	8.5	10.5	37.5	75%
4	ComEd	18.5	8.5	9.5	36.5	73%
5	BGE	18	10	8	36	72%
5	PG&E	15.5	10.5	10	36	72%
7	LADWP	14.5	11.5	9	35	70%
8	DTE	14	11.5	9	34.5	69%
9	PGE	15	10	8	33	66%
10	Eversource CT	14.5	10	8	32.5	65%
11	Consumers	12.5	10.5	9	32	64%
12	Xcel MN	15	8.5	7	30.5	61%
13	NG NY	10.5	10	8.5	29	58%

Rank	Utility	Program performance (26 pts)	Program offerings (12.5 pts)	Enabling mechanisms (11.5 pts)	Total (50 pts)	% of total points
13	SCE	12	8	9	29	58%
15	Xcel CO	13.5	8	7	28.5	57%
16	Ameren IL	13	6.5	7.5	27	54%
17	PECO	8	11	6	25	50%
18	Duke OH	12.5	4	8	24.5	49%
18	MidAm IA	13	8	3.5	24.5	49%
20	SRP	14	4	6	24	48%
21	AEP OH	9.5	7.5	6	23	46%
21	Entergy AR	12.5	5.5	5	23	46%
23	Ameren MO	11	6	5.5	22.5	45%
23	Duke SC	9.5	6.5	6.5	22.5	45%
23	We Energies	7.5	9	6	22.5	45%
26	Duke NC	9	6.5	6.5	22	44%
27	OG&E	7.5	8	6	21.5	43%
27	PSE	10.5	6.5	4.5	21.5	43%
29	ConEd	7.5	6	7.5	21	42%
29	PPL	9	7.5	4.5	21	42%
31	APS	6.5	7	7	20.5	41%
32	GA Power	5.5	8.5	6.5	20	40%
33	CPS	7	6.5	5	18.5	37%
34	LIPA	9.5	3	5.5	18	36%
34	OH Edison	9.5	5	3.5	18	36%
34	PacifiCorp UT	8	4	6	18	36%
37	Nevada Power	4.5	7	5.5	17	34%
37	Duke Progress	6.5	5	5.5	17	34%
39	Duke IN	6.5	4.5	5.5	16.5	33%
40	West Penn	5	4	5	14	28%
41	CenterPoint	2.5	5.5	4.5	12.5	25%
42	Oncor	2.5	5	4.5	12	24%
42	PSE&G	4	4	4	12	24%
44	SCE&G	2	5	4.5	11.5	23%
45	AEP TC	3.5	4	3.5	11	22%
46	TECO	2.5	5.5	1.5	9.5	19%

Rank	Utility	Program performance (26 pts)	Program offerings (12.5 pts)	Enabling mechanisms (11.5 pts)	Total (50 pts)	% of total points
47	Entergy LA	1.5	5.5	2	9	18%
48	Duke FL	2.5	5	1	8.5	17%
48	JCP&L	2	3.5	3	8.5	17%
50	Dominion	1	2.5	3.5	7	14%
51	FP&L	2	2	2.5	6.5	13%
52	AL Power	0	3.5	1.5	5	10%

* We awarded a half-point bonus to NG MA for far exceeding the top threshold of 3% savings as a percentage of sales.

Regional Results

Figure ES1 shows regional performance by utilities in the *2020 Scorecard*.

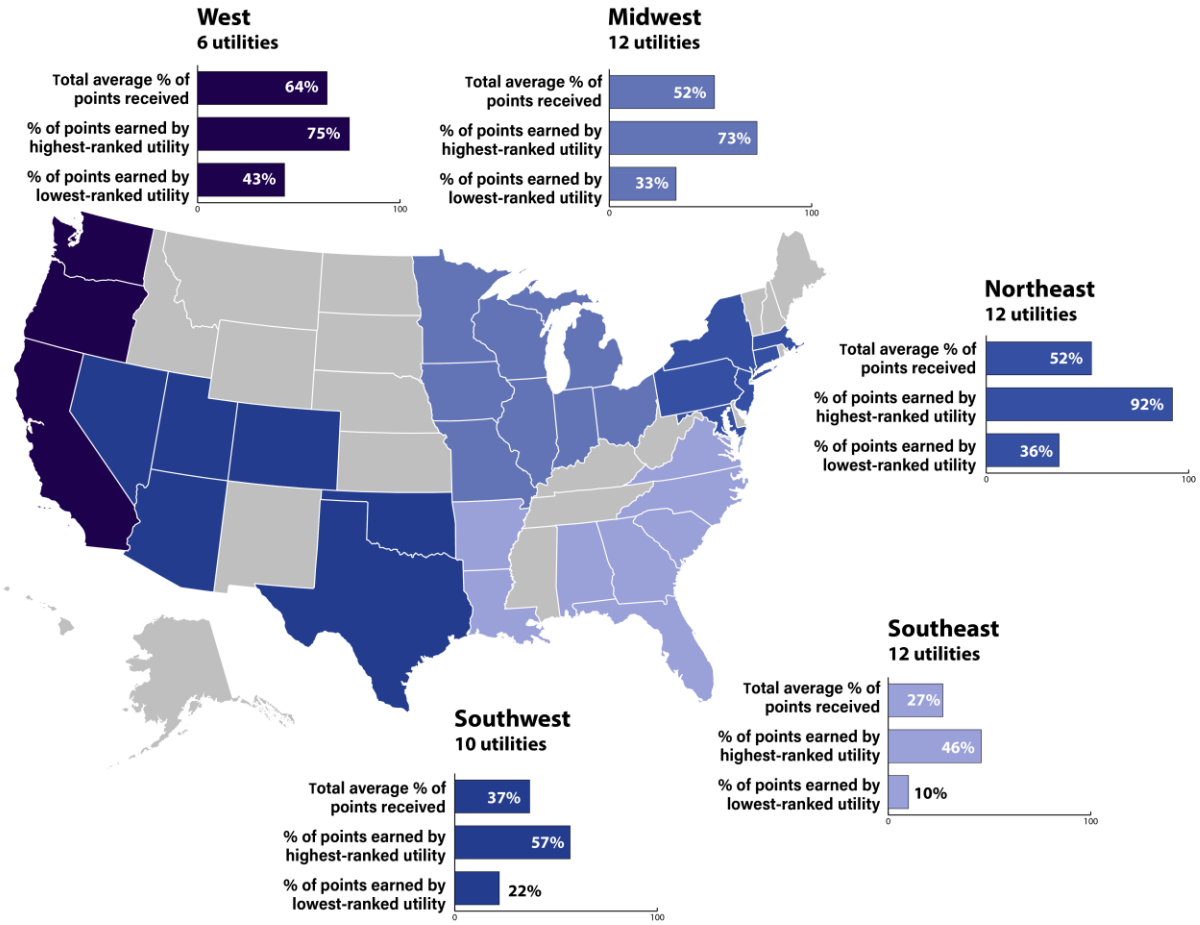

Figure E1. Utility performance by region

CURRENT TRENDS AND NEEDS

The utility landscape has transformed in many ways since the previous edition of the *Scorecard.* New technologies are emerging; states, utilities, and other stakeholders are increasingly focused on reducing greenhouse gas emissions (GHGs); and distributed energy resources (DERs) are continuing to come online. These and other trends are reflected in this year's *Scorecard*.

Energy savings are increasing. First-year energy savings increased by more than 3.2 TWh, or 20%, among the 51 utilities that were included in both the 2017 and 2020 editions of the *Scorecard*. (However this trend was not universal, with seven utilities experiencing savings decreases of more than 0.1% of sales.) Peak demand savings also increased, by more than 450 MW. This progress goes hand in hand with a large increase in program offerings. The 52 utilities offered more than 900 different programs in 2018, about 300 more than in 2015.[2]

Thirty-seven utilities in the *Scorecard* have adopted GHG reduction goals at varying levels of ambition (SEPA 2019). Energy efficiency is a critical tool for meeting these goals, and high savings can indicate that utilities are considering energy efficiency as a core element in their plans to reduce emissions (Nadel and Ungar 2019). Nineteen utilities scoring in the bottom half of our rankings and 6 in the bottom 10 have carbon goals in place, indicating their need to ramp up energy efficiency to meet their goals.

Utilities are innovating to meet changing system needs. Thirty-two utilities piloted new programs in 2018. Pilots included smart thermostats, online marketplaces for energy-efficient products, and DERs such as demand response and storage systems. Utilities are increasingly deploying energy efficiency as a DER or to meet policy goals like reduced emissions. For example, in 2015 only 4 utilities were pursuing geo-targeted efficiency; this increased to 11 in 2018. Additionally, seven utilities pursued energy-efficient fuel switching programs.[3] And utilities with advanced metering infrastructure (AMI) are providing feedback on energy usage to customers and deploying grid-interactive efficient buildings (GEBs). Programs that direct efficiency toward particular system needs, such as in areas of high demand growth on the distribution level, and that offset or delay the need for new or upgraded traditional infrastructure, can capture additional value as a complement to broad-scale efficiency.

Utility business models are slow to change. Two more utilities earned credit in the full revenue decoupling metric, and four more earned credit for performance incentive mechanisms, compared with 2015.[4] These policies incentivize robust efficiency performance. However the increase in utilities earning credit is due to methodology changes; the number of utilities

[2] As defined by the program categories listed in Category 2 of this report. Changes in methodology as described in our discussion of Category 2 may have contributed to this increase in addition to general program development.

[3] These are programs that encourage energy-efficient fuel switching to deliver overall BTU energy savings, GHG reductions, and customer cost savings.

[4] Full revenue decoupling is a mechanism that disconnects revenue recovery from sales volumes and reduces the utility disincentive to promote customer conservation and energy efficiency (RAP 2016). Performance incentives offer a utility a financial return on its energy efficiency achievements (Nowak et al. 2015).

with these policies has not grown despite rising interest nationally in making changes to the utility business model, such as through performance-based ratemaking (PBR). PBR ties utility revenue to performance on desired outcomes like increased energy affordability, improved system reliability, and GHG reductions, which are supported by energy efficiency, rather than to capital investments (Holden 2019). Additionally, residential utility rate structures and customer charge levels have not changed much since 2015. Rates are an important tool to encourage energy-efficient behaviors, such as with variable price signals that reflect how much it actually costs to produce and deliver electricity at various times, and with low fixed charges (also called customer charges) (Baatz 2017). The same number of utilities offer time-of-use rates, and the average customer charge has increased by only about $0.40.

Energy usage data need more attention. Energy usage data allow customers to better understand and manage their consumption. Many challenges to widespread data access and sharing remain, including a lack of clear legislative and regulatory requirements and limited advanced metering in many jurisdictions. As in the 2017 *Scorecard*, utilities tend to have either almost full penetration of AMI or none. Only seven utilities give both residential and commercial customers access to energy usage data in a convenient format. Of the 27 utilities with AMI penetration of 25% or greater, 22 use AMI to inform rate design that encourages energy-efficient behaviors and use AMI to provide behavior-based feedback to customers. Only nine use their AMI data to better target programs through data disaggregation, and only five are undertaking programs to promote GEBs.[5]

Utilities are focusing more on low-income programs. Average low-income energy savings (in MWh) have increased by about 60% since 2015. On average, utilities are spending more than 10% of their efficiency funding on low-income programs. Thirty-one utilities offer low-income programs that meet our definition of "comprehensive"; most do so by offering measures that go beyond direct install and address the building envelope.

Utilities are increasingly promoting electric vehicles. Sixteen utilities are offering a financial incentive for electric vehicle service equipment (EVSE, or charging equipment), and six offer make-ready programs that allow other organizations to deploy EVSE quickly and economically.[6] Even more utilities (25) are using rate design to promote EV charging at off-peak times.

EFFECTIVE STATE POLICIES

Our results highlight the importance of strong state policies and regulatory support for high performance in utility-sector efficiency programs. All of the top 10 utilities in this report are located in states that also rank among the top 13 in ACEEE's *2019 State Energy Efficiency Scorecard*. Policies in these states—such as energy efficiency resource standards (EERS) and

[5] See our discussion of Category 2 for more information on these programs and how utilities are using AMI to save energy.

[6] In make-ready programs, utilities prepare sites for the installation of EVSE by another party through electric infrastructure upgrades or installation.

financial opportunities for utilities to maintain and increase revenues while delivering efficiency—are important in driving performance.

CONCLUSION

The top 10 utilities all show a clear commitment to energy efficiency, with high energy savings and leadership across a breadth of programs and metrics. This commitment indicates the importance of efficiency to utilities and the benefits it provides to customers. Eversource Massachusetts and National Grid Massachusetts excelled in the *Scorecard*, both earning more than 90% of the available points. These two utilities are especially strong in quantitative energy efficiency program performance as well as energy savings targets.

The metrics evaluated in the *Scorecard* provide information to utilities, regulators, and others on how to realize the many benefits of efficiency for businesses, customers, and communities. The report increases the availability of utility-sector energy efficiency data to enable benchmarking and highlights areas where data availability can improve. It also provides a baseline for utilities to assess performance and gain insights into trends that will strengthen program efforts. A utility shows its commitment to energy efficiency through the quantitative performance assessed in the *Scorecard* and by including efficiency in future planning through pilot programs, implementation of emerging technologies, and setting strong targets.

Introduction

Energy efficiency is a clean and flexible grid resource that brings substantial benefits to the electric utility system. The need for robust energy efficiency programs is growing with advances in technology, an increasing focus on mitigating climate change, and more distributed energy resources coming online. These programs play a key role in eliminating energy waste; while some saved more and many saved less, the utilities covered in the 2020 *Utility Scorecard* saved an average of about 1% of their sales through more than 900 energy efficiency programs. By reducing energy consumption, utilities can delay or avoid the need to build new infrastructure like power plants and distribution assets. They can also lower wholesale prices for electricity and reduce the need for electricity from other sources such as natural gas, especially when efficiency is deployed in conjunction with other clean energy resources (Relf and Baatz 2017; Molina 2019). These benefits reduce costs for all utility customers (Chernick and Plunkett 2014). Reducing energy consumption can also decrease harmful air pollutants associated with fossil fuel generation, including criteria pollutants such as ozone, sulfur dioxide, and particulate matter that cause asthma and other respiratory conditions (Hayes and Kubes 2018). Efficiency has the potential to cut US greenhouse gas emissions by 50% by 2050 (Nadel and Ungar 2019).

The *Utility Scorecard* analyzes achievements in the utility sector, focusing primarily on end-use energy efficiency. Building on the first edition, published in 2017, as well as on new research on utility-sector energy efficiency, this year's *Scorecard* examines 20 areas related to utilities' energy efficiency efforts.[1] Each metric relies on primary data to assess a critical aspect of energy efficiency. We have updated some metrics from 2017 and included two new scored metrics to ensure that the report reflects the current landscape of utility-sector programs, policies, and achievements. As in 2017, we highlight the successes of leading utilities and also point out areas for improvement.

Methodology

In this section, we provide information on the selection of the utilities and scoring metrics contained in the report. We also outline our approach to data collection, including limitations to the data we used.

SELECTION OF UTILITIES

This year's *Scorecard* focuses on the United States' 52 largest electric utilities by retail sales volume.[2] We include all 51 utilities from the previous edition and add Tampa Electric, which rose to 49th place by retail sales in 2017. We used 2017 retail sales data published by the US Department of Energy's Energy Information Administration (EIA) to determine which utilities to include because 2018 sales data had not yet been finalized at the time of utility selection (EIA 2018). All other data are for 2018, unless otherwise specified. This set of

[1] ACEEE anticipates updating this report every two or three years.

[2] Two of these utilities (Eversource Energy and PG&E) and a third-party administrator whose performance is included in certain metrics as noted throughout the report (the New York State Energy Research and Development Authority [NYSERDA]) are represented on ACEEE's board of directors. About 20 others have been ACEEE conference sponsors, research funders, or Ally Program members over the past two years. All 52 utilities had the opportunity to review our draft findings. None contributed to the report's funding.

utilities represents various regions, ownership types, and program administrator models. It accounts for about 54% of total 2018 electricity sales and covers 31 states (EIA 2019d).

The final list of utilities includes investor-owned (IOU), municipal, and state and other public utilities such as Long Island Power Authority.[3] We focused on state-jurisdictional utilities rather than parent or holding companies because most energy efficiency decisions are made at this level, and because efficiency programs and policies may vary among different local distribution utilities under the same parent company. For example, we included Georgia Power and Alabama Power as two separate utilities instead of focusing on their parent, Southern Company. We included both Duke Energy subsidiaries in North Carolina (Duke Energy Carolinas and Progress Energy) as separate entities, as each individually ranks among the 52 largest utilities. While local power companies in the states served by the Tennessee Valley Authority often offer energy efficiency programs under Tennessee Valley Authority's Energy Right Solutions programs and the utility offers some programs directly to its large customers, we did not include Tennessee Valley Authority in this report because it is a wholesale supplier and none of its wholesale power customers rank among the 52 largest utilities.

A few states use a third-party program administration model to deliver energy efficiency programs to retail customers. In those states, we worked with both the utilities and the program administrators to appropriately allocate savings, spending, and other program data from within each utility's territory, regardless of who administered the program. Even where utilities do not directly administer programs, they can help or hinder third-party or state efforts through their rate design, data sharing, resource planning, and other practices. These administrators include Focus on Energy in Wisconsin, Energy Trust of Oregon, New York State Energy Research and Development Authority (NYSERDA), New York Power Authority (NYPA), and others.[4] It is important to note that it can be difficult for third-party administrators to allocate data to specific utility territories, as programs are often run with a statewide orientation.

Table 1 lists the utilities included in this report, sorted by sales, and shows 2018 data on revenues, sales, and customers. All utilities are IOUs except CPS, Los Angeles Department of Water and Power (LADWP), Long Island Power Authority (LIPA), and Salt River Project (SRP). Sales include both bundled and unbundled sales.

Table 1. Utilities included in the *2020 Scorecard*, by sales volume

Name	Abbreviation	State	Revenue ($1,000s)	Sales (GWh)	Customers
Oncor Electric Delivery	Oncor	TX	3,534,746	130,008	3,071,275
Florida Power & Light	FP&L	FL	10,716,741	110,073	4,961,288
CenterPoint Energy	CenterPoint	TX	2,221,747	90,409	2,483,716

[3] We did not include retail power marketers or utilities that do not operate a retail distribution system.

[4] Utilities with portfolios that were fully or partially administered by the state or third parties in 2018 include Ameren IL, BGE, ComEd, ConEd, JCP&L, LADWP, LIPA, NG NY, PG&E, PGE, PSE&G, SCE, SDG&E, and We Energies.

Name	Abbreviation	State	Revenue ($1,000s)	Sales (GWh)	Customers
Commonwealth Edison	ComEd	IL	5,013,341	89,440	4,021,991
Southern California Edison	SCE	CA	11,849,300	86,852	5,111,838
Georgia Power	GA Power	GA	8,044,993	85,492	2,536,685
Virginia Electric & Power	Dominion	VA	7,482,688	80,985	2,480,094
Pacific Gas & Electric	PG&E	CA	13,608,079	80,185	5,471,786
Duke Energy Carolinas	Duke NC	NC	4,868,514	59,211	2,005,333
Consolidated Edison	ConEd	NY	7,982,457	56,832	3,482,663
Entergy Louisiana	Entergy LA	LA	3,692,871	56,150	1,083,560
Alabama Power	AL Power	AL	5,475,948	55,686	1,480,475
DTE Electric	DTE	MI	5,101,459	48,602	2,201,184
Ohio Power	AEP OH	OH	2,809,401	44,562	1,484,321
Public Service Electric & Gas	PSE&G	NJ	3,725,259	41,899	2,266,387
Duke Energy Florida	Duke FL	FL	4,486,176	39,145	1,801,551
PECO Energy	PECO	PA	2,176,953	38,479	1,640,812
Progress Energy	Duke Progress	NC	3,575,788	38,362	1,411,441
Consumers Energy	Consumers	MI	4,382,878	37,864	1,827,159
PPL Electric Utilities	PPL	PA	1,897,228	37,489	1,440,559
Ameren Illinois	Ameren IL	IL	1,497,943	37,133	1,220,680
Niagara Mohawk Power (National Grid New York)	NG NY	NY	2,241,744	35,294	1,679,057
Ameren Missouri	Ameren MO	MO	3,161,694	33,700	1,223,595
Northern States Power	Xcel MN	MN	3,336,330	30,449	1,290,004
Baltimore Gas & Electric	BGE	MD	2,088,877	30,224	1,290,931
Public Service Co. of Colorado	Xcel CO	CO	2,737,949	29,249	1,478,992
Salt River Project	SRP	AZ	2,893,909	28,975	1,060,016
Duke Energy Indiana	Duke IN	IN	2,681,215	28,631	830,270
Arizona Public Service	APS	AZ	3,496,261	27,943	1,235,451
AEP Texas Central	AEP TC	TX	997,770	26,054	848,436
Oklahoma Gas & Electric	OG&E	OK	1,876,060	25,398	778,323
PacifiCorp	PacifiCorp UT	UT	1,984,339	24,514	915,252
Ohio Edison	OH Edison	OH	1,382,438	24,414	1,050,129
Wisconsin Electric Power	We Energies	WI	2,838,853	24,292	1,130,434
MidAmerican Energy	MidAm IA	IA	1,720,544	23,670	689,356
Nevada Power	Nevada Power	NV	2,118,828	23,045	934,370

Name	Abbreviation	State	Revenue ($1,000s)	Sales (GWh)	Customers
Puget Sound Energy	PSE	WA	2,175,580	22,726	1,149,781
South Carolina Electric & Gas*	SCE&G	SC	2,307,804	22,657	726,679
Entergy Arkansas	Entergy AR	AR	1,667,418	22,525	711,931
City of San Antonio, TX	CPS	TX	2,248,565	22,524	832,590
Eversource MA	Eversource MA	MA	2,901,061	22,335	1,052,886
Los Angeles Department of Water & Power	LADWP	CA	3,821,149	22,064	1,435,572
Duke Energy Carolinas	Duke SC	SC	1,751,299	21,822	591,113
Eversource CT	Eversource CT	CT	2,904,049	21,467	1,251,052
Jersey Central Power & Light	JCP&L	NJ	1,747,211	21,085	1,131,190
Duke Energy Ohio	Duke OH	OH	969,960	20,687	718,099
West Penn Power	West Penn	PA	972,932	20,550	726,645
Massachusetts Electric (National Grid Massachusetts)	NG MA	MA	2,340,736	19,963	1,317,661
Tampa Electric	TECO	FL	1,998,478	19,631	763,571
Long Island Power Authority	LIPA	NY	3,602,574	19,610	1,131,776
Portland General Electric	PGE	OR	1,760,151	19,221	888,123
San Diego Gas & Electric	SDG&E	CA	3,804,123	18,767	1,453,179

Revenue, sales, and customer data from EIA 2019d; utilities complete this form annually. *South Carolina Electric & Gas was acquired by Dominion Energy in 2019 and began to operate as Dominion Energy in 2019; we use SCE&G in this report because that was the utility's name in 2018.

Figure 1 shows the weight of each metric in the overall scoring.

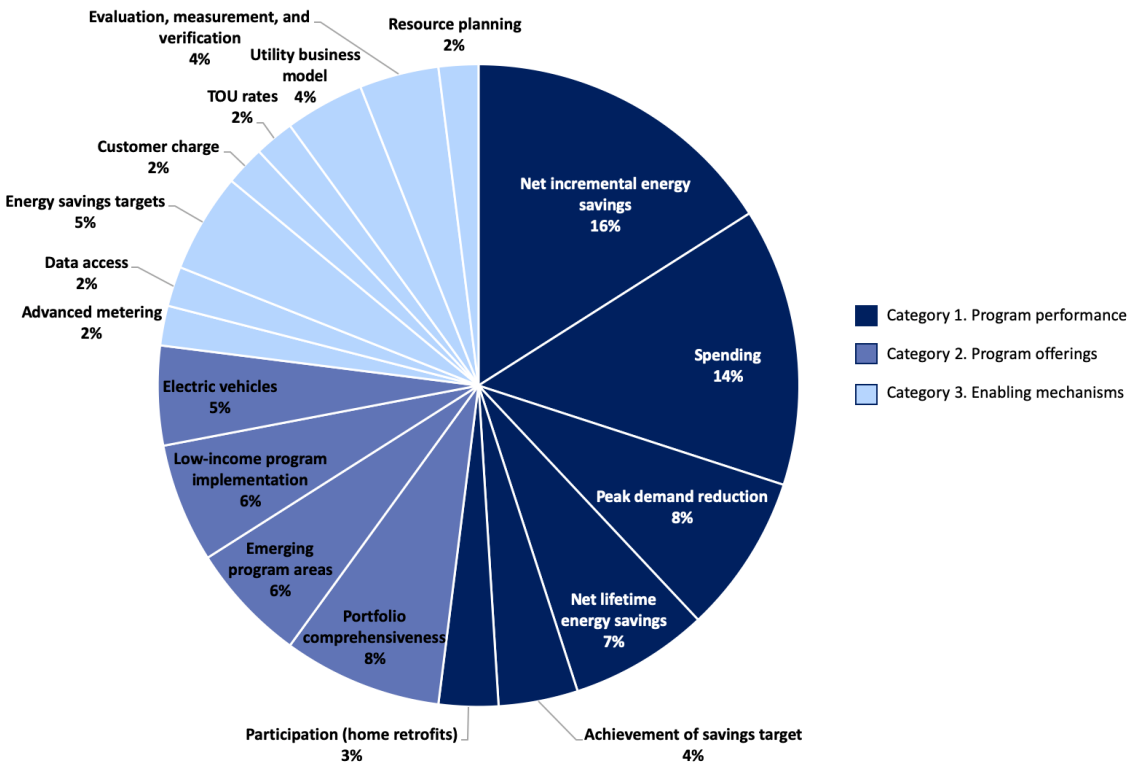

Figure 1. Weight of each metric

METRICS AND SCORING

The metrics in this report reflect the current utility energy efficiency landscape and cover customer-funded programs and initiatives as well as other areas of utility focus that relate more broadly to energy efficiency, such as electric vehicles and customer rates. The metrics allow flexibility in how utilities can achieve points, as their physical, economic, and political environments vary greatly, and what is effective in one utility's territory may not be in another's.[5] In the Practices of Leading Energy-Saving Utilities section, we outline how our categories of metrics come together to represent our vision of a well-rounded, high-performing energy-saving utility.

Utilities operate in a landscape of diverse regulatory and state policies that strongly influence planning, administration, and implementation of energy efficiency programs. Our metrics attempt to evaluate utility performance on the basis of actions utilities can take to advance energy efficiency, including in the regulatory or policy arena.[6] However we do recognize that electric utilities are regulated entities and often act only with regulatory approval. Our scoring represents what is happening within a utility service territory, where much of what happens is the result of complex legislative and regulatory processes.

[5] For example, agricultural energy efficiency programs may not be applicable to every utility, and therefore utilities could still earn full points for program offerings without having such a program.

[6] ACEEE's *State Energy Efficiency Scorecard* provides more information on state energy efficiency policies.

We developed a set of 20 metrics (two unscored) that allocate a total of 50 points across three categories:

- Quantitative energy efficiency savings and spending performance: 26 points
- Energy efficiency program offerings: 12.5 points
- Enabling mechanisms: 11.5 points

These categories recognize the importance not only of current-year performance but also of utility innovation, long-term planning, and policies that are critical to the continued success of energy efficiency programs. We have renamed and reorganized Categories 2 and 3 from the previous edition of the *Scorecard* to better reflect their component metrics. Category 2 evaluates the set of programs offered by each utility for its breadth and coverage of certain emerging technologies and program types. Category 3 evaluates the technologies, policies, rates, and planning processes that enable high levels of energy savings.

We allocate about half of the points to Category 1, energy efficiency program performance; about a quarter to Category 2, energy efficiency program offerings; and about a quarter to Category 3, enabling mechanisms. Point values for each set of metrics and each individual metric indicate their approximate relative importance in energy efficiency achievement for utilities. However when allocating points, we also took into account the quality and availability of data. Table 2 lists each metric included in the report and its point value.

Table 2. Metrics and scoring

Metric	Description	2020 points available	Change from 2017	% of 2020 total
Category 1. Energy efficiency program performance		26		+1
Net incremental energy savings	Net incremental energy savings as percentage of total sales	8	–	16%
Spending	Total energy efficiency spending as a percentage of revenue (includes performance incentives)	7	–	14%
Peak demand reduction	% of total peak demand reduction from energy efficiency (not demand response) on utility annual peak	4	–	8%
Net lifetime energy savings	Net lifetime electricity savings from measures installed in 2018 as a % of total retail sales	3.5	–0.5	7%
Achievement of savings target	% of 2018 MWh savings target achieved	2	–	4%
Participation (home retrofits)	Number of customers served by home retrofit programs out of total residential customers	1.5	+1.5	3%
Cost effectiveness	Primary cost-effectiveness test and overall portfolio score	N/A	–	0%

Metric	Description	2020 points available	Change from 2017	% of 2020 total
Category 2. Energy efficiency program offerings		12.5		–2.5
Portfolio comprehensiveness	Implementation of various residential, commercial, and industrial programs	4	+0.5	8%
Emerging program areas	Inclusion of various measures or programs, including pilots	3	–0.5	6%
Low-income program implementation	Spending, savings, and comprehensiveness of residential low-income programs	3	–	6%
Electric vehicles	Promotion of electric vehicles through EVSE incentives; encouragement of off-peak charging	2.5	+0.5	5%
Category 3. Enabling mechanisms		11.5		+1.5
Advanced metering	% of meters installed in 2018 that are smart meters (AMI)	1	–	2%
Data access	Implementation of automated benchmarking services and Green Button Connect My Data	1	–	2%
Energy savings targets	2018–2020 net incremental energy savings targets as a percentage of 2018 sales	2.5	–1.5	5%
Customer charge	Level of residential customer charge of primary rate option	1	–	2%
Residential demand charges	Availability and adoption of residential rates including a demand charge	N/A	–	0%
Time-of-use-rates	Availability of opt-in or default time-of-use rate for residential customers	1	–	2%
Utility business model	Full revenue decoupling and performance incentives in 2018	2	–	4%
Evaluation, measurement, and verification	Independence of EM&V and the calculation of net savings	2	–	4%
Resource planning	Inclusion of energy efficiency in integrated resource planning process; for utilities in restructured states, provision of information to other organizations for their planning purposes	1	+1	2%
Total		50		

Changes in point distribution from 2017 to 2020 are described in further detail in the relevant chapters. Some changes are due to modifications of the scoring methodology.

NEW METRICS

The utility landscape is rapidly evolving as distributed energy resources (DERs) and new technologies and software come online and as grid infrastructure changes.[7] These changes

[7] DERs are resources "sited close to customers that can provide some or all of their immediate electric or power needs and can also be used by the system to either reduce demand (as with energy efficiency) or provide support

affect the utility business model and create new opportunities for utilities to deliver energy efficiency. To ensure that the metrics included in the report reflect this changing landscape, we reviewed their relevance and importance to effective energy efficiency portfolios. We conducted a survey seeking input on the importance of the previous edition's metrics and the way in which we evaluated them. We sent the survey to key contacts and subject matter experts, as well as utility contacts. We also sought input on new metrics to include in the report. We considered all the input, but to avoid potential conflicts of interest, we carefully reviewed utility feedback in conjunction with other, independent experts' comments.

We developed this year's list of 18 scored metrics and 2 unscored metrics on the basis of survey results, our ongoing research, and internal discussions. In addition to updating some existing metrics, we added 4 new ones:

- Participation (home retrofits): 1.5 points
- Residential demand charge: Unscored
- Resource planning: 1 point
- Cost effectiveness: Unscored

We discuss the details of each of these new metrics in the relevant report section.

DATA COLLECTION

Each of the 20 metrics relies heavily on primary data collected by ACEEE. Appendix A lists our sources. We collected information from utility annual reports, program plans, evaluations, and other sources such as utility websites. We extracted publicly available data and program information largely based on 2018 regulatory filings and 2018–2020 planning documents, as well as additional filings on utility and public utility commission websites. All data in the *Scorecard* are for 2018 unless otherwise stated. For utilities that do not operate on the calendar year, we used data from the 2017–2018 program year. We used evaluated data whenever possible. We used this information to pre-fill a data request that we sent to contacts at each of the 52 utilities. Utility representatives from 43 of these utilities provided updates and corrections to the data request and answered questions directly on nonquantitative metrics. We followed up with personal communications with utility representatives to clarify data and to fill gaps and did additional verification of information reported by the utilities. For example, the data request provided program definitions and asked utilities to report which programs they offered in 2018. We used program filings and utility websites to confirm what they reported.

We also relied on publicly available data collected from EIA Form 861, FERC Form 1, active utility tariffs, and websites maintained by third parties such as ENERGY STAR® and utility energy efficiency evaluator groups. We used publicly available data and information collected from other ACEEE research to cross-check data provided in utility filings. We used 2018 EIA Form 861 energy efficiency data for utilities that did not respond to requests for information and for which we were unable to find regulatory filings or specific data. This

to satisfy the energy, capacity, or ancillary service needs of the distribution grid" (Baatz, Relf, and Nowak 2018, 14).

applies to all quantitative data for Alabama Power and to spending information for Dominion Energy. These cases are also noted in the tables.

In tallying sales, revenue, and customer counts for each utility, we included customers who are eligible to opt out of energy efficiency programs. This accounts for the negative impact of opt-out provisions that allow large customers to avoid participating in utility energy efficiency programs. Including opt-out customers increases the denominator of several metrics, although some utilities exclude opt-out customers from these figures in their own internal calculations. In some cases, the customers eligible to opt out represent a large portion of sales. For example, exempt and non-jurisdictional customers account for 47% of sales in Dominion's territory (Michael Hubbard, manager of energy conservation, Dominion Energy, pers. comm., December 18, 2019).

In some cases we adjusted data to normalize results for scoring purposes. For utilities in states relying on third-party program administrators, we used publicly available data as well as allocators to assign performance within each utility's territory. We confirmed these data with utility and third-party program administrator staff. In all tables in this report, blank cells indicate that no data were found.

DATA LIMITATIONS

Although we used a data request this year to improve the quality of reported data, we still encountered challenges. Some utilities do not publicly disclose detailed information on energy efficiency programs and performance. Annual energy efficiency reports are not typically available on utility websites and are sometimes difficult to locate through public utility commission websites. Additionally, annual reports are sometimes broken into many documents without a summary, making data difficult to extract and interpret.

Utilities do not report data consistently and may include or exclude certain types of programs from their reporting, sometimes in response to regulatory requirements. For example, some utilities include third-party programs as part of their own portfolio, while others report these programs separately. Utilities may also separately report data from certain programs, such as conservation voltage reduction, on the basis of utility commission reporting standards and requirements. Utilities sometimes include demand response and renewable energy programs within efficiency portfolios. We do not include any spending or savings data related to demand response and renewable energy in any metrics in this report. While we encourage integrated programs that combine efficiency with other distributed energy resources where the net benefits exceed the cost of integration, we limit consideration of those programs to the chapter on energy efficiency program offerings (York, Relf, and Waters 2019). We may consider integrated energy efficiency and demand response programs in future editions.

The level of detail in annual reports also varies widely across utilities. Many include extensive descriptions of programs, while others list program names without descriptions or provide only summary data. These variations make it difficult to consistently interpret and analyze program and emerging technology offerings. Similarly, definitions of energy efficiency–related terms vary widely across utilities. These variations make comparison of

utility performance challenging for many metrics, such as cost-effectiveness testing, research and development programs, and low-income programs.

Reported levels of savings for utilities are also inconsistent. For example, it is often unclear in annual reports and filings whether utilities are reporting savings at the meter or at the generator level. The difference between the two values is energy losses on the transmission and distribution system. Avoiding energy losses reduces the need for additional electricity and represents a large amount of energy savings. Many utilities also do not provide loss factors or program- or portfolio-level net-to-gross ratios (NTGRs).[8]

For utilities that did not report generator-level savings, we adjusted meter-based energy and peak demand savings as well as savings targets to net savings at the generator level to account for additional savings from avoided line losses. For this adjustment we applied an average loss factor to savings figures that were not already reported at the generator level. In cases where utility-specific loss factors were unavailable, we used 5%, which is the average of EIA's estimated US transmission and distribution losses for 2013–2017 (EIA 2019e). If we were unable to determine the reporting level for a utility's savings data (generator versus meter), we assumed generator-level in order to be conservative. We also applied loss factors to the EIA total retail sales and total peak demand data, as they are reported at the meter level. While we use average line losses in this report due to inconsistent data, utilities should use marginal line losses in valuing energy efficiency resources to account for varying value during peak and nonpeak periods.

We evaluate net savings in this report. As indicated in footnote 8, net savings are energy savings attributable to energy efficiency programs. These reported savings may implicitly or explicitly include the effects of factors such as free ridership, participant and nonparticipant spillover, and induced market effects (for a discussion of these effects, see Violette and Rathbun 2017). While it is not an exact comparison because states and utilities measure net savings differently, using net savings allows a more-direct comparison of utility program achievement.

However some utilities report only gross savings, and in other cases it is unclear whether the utility is reporting net or gross savings. Where utilities report gross savings, we adjusted these to net savings using the utility's NTGR. In cases where we could not determine whether savings were net or gross, or where we could not find an NTGR, we applied an NTGR of 83.1%.[9] Appendix B provides more detail on reporting levels, line loss factors, and NTGRs.

Our pre-filled data request allowed us to ask utilities directly about uncertain and unreported information and gave us more clarity on data reporting levels, NTGRs, and line loss factors. However inconsistencies across regulatory environments and reporting

[8] The net-to-gross ratio is an assessment of net versus gross savings. Net savings are changes in energy consumption attributable directly to a program, which may implicitly or explicitly include factors like induced market effects, free ridership, and participant and nonparticipant spillover. Gross savings are changes in energy consumption attributable to a program from program participants regardless of why they participated (ACEEE 2019).

[9] This is the average of the NTGRs that were reported by utilities for 2018 savings.

requirements still left us with a number of the issues described above, both in dealing with directly reported information and in confirming it with filings and publicly available documents.

Overall Scores

Our review of the largest 52 utilities demonstrates wide variation in energy efficiency programs, actions, and other areas. When reviewing performance results, it is important to consider the varied regulatory and state policy landscapes that may constrain utilities' behavior.

All 52 utilities are regulated entities, meaning much of their behavior is influenced by this landscape. For example, utilities will not undertake major investments or significant expenses, including energy efficiency programs, without an opportunity to recover associated costs. State policies too can influence utility actions, with some policies hindering utility action on energy efficiency and others, such as energy efficiency resource standards (EERS), driving greater performance.[10] It is important to note, however, that utilities can have leverage in policy and regulatory decision making to influence enabling mechanisms for energy efficiency such as those assessed in Category 3.

Table 3 shows the scores for each utility for all three categories of metrics.

[10] See Molina and Kushler 2015.

Table 3. Scores for all three categories of metrics

Rank	Utility	Program performance (26 pts)	Program offerings (12.5 pts)	Enabling mechanisms (11.5 pts)	Total (50 pts)	% of total points
1	Eversource MA	26	11.5	8.5	46	92%
1	NG MA	26.5*	11	8.5	46	92%
3	SDG&E	18.5	8.5	10.5	37.5	75%
4	ComEd	18.5	8.5	9.5	36.5	73%
5	BGE	18	10	8	36	72%
5	PG&E	15.5	10.5	10	36	72%
7	LADWP	14.5	11.5	9	35	70%
8	DTE	14	11.5	9	34.5	69%
9	PGE	15	10	8	33	66%
10	Eversource CT	14.5	10	8	32.5	65%
11	Consumers	12.5	10.5	9	32	64%
12	Xcel MN	15	8.5	7	30.5	61%
13	NG NY	10.5	10	8.5	29	58%
13	SCE	12	8	9	29	58%
15	Xcel CO	13.5	8	7	28.5	57%
16	Ameren IL	13	6.5	7.5	27	54%
17	PECO	8	11	6	25	50%
18	Duke OH	12.5	4	8	24.5	49%
18	MidAm IA	13	8	3.5	24.5	49%
20	SRP	14	4	6	24	48%
21	AEP OH	9.5	7.5	6	23	46%
21	Entergy AR	12.5	5.5	5	23	46%
23	Ameren MO	11	6	5.5	22.5	45%
23	Duke SC	9.5	6.5	6.5	22.5	45%
23	We Energies	7.5	9	6	22.5	45%
26	Duke NC	9	6.5	6.5	22	44%
27	OG&E	7.5	8	6	21.5	43%
27	PSE	10.5	6.5	4.5	21.5	43%
29	ConEd	7.5	6	7.5	21	42%
29	PPL	9	7.5	4.5	21	42%
31	APS	6.5	7	7	20.5	41%
32	GA Power	5.5	8.5	6	20	40%
33	CPS	7	6.5	5	18.5	37%

Rank	Utility	Program performance (26 pts)	Program offerings (12.5 pts)	Enabling mechanisms (11.5 pts)	Total (50 pts)	% of total points
34	LIPA	9.5	3	5.5	18	36%
34	OH Edison	9.5	5	3.5	18	36%
34	PacifiCorp UT	8	4	6	18	36%
37	Nevada Power	4.5	7	5.5	17	34%
37	Duke Progress	6.5	5	5.5	17	34%
39	Duke IN	6.5	4.5	5.5	16.5	33%
40	West Penn	5	4	5	14	28%
41	CenterPoint	2.5	5.5	4.5	12.5	25%
42	Oncor	2.5	5	4.5	12	24%
42	PSE&G	4	4	4	12	24%
44	SCE&G	2	5	4.5	11.5	23%
45	AEP TC	3.5	4	3.5	11	22%
46	TECO	2.5	5.5	1.5	9.5	19%
47	Entergy LA	1.5	5.5	2	9	18%
48	Duke FL	2.5	5	1	8.5	17%
48	JCP&L	2	3.5	3	8.5	17%
50	Dominion	1	2.5	3.5	7	14%
51	FP&L	2	2	2.5	6.5	13%
52	AL Power	0	3.5	1.5	5	10%

*** We awarded a half-point bonus to NG MA for far exceeding the top threshold of 3% savings as a percentage of sales.**

Figure 2 breaks down each utility's scores for all three categories of metrics.

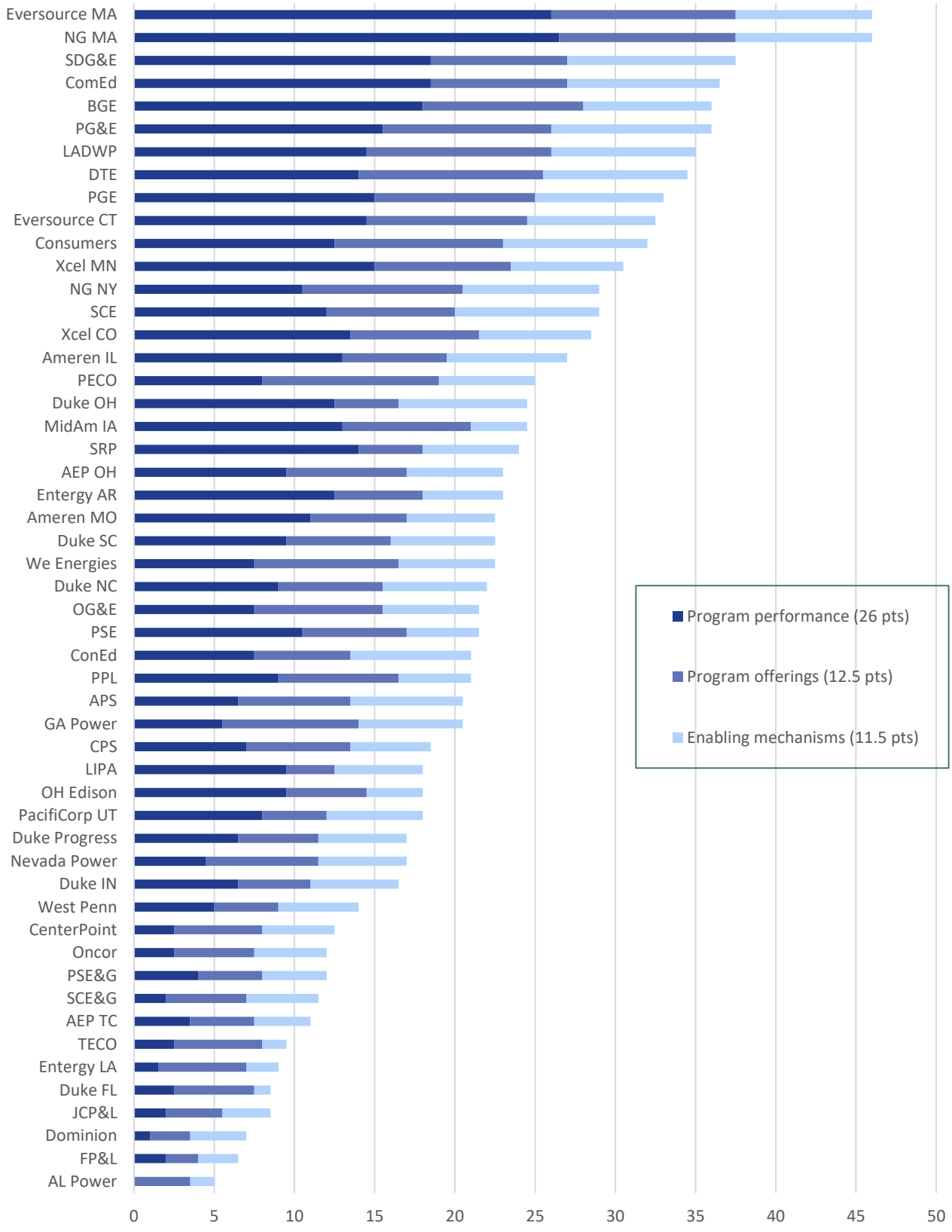

Figure 2. Scores by category

On average, the 52 utilities earned about 22 points, or 44%, out of the available 50. The median was slightly lower at 21.75. The top 10 performers are located in 7 states, including 3 utilities from California and 2 from Massachusetts. Two utilities within each of the parent companies Exelon and Eversource fall into the top 10. In contrast, 7 of the bottom 10 utilities are in the southeastern United States. The standings indicate that company commitment level and regional pressure and policy context may be important to high efficiency achievement. The top 10 performers range significantly in size based on 2018 sales, from the fourth- and eighth-largest utilities (ComEd and PG&E) to the two smallest of the group (PGE and SDG&E).

Eversource Massachusetts (Eversource MA) and National Grid Massachusetts (NG MA) earned the most points with 46 out of 50, both excelling in all three categories. These were the top performers in the 2017 report as well. The two leaders are more than 8 points in front of the next utility (San Diego Gas & Electric) and nearly 14 points ahead of 10th-place Eversource CT. This indicates there is opportunity for improvement even among the top performers.

The top two utilities are especially strong in the Category 1 quantitative program performance metrics and score well in metrics that assess energy savings targets. The high level of achievement in these categories reflects strong regulatory support and the state policy goal of reaching high levels of savings. These utilities also scored nearly full points in Category 2, indicating it is important to offer a breadth of energy efficiency programs.

Regionally, there is wide variation in scores. The West and Midwest were the highest-scoring regions, with 64% and 52% of available points earned, on average, respectively, while the Southeast earned an average of only 27% of all possible points. The Northeast's electric grid has the lowest average emissions rate nationally, while the Southeast has the second highest and the Midwest the highest (EPA 2019). As a result, each megawatt-hour saved from energy efficiency in the Southeast and Midwest is on average displacing relatively greater emissions than in other regions. This makes energy efficiency a particularly valuable tool for greenhouse gas reduction in these regions, especially in the Southeast, where there is the most potential for energy efficiency growth based on performance in the *Scorecard*. Additionally, in 2018 and 2019, respectively, Iowa and Ohio passed legislation greatly limiting energy efficiency programs (Berg et al. 2019). Utilities in these states are likely to drop in future rankings and will be missing out on cost-effective carbon reduction strategies as they roll back energy efficiency programs. Table 4 shows how utilities in each region performed, the percentage of possible points earned by the top and bottom utilities, and the three top-scoring utilities in each region.[11]

[11] The Midwest includes utilities in IA, IL, IN, MI, MN, MO, OH, and WI. The Northeast includes utilities in CT, MA, MD, NJ, NY, and PA. The Southeast includes utilities in AL, AR, FL, GA, LA, NC, SC, and VA. The Southwest includes utilities in AZ, CO, OK, NV, UT, and TX. The West includes utilities in CA, OR, and WA.

Table 4. Utility performance by region

Region	Number of utilities	Average % of total points achieved	% of points earned by highest-ranked utility	% of points earned by lowest-ranked utility	Top three utilities in the region (% of available points)
West	6	64%	75%	43%	San Diego Gas & Electric (75%), Pacific Gas & Electric (72%), Los Angeles Department of Water and Power (70%)
Midwest	12	52%	73%	33%	Commonwealth Edison (73%), DTE (69%), Consumers (64%)
Northeast	12	52%	92%	36%	Eversource MA (92%), National Grid MA (92%), BGE (72%)
Southwest	10	37%	57%	22%	Xcel CO (57%), Salt River Project (48%), Oklahoma Gas & Electric (43%)
Southeast	12	27%	46%	10%	Entergy AR (46%), Duke SC (45%), Duke NC (44%)

All of the metrics in *The 2020 Utility Energy Efficiency Scorecard* are important to building a well-balanced, effective, and forward-thinking energy efficiency portfolio. This report offers a baseline to assess utility performance and provides insights into trends that will help inform portfolio design and delivery in the future. The benefits of efficiency for utilities and their customers are numerous, as evidenced by the achievements of the group of utilities leading the way in this report. For utilities that are just getting started or continuing to develop their portfolios, this report can provide information on what elements are important to include.

Current Trends and Needs

The utility landscape has transformed in many ways since the previous edition of the *Scorecard.* New technologies are emerging; states, utilities, and other stakeholders are increasingly focused on reducing GHGs; and DERs are continuing to come online. These and other trends are reflected in this year's *Scorecard*.

Energy savings are increasing. First-year energy savings increased by more than 3.2 TWh, or 20%, among the 51 utilities that were included in both the 2017 and 2020 editions of the *Scorecard*. (However this trend was not universal, with seven utilities experiencing savings decreases of more than 0.1% of sales.) Peak demand savings also increased, by more than 450 MW. These increased savings go hand in hand with a large increase in program offerings. The 52 utilities offered more than 900 different programs in 2018, about 300 more than in 2015.[12]

Thirty-seven utilities in the *Scorecard* have adopted greenhouse gas reduction goals at varying levels of ambition (SEPA 2019). Energy efficiency is a critical tool for meeting these

[12] As defined by the program categories listed in Category 2. Changes in methodology as described in our discussion of Category 2 may have contributed to this increase in addition to general program development.

goals, and high savings can indicate that utilities are considering energy efficiency as a core element in their plans to reduce emissions (Nadel and Ungar 2019). Nineteen utilities scoring in the bottom half of our rankings and 6 in the bottom 10 have carbon goals in place, indicating their need to ramp up energy efficiency to meet their goals.

Utilities are innovating to meet changing system needs. Thirty-two utilities piloted new programs in 2018. Pilots included smart thermostats, online marketplaces for energy-efficient products, and DERs such as demand response and storage systems. Utilities are increasingly deploying energy efficiency as a DER or to meet policy goals like reduced emissions. For example, in 2015 only 4 utilities were pursuing geo-targeted efficiency; this increased to 11 in 2018. Additionally, seven utilities pursued energy-efficient fuel switching programs.[13] And utilities with advanced metering infrastructure (AMI) are providing feedback on energy usage to customers and deploying grid-interactive efficient buildings (GEBs). Programs that direct efficiency toward particular system needs, such as in areas of high demand growth on the distribution level, and offset or delay the need for new or upgraded traditional infrastructure, can capture additional value as a complement to broad-scale efficiency.

Utility business models remain slow to change. Two more utilities earned credit in the full revenue decoupling metric, and four more earned credit for performance incentive mechanisms, compared with 2015.[14] These policies incentivize robust efficiency performance. However the increase in utilities earning credit is due to methodology changes; the number of utilities with these policies has not grown despite rising interest nationally in making changes to the utility business model, such as through performance-based ratemaking (PBR). PBR ties utility revenue to performance on desired outcomes like increased energy affordability, improved system reliability, and GHG reductions, which are supported by energy efficiency, rather than to capital investments (Holden 2019). Additionally, residential utility rate structures and customer charge levels have not changed much since 2015. Rates are an important tool to encourage energy-efficient behaviors, such as with variable price signals about how much it actually costs to produce and deliver electricity at various times, and with low fixed charges (also called customer charges) (Baatz 2017). The same number of utilities offer time-of-use rates, and the average customer charge has increased by only about $0.40.

Energy usage data need more attention. Energy usage data allow customers to better understand and manage their consumption. Many challenges to widespread data access and sharing remain, including a lack of clear legislative and regulatory requirements and limited advanced metering in many jurisdictions. As in the 2017 *Scorecard*, utilities tend to have either almost full penetration of AMI or none. Only seven utilities give both residential and commercial customers access to energy usage data in a convenient format. Of the 27 utilities with AMI penetration of 25% or greater, 22 use AMI to inform rate design that encourages

[13] These are programs that encourage energy-efficient fuel switching to deliver overall BTU energy savings, GHG reductions, and customer cost savings.

[14] Full revenue decoupling is a mechanism that disconnects revenue recovery from sales volumes and reduces the utility disincentive to promote customer conservation and energy efficiency (RAP 2016). Performance incentives offer a utility a financial return on its energy efficiency achievements (Nowak et al. 2015).

energy-efficient behaviors and use AMI to provide behavior-based feedback to customers. Only 9 use their AMI data to better target programs through data disaggregation, and only 5 are undertaking programs to promote GEBs.[15]

Utilities are focusing more on low-income programs. Average low-income energy savings (in MWh) have increased by about 60% since 2015. On average, utilities are spending more than 10% of their efficiency funding on low-income programs. Thirty-one utilities offer low-income programs that meet our definition of *comprehensive*; most do so via offerings beyond direct-install measures that address the building envelope.

Utilities are increasingly promoting electric vehicles. Sixteen utilities are offering a financial incentive for electric vehicle service equipment (EVSE, or charging equipment), and six offer make-ready programs that allow other organizations to deploy EVSE quickly and economically.[16] Even more utilities (25) are using rate design to promote EV charging at off-peak times.

Looking Forward

This report largely represents a snapshot of the utility energy efficiency landscape in 2018 and provides insights into trends that developed after the previous edition of the *Scorecard*. New policies and developments have arisen since 2018 that our scoring may not have captured. These developments provide a window into what we might expect from utilities in the coming years.

Multiple utilities have either proposed or have gained approval of large new energy efficiency portfolios. In response to Virginia's Grid Transformation and Security Act passed in 2018, Dominion's regulators approved 11 new energy efficiency programs (6 residential and 5 commercial and industrial) that the utility began to implement in 2019 (Walton 2019b). In 2018 PSE&G proposed a portfolio of 22 new energy efficiency programs to run over the course of six years. The proposal has not yet been approved (PSEG 2019). SCE&G also proposed new or modified demand-side management programs in 2019, a suite of seven residential and three nonresidential programs (Dominion Energy South Carolina 2019).

State policies enacted since 2018 are likely to hinder future performance of other utilities. In 2019 the Ohio legislature passed HB 6, which effectively gets rid of the state's EERS and removes cost recovery for programs beyond those that meet the rolled-back goals. Iowa's SF 2311 capped utility energy efficiency spending and expanded customers' eligibility to opt out of programs (Berg et al. 2019). In 2019 California adopted energy savings goals for IOUs that decrease in future years (Walton 2019a).

[15] See our discussion of Category 2 for more information on these programs and how utilities are using AMI to save energy.

[16] In make-ready programs, utilities prepare sites for the installation of EVSE by another party through electric infrastructure upgrades or installation.

Category 1. Energy Efficiency Program Performance

In Category 1 we review several key areas of utility-sector energy efficiency program performance: incremental energy savings, program spending, peak demand reduction, net lifetime savings, progress toward energy savings targets, and participation (home retrofits). Table 5 shows scores for Category 1.

Table 5. Category 1 scores by metric

Utility	Incremental savings (8 pts)	Spending (7 pts)	Peak demand reduction (4 pts)	Lifetime energy savings (3.5 pts)	% to 2018 target (2 pts)	Participation (1.5 pts)	Total (26 pts)	% of category
Eversource MA	8	7	4	3.5	2	1.5	26	100%
NG MA	8.5*	7	4	3.5	2	1.5	26.5	100%
ComEd	5.5	6	1.5	2.5	2	1	18.5	71%
SDG&E	6	2	4	3.5	2	1	18.5	71%
BGE	5	5	2.5	2	2	1.5	18	69%
PG&E	4.5	2	3.5	2.5	2	1	15.5	60%
PGE	4	4.5	2	2.5	1	1	15	58%
Xcel MN	4.5	3	2	2.5	2	1	15	58%
LADWP	4.5	3.5	1	3	1.5	1	14.5	56%
Eversource CT	4	3.5	1.5	2	2	1.5	14.5	56%
DTE	4	2.5	2	2.5	1.5	1.5	14	54%
SRP	5.5	1	3	1.5	2	1	14	54%
Xcel CO	4	2.5	2	2.5	1.5	1	13.5	52%
MidAm IA	3.5	3.5	2	2	1	1	13	50%
Ameren IL	2.5	5.5	1	1.5	1	1.5	13	50%
Consumers	4	2.5	1.5	2	1.5	1	12.5	48%
Duke OH	3.5	3	2	1.5	1.5	1	12.5	48%
Entergy AR	3	3	2	2	1.5	1	12.5	48%
SCE	4	1.5	2	2.5	2	0	12	46%
Ameren MO	3	2	2.5	1.5	2	0	11	42%
NG NY	3	4.5	1	1	0.5	0.5	10.5	40%
PSE	3	4	0	1.5	1	1	10.5	40%
AEP OH	2.5	2	1.5	1.5	0.5	1.5	9.5	37%
Duke SC	3	1.5	1.5	1	1	1.5	9.5	37%
LIPA	4	1.5	1.5	1	1.5	0	9.5	37%
OH Edison	3	2	1	1.5	2	0	9.5	37%
PPL	2.5	2.5	1	1	0.5	1.5	9	35%
Duke NC	2.5	1.5	1.5	1	1	1.5	9	35%

Utility	Incremental savings (8 pts)	Spending (7 pts)	Peak demand reduction (4 pts)	Lifetime energy savings (3.5 pts)	% to 2018 target (2 pts)	Participation (1.5 pts)	Total (26 pts)	% of category
PECO	2.5	2.5	1	0.5	0.5	1	8	31%
PacifiCorp UT	2.5	2	0.5	1.5	0.5	1	8	31%
ConEd	2	2	1	1	0.5	1	7.5	29%
OG&E	2	1.5	1	0.5	1	1.5	7.5	29%
We Energies	2	1.5	0.5	1.5	0.5	1.5	7.5	29%
CPS	1.5	1.5	2	0.5	0.5	1	7	27%
APS	2	0.5	1.5	1	0.5	1	6.5	25%
Duke IN	2	1	1	0.5	0.5	1.5	6.5	25%
Duke Progress	2	1.5	0.5	0.5	0.5	1.5	6.5	25%
GA Power	1.5	0.5	1.5	0.5	0.5	1	5.5	21%
West Penn	2	1	0.5	0.5	1	0	5	19%
Nevada Power	1.5	0.5	0.5	0.5	0	1.5	4.5	17%
PSE&G	1	1.5	0.5	0.5	0	0.5	4	15%
AEP TC	0.5	1	0.5	0	0	1.5	3.5	13%
CenterPoint	0.5	1	0.5	0	0	0.5	2.5	10%
Duke FL	0.5	0	0.5	0	0	1.5	2.5	10%
Oncor	0.5	1	0	0	0	1	2.5	10%
TECO	0.5	0.5	0	0	0.5	1	2.5	10%
FP&L	0	0.5	0.5	0	0	1	2	8%
JCP&L	1	1	0	0	0	0	2	8%
SCE&G	1	0.5	0	0	0	0.5	2	8%
Entergy LA	0	0	0	0	0	1.5	1.5	6%
Dominion	0	0.5	0	0	0	0.5	1	4%
AL Power	0	0	0	0	0	0	0	0%

* We awarded a half-point bonus to NG MA for far exceeding the top threshold of 3% savings as a percentage of sales.

Figure 3 shows the distribution of scores in Category 1.

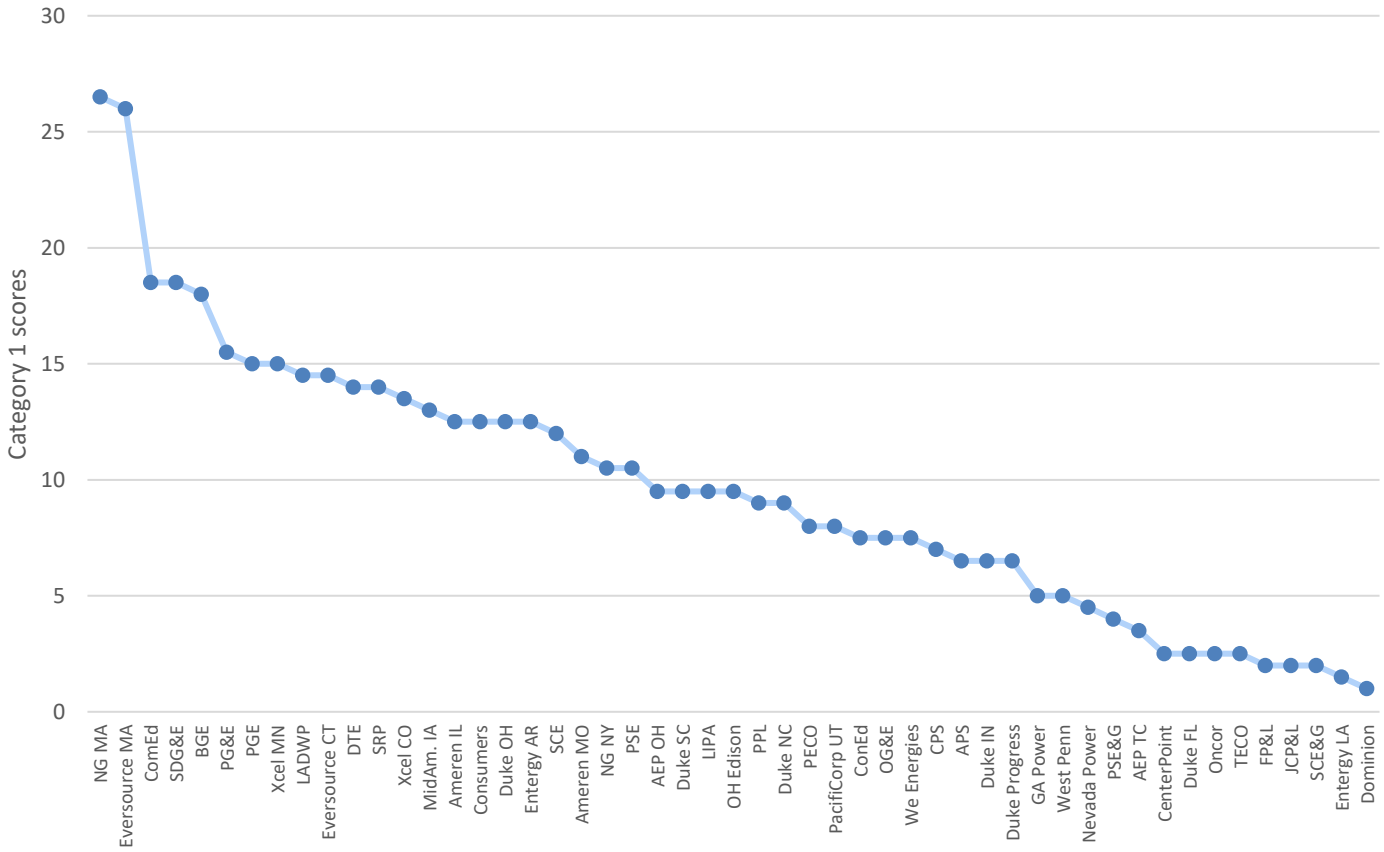

Figure 3. Distribution of Category 1 scores

Utilities could earn more than half of the *Scorecard*'s total possible points in Category 1. This category is the most heavily weighted in the *Scorecard* because energy and peak demand savings (as well as their associated benefits such as GHG emission reductions in some scenarios) are the ultimate goal of energy efficiency portfolios. The category's results are a strong indicator of a utility's energy efficiency performance. Two utilities earned full points in Category 1, NG MA and Eversource MA. No other utilities reached 20 points, and on average, utilities earned just 9.5 points. The top 10 utilities in this category include 2 from Massachusetts and 3 from California. ComEd and BGE placed third and fifth, respectively, in this category, and are from the same parent company (Exelon). Eversource Energy also has 2 utilities in the top 10 in this category.

Incremental net savings as a percentage of retail sales is the most heavily weighted metric in the report, with 8 available points. We weight net incremental savings heavily because this is the primary metric of success for energy efficiency portfolios in most states and is relatively easily comparable across utilities. Savings achievements are also awarded points in the peak demand savings, lifetime savings, and target achievement metrics. On average, the group realized incremental net energy savings of 1.03% of retail sales in 2018. However strong performance is not universal, with 10 utilities attaining savings of 0.25% or less. One utility, NG MA, achieved energy savings of more than 3.5%, and Eversource MA saved more than 3%. Eversource MA and NG MA also led the group with more than 9% of utility

revenue spent on energy efficiency programs in 2018. Those in the top 11 in this metric all spent more than 3.5% of revenue on efficiency; on average, the figure was 2.58%.[17]

In future editions, we plan to also score utilities on total annual savings, sometimes called cumulative annual persisting savings. These are the total energy savings in a given year from all programs and measures installed in that year *and* those installed in previous years that continue to save energy (i.e., have not yet reached the end of their useful life). This recognizes historical investment in energy efficiency, as some measures save energy for decades, meaning the total annual energy savings in 2018 could contain savings from programs put in place as far back as the mid-1990s. While we did not include total annual energy savings as a metric for this report due to a lack of data and challenges with data consistency, we do consider it to be an important metric because it indicates energy savings from longer-lived measures and a longer history of successful program implementation. Deep savings are also critical to mitigating climate change.

Three utilities earned full points for peak demand reduction. Notably, 2 California and 2 Massachusetts utilities scored among the top 10 on this metric. This could indicate that there is a particular commitment to peak demand reduction by utilities in California and Massachusetts in order to avoid the costs associated with high peak demand. Additionally, these states have high energy savings, which could contribute to high peak demand savings. On average, the 52 utilities reduced their peak demand by 0.81% in 2018.

Two utilities—the two top performers overall in Category 1—achieved more than 30% lifetime savings as a percentage of 2018 retail sales. The top 10 performers in this category have a weighted average measure life of 12.3 years. This is important because a focus on long-lasting energy efficiency measures can indicate that utilities are thinking about efficiency's contribution to GHG reduction targets and its role in the future resource mix (Gold and Nowak 2019). The average measure life for all utilities that reported an average measure life or lifetimes savings is 11.25 years. These results are close, indicating that even greater success in this metric will depend not only on investments in measures with long lives but also on a commitment to achieving high incremental savings.

We evaluated each utility's progress toward its 2018 energy savings target. This metric is important, as research shows that targets drive energy efficiency performance, and results surpassing the established target indicate that a utility has gone beyond its own expectations (Gold, Gilleo, and Berg 2019). However it is also important to consider the stringency of the target, as utilities that surpassed their targets by the highest percentages also delivered some of the lowest overall savings. Our scoring in this edition of the report takes into account the magnitude of the target to account for this effect. Notably, SDG&E saved more than twice its target, over 1% of sales, and NG MA achieved 98% of its target, almost 4% of sales.

The final metric in Category 1 evaluates participation using home retrofit programs as a proxy for participation in all energy efficiency programs. Three utilities completed more than 100,000 home energy assessments, and two retrofitted more than 1,000 homes.

[17] See Appendix B for spending data.

However we find that utilities report participation information inconsistently, using different definitions of participants.

UTILITY SPOTLIGHTS: ENERGY EFFICIENCY PROGRAM PERFORMANCE

Baltimore Gas & Electric (BGE)

BGE performed well in Category 1, ranking fifth overall in the category and sixth, fifth, and sixth for net incremental energy savings, spending, and peak demand reduction metrics, respectively. BGE's strong, well-rounded performance is a result of its diverse slate of programs, including 22 residential, commercial, and industrial programs and 10 emerging measures or programs. For example, BGE was one of 9 utilities to offer high-efficiency ceiling fans and one of 11 utilities to use data disaggregation in its programs. BGE piloted smart home and small business financing programs in 2018.

BGE is also aided by state policies that encourage energy efficiency achievement and ambitious energy savings goals. Maryland's business model for energy efficiency is strong, motivating the utility to invest in energy efficiency. BGE can earn a return on its energy efficiency expenses, which are capitalized at the utility's weighted average cost of capital, with these returns acting as a shareholder incentive for BGE. Maryland also has full revenue decoupling in place to make up for lost revenue caused by energy savings. Additionally, Maryland has ambitious EERS goals, requiring utilities to reach 2% incremental savings through 2023 (Maryland General Assembly 2017). Notably, BGE ranked in the top 11 utilities for the energy savings target metric in Category 3, which evaluates the strength of the utility's targets as a percentage of sales. Even with a challenging target in place, BGE achieved 147% of its 2018 target.

Ohio Power (AEP OH)

AEP OH's Community Assistance Program (CAP) helps eligible customers reduce energy usage and create a healthier and more comfortable living environment in their homes. Residential customers with annual incomes at or below 200% of the federal poverty line are eligible to participate in CAP. Multifamily units are also eligible to participate if at least half of the units in an apartment building with less than 50 units are rented by eligible customers and are individually metered (AEP OH 2019). Along with air sealing and insulation, this program offers measures such as appliance recycling, home audits, HVAC replacement, health and safety repairs, and more at no cost to the customer. To implement this program, AEP OH distributes funding to community-based agencies (AEP OH 2019).

AEP OH installed 225,260 air sealing and insulation measures through CAP in 2018. While each customer likely received more than one measure, if only one measure were installed per customer, this would mean that the program served about 17.5% of AEP OH's residential customers, the second-highest participation rate measured in the *Scorecard*. In total, AEP OH completed 4,927 CAP projects in 2018, of which air sealing and insulation measures are one part. These projects represent almost 0.4% of all residential customers, which is a notable achievement for a low-income program. Additionally, AEP OH delivered CAP weatherization services and products to 74% of Murray City, a rural town of 500 residents in southeast Ohio. Table 6 shows what measures were installed through CAP and the energy and demand savings achieved from each measure (AEP OH 2019).

Table 6. Achievement by measure for AEP OH's CAP program in 2018.

Item	Number installed	Savings (kWh)	Savings (kW)
Appliance retirement	1	1,244	0.2
Fridges and freezers	3,889	1,776,109	286.6
Audits	5,333	0	0.0
HVAC	2,069	26,587	3.9
Hot water	2,176	174,618	19.2
Lighting	52,165	1,988,082	341.9
Other	67	3,145	0.7
Smart strips	3,668	300,448	0.0
Air sealing and insulation	225,260	290,250	8.1
Total	294,628	4,560,483	660.7

Now we review each metric in greater detail.

INCREMENTAL SAVINGS: NET SAVINGS AS A PERCENTAGE OF RETAIL SALES

Incremental net savings as a percentage of retail sales is the metric with the highest point value, 8 possible points. This metric evaluates the level of electric savings (MWh) achieved in 2018 from energy efficiency programs run by the utility and in its territory. We used 2018 total retail sales data to calculate each utility's savings as a percentage of its total sales in order to normalize savings data across utilities of different sizes and regions. Table 7 shows the scoring for this metric.

Table 7. Scoring for net savings as a percentage of retail sales

Net savings as % of retail sales	Score	Net savings as % of retail sales	Score
3.00+	8.0	1.20–1.39	3.5
2.80–2.99	7.5	1.00–1.19	3.0
2.60–2.79	7.0	0.80–.99	2.5
2.40–2.59	6.5	0.60–0.79	2.0
2.20–2.39	6.0	0.40–0.59	1.5
2.00–2.19	5.5	0.20–0.39	1.0
1.80–1.99	5.0	0.09–0.19	0.5
1.60–1.79	4.5	<0.09	0.0
1.40–1.59	4.0		

We define incremental annual savings as the savings in program year 2018 from all the measures implemented under the programs in that year only. These are annualized or full-year savings, regardless of when measures were installed during the program year. The numbers presented here may not match the values utilities report for spending and savings. This is because we adjusted savings data to be net at the generator level and removed demand response and renewable energy programs where applicable.[18]

Table 8 shows scores for net savings as a percentage of retail sales.

[18] We do not include any spending or savings data related to demand response and renewable energy in any metrics in this report. While we encourage integrated programs that combine efficiency with other distributed energy resources where the net benefits exceed the cost of integration, we limited consideration of those programs to the chapter on energy efficiency program offerings (York, Relf, and Waters 2019). We may consider integrated energy efficiency and demand response programs in future editions.

Table 8. Scores for net savings as a percentage of retail sales in 2018

Utility	Net incremental savings (MWh)	Savings as % of sales	Points
NG MA	782,838	3.73%	8.5*
Eversource MA	760,750	3.15%	8
SDG&E	463,260	2.35%	6
ComEd	2,064,720	2.08%	5.5
SRP	624,658	2.05%	5.5
BGE	616,559	1.96%	5
Xcel MN	565,220	1.73%	4.5
LADWP	395,609	1.63%	4.5
PG&E	1,352,387	1.61%	4.5
SCE	1,415,400	1.55%	4
Consumers	641,648	1.55%	4
Eversource CT	346,200	1.54%	4
DTE	777,405	1.50%	4
Xcel CO	453,854	1.45%	4
PGE [a]	303,416	1.45%	4
LIPA	293,161	1.41%	4
Duke OH	292,107	1.32%	3.5
MidAm IA	322,760	1.27%	3.5
OH Edison	286,819	1.12%	3
PSE	261,586	1.10%	3
Entergy AR	255,930	1.08%	3
NG NY [a]	397,304	1.07%	3
Ameren MO	364,080	1.03%	3
Duke SC	233,774	1.01%	3
AEP OH	467,385	1.00%	2.5
Duke NC	624,322	0.99%	2.5
Ameren IL	404,725	0.98%	2.5
PacifiCorp UT	230,839	0.87%	2.5
PECO	349,889	0.84%	2.5
PPL	326,966	0.82%	2.5
We Energies[a]	202,487	0.77%	2
Duke Progress	305,066	0.76%	2
West Penn	162,428	0.75%	2
APS	212,752	0.71%	2
ConEd [a]	425,521	0.71%	2
OG&E	187,414	0.68%	2
Duke IN	199,640	0.65%	2
Nevada Power	134,609	0.56%	1.5
CPS	126,985	0.54%	1.5
GA Power	413,919	0.46%	1.5
PSE&G [a]	175,192	0.40%	1
JCP&L [a]	64,189	0.29%	1
SCE&G	58,635	0.25%	1
TECO	40,696	0.20%	0.5
AEP TC	53,294	0.19%	0.5
Duke FL	68,377	0.16%	0.5
CenterPoint	140,997	0.15%	0.5
Oncor	182,620	0.13%	0.5
Dominion	70,097	0.08%	0
FP&L	72,652	0.06%	0
AL Power [b]	10,127	0.02%	0
Entergy LA	5,963	0.01%	0
Average		**1.03%**	

Savings are net at the generator level. We adjusted EIA retail sales data (shown in table 1, above) for line loss factors to be consistent with the generator-level reporting of savings. See Appendix B for meter-level savings and loss factors. * We awarded a half-point bonus to NG MA for far exceeding the top threshold of 3% savings as a percentage of sales. [a] Includes savings separately allocated from a third-party program administrator. [b] Savings from EIA 2019b.

NG MA earned 8.5 points as the top performer with savings of more than 3.7%, significantly higher than the rest of the group. Eversource MA also achieved well above the other utilities, saving more than 3.1% of sales. SDG&E was the next-highest, at 2.35% savings. On average, the utilities achieved savings of 1.03% of retail sales. Twenty-five of the 52 utilities, or 48%, reached savings of 1% or higher.

Thirteen utilities achieved savings levels higher than 1.50% in 2018, compared with four utilities in 2015. The overall group average increased by only 0.13 percentage points in that time. Eversource MA, ComEd, NG MA, PG&E, and SRP remained in the top 10 spots for net incremental savings, and BGE, LADWP, SCE, SDG&E, and Xcel MN joined them in this edition. APS, LIPA, Eversource CT, PGE, and Xcel CO fell out of the top 10. SDG&E increased its savings by 0.99% of retail sales, the largest increase of the group, while APS's savings fell the most, by 0.8%.

SPENDING AS A PERCENTAGE OF TOTAL REVENUE

Utilities could earn up to 7 points for spending on energy efficiency programs. This is a critical indicator of a utility's commitment to energy efficiency; higher levels of spending indicate significant investment in administration and evaluation of programs. However spending is weighted less heavily than savings achievements, which are considered in multiple metrics in this report. Total spending includes all direct spending on energy efficiency programs, which may include direct incentives and technical services to customers; program administration, marketing, planning, and delivery; evaluation, measurement, and verification (EM&V); and education.[19] Total spending also includes utility performance incentives, as these are customer funded. Appendix B provides more detail on performance incentive costs. For comparison of spending across utilities of different sizes, we calculated spending as a percentage of total utility revenue from retail sales.[20]

Table 9 shows scoring for spending as a percentage of total revenue.

Table 9. Scoring for spending as a percentage of revenue

Spending as % of revenue	Score	Spending as % of revenue	Score
9.00+	7.0	3.00–3.49	3.0
8–8.99	6.5	2.50–2.99	2.5
7.00–7.99	6.0	2.00–2.49	2.0
6.00–6.99	5.5	1.50–1.99	1.5
5.00–5.99	5.0	1–1.49	1.0

[19] We do not include any spending or savings data related to demand response and renewable energy in any metrics in this report. While we encourage integrated programs that combine efficiency with other distributed energy resources where the net benefits exceed the cost of integration, we limited consideration of those programs to the chapter on energy efficiency program offerings (York, Relf, and Waters 2019). We may include integrated energy efficiency and demand response programs in additional metrics in future editions.

[20] Revenue from retail sales does not include wholesale power sales.

Spending as % of revenue	Score
4.50–4.99	4.5
4.00–4.49	4.0
3.50–3.99	3.5

Spending as % of revenue	Score
0.50–0.99	0.5
0–0.49	0.0

Table 10 shows scores for spending as a percentage of total revenue.

Table 10. Scores for spending as a percentage of revenue in 2018

Utility	Spending	Spending as % of revenue	Points
NG MA	$266,403,945	11.38%	7
Eversource MA	$266,403,945	9.18%	7
ComEd	$352,988,361	7.04%	6
Ameren IL	$99,696,676	6.66%	5.5
BGE	$114,626,581	5.49%	5
PGE [a]	$85,681,659	4.87%	4.5
NG NY [a]	$105,971,504	4.73%	4.5
PSE	$91,086,596	4.19%	4
MidAm IA	$63,804,277	3.71%	3.5
Eversource CT	$104,171,027	3.59%	3.5
LADWP	$135,201,757	3.54%	3.5
Duke OH	$32,134,301	3.31%	3
Xcel MN	$107,451,885	3.22%	3
Entergy AR	$50,930,300	3.05%	3
Xcel CO	$79,513,396	2.90%	2.5
PECO	$61,127,000	2.81%	2.5
PPL	$53,162,395	2.80%	2.5
Consumers	$117,838,710	2.69%	2.5
DTE	$127,955,350	2.51%	2.5
ConEd [a]	$187,575,807	2.35%	2
AEP OH	$62,864,638	2.24%	2
OH Edison	$30,597,049	2.21%	2
PG&E	$294,599,628	2.16%	2
SDG&E	$82,155,060	2.16%	2

Utility	Spending	Spending as % of revenue	Points
LIPA	$71,724,487	1.99%	1.5
CPS	$44,471,193	1.98%	1.5
We Energies [a]	$55,824,164	1.97%	1.5
OG&E	$36,309,247	1.94%	1.5
Duke NC	$93,506,270	1.92%	1.5
PSE&G [a]	$62,144,124	1.67%	1.5
SCE	$197,407,004	1.67%	1.5
Duke Progress	$58,370,956	1.63%	1.5
JCP&L [a]	$25,327,197	1.45%	1
AEP TC	$12,931,010	1.30%	1
SRP	$37,168,928	1.28%	1
CenterPoint	$25,959,263	1.17%	1
Oncor	$38,476,301	1.09%	1
Duke IN	$28,277,308	1.05%	1
West Penn	$10,008,550	1.03%	1
Nevada Power	$19,204,887	0.91%	0.5
APS	$28,245,298	0.81%	0.5
FP&L	$84,457,000	0.79%	0.5
TECO	$14,925,900	0.75%	0.5
GA Power	$56,698,715	0.70%	0.5
Dominion [b]	$52,662,000	0.70%	0.5
SCE&G	$13,585,912	0.59%	0.5
Duke FL	$20,796,850	0.46%	0
AL Power [b]	$3,444,670	0.06%	0

Utility	Spending	Spending as % of revenue	Points
PacifiCorp UT	$42,028,572	2.12%	2
Ameren MO	$66,483,135	2.10%	2
Duke SC	$34,916,305	1.99%	1.5
Entergy LA	$1,637,661	0.04%	0
Average		**2.58%**	

[a] Includes spending separately allocated from a third-party administrator. [b] Spending data from EIA 2019b.

NG MA and Eversource MA earned a full 7 points, and NG MA spent more than 11% of its revenue on energy efficiency programs. On average, utilities spent 2.58% of their revenue on energy efficiency. Much more variability exists in spending levels among the top performers than among those lower on the list. The top 10 utilities spent from less than 4% to nearly 11.5% of revenue on energy efficiency, a difference of about 7.5 percentage points, while the rest of the utilities all fell below 4%. It is important to note that some states have implemented energy efficiency spending caps for utilities that limit cost-effective savings opportunities.[21]

Seventeen utilities earned 1 point or less for spending in 2018 compared with 12 utilities in 2015, and the overall group average fell by 0.12 percentage points, from 2.70% to 2.58% of revenue spent on energy efficiency programs. ComEd and Ameren IL, both in Illinois, increased their spending most, by 2.42 and 1.87 percentage points, respectively. Eversource CT's and Duke FL's spending both fell by more than 1.8% of revenue.

PEAK DEMAND REDUCTION AS A PERCENTAGE OF TOTAL PEAK DEMAND

While our primary focus of this section is on energy savings, peak demand reduction is also an important aspect of utility-sector energy efficiency programs. Reducing peak demand provides multiple benefits to both the utility and the customer. Utilities avoid higher peak-period supply costs that must be recovered from customers, and they may also be able to defer or avoid costly investment in new power plants and transmission and distribution infrastructure that would otherwise be needed to meet future peak demand (Baatz, Relf, and Nowak 2018). As DERs proliferate, they can alter utilities' system demands and can contribute to more distinct peak demand periods. This trend increases the importance of deploying energy efficiency to meet time-specific system needs. While this metric partly captures the time value of energy efficiency, future editions may credit programs that more explicitly target efficiency for its time value.

We focus on peak demand reductions from energy efficiency rather than from demand response programs. While demand response initiatives provide additional reductions during peak periods, complementing the benefits of efficiency, demand response shifts demand rather than reducing overall consumption. Without additional policies in place like performance incentives, utilities are more likely to undertake demand response programs, which do not decrease sales. We collected peak demand savings for the peak periods

[21] For example, Pennsylvania limits utility spending on customer energy efficiency programs to 2% of the electric distribution company's total annual revenue (Pennsylvania PUC 2015). Iowa also enacted legislation in 2018 imposing a restrictive spending cap (Berg et al. 2019).

defined by each utility. These periods vary widely across utilities and jurisdictions and may be defined as coincident with the utility's own peak demand or with the broader system's or region's peak demand (Frick et al. 2019).

Utilities could earn up to 4 points for peak demand reduction from energy efficiency as a percentage of total peak demand in 2018. Table 11 shows the scoring.

Table 11. Scoring for peak demand reduction

Peak demand reduction as % of total peak demand	Score
2+	4.0
1.75–1.99	3.5
1.5–1.74	3.0
1.25–1.49	2.5
1–1.24	2.0
0.75–0.99	1.5
0.5–0.74	1.0
0.25–0.49	0.5
0–0.24	0.0

Table 12 shows the scores for peak demand reduction.

Table 12. Scores for peak demand reduction

Utility	Peak savings (MW)	Peak savings as % of total peak demand	Points
SDG&E	138	2.99%	4
NG MA	117	2.39%	4
Eversource MA	110	2.19%	4
PG&E	360	1.99%	3.5
SRP	123	1.60%	3
BGE	96	1.39%	2.5
Ameren MO	102	1.36%	2.5
SCE	301	1.22%	2
MidAm IA	65	1.20%	2
Duke OH	51	1.17%	2
Xcel MN	90	1.10%	2

Utility	Peak savings (MW)	Peak savings as % of total peak demand	Points
LADWP	44	0.64%	1
PPL	50	0.63%	1
NG NY [a]	44	0.64%	1
Duke IN	38	0.61%	1
Ameren IL	57	0.59%	1
ConEd [a]	80	0.57%	1
PECO	51	0.54%	1
West Penn	19	0.48%	0.5
We Energies [a]	26	0.42%	0.5
AEP TC	17	0.41%	0.5
PacifiCorp UT	47	0.41%	0.5

Utility	Peak savings (MW)	Peak savings as % of total peak demand	Points
CPS	58	1.09%	2
Xcel CO	75	1.06%	2
DTE	123	1.01%	2
PGE [a]	42	1.00%	2
Entergy AR	48	1.00%	2
Eversource CT	50	0.93%	1.5
Consumers	77	0.93%	1.5
ComEd	216	0.91%	1.5
Duke SC	47	0.91%	1.5
GA Power	149	0.90%	1.5
LIPA	52	0.89%	1.5
APS	68	0.88%	1.5
Duke NC	125	0.84%	1.5
AEP OH	74	0.83%	1.5
OH Edison	41	0.70%	1
OG&E	45	0.69%	1
Nevada Power	25	0.40%	0.5
Duke Progress	57	0.35%	0.5
FP&L	73	0.30%	0.5
PSE&G [a]	29	0.28%	0.5
Duke FL	29	0.26%	0.5
CenterPoint	40	0.25%	0.5
SCE&G	12	0.25%	0
Oncor	59	0.24%	0
JCP&L [a]	14	0.23%	0
TECO	9	0.22%	0
Dominion	13	0.07%	0
AL Power [b]	5	0.04%	0
Entergy LA	1	0.01%	0
PSE	-	0.00%	0
Average		**0.81%**	

Total peak demand data are from EIA 2019c. Blank indicates no data were found. Savings are net at the generator level. We adjusted total peak demand figures for line loss factors to be consistent with the generator-level reporting of savings. See Appendix B for meter-level savings and loss factors. [a] Includes savings separately allocated from a third-party program administrator. [b] Data from EIA 2019b.

SDG&E, NG MA, and Eversource MA earned full points for this metric with over 2% demand savings as a percentage of peak demand. The average peak demand reduction from energy efficiency was 0.81% of total peak demand. The median, however, was lower, at 0.70%, indicating that the top-performing utilities are bringing up the group average. Twenty-five utilities achieved savings above the group's average. Seven utilities at the bottom achieved very small savings that earned them no points, and we lacked data for one. Overall, average peak demand savings increased slightly, from 0.76% to 0.81%, since the last *Scorecard*. SDG&E increased its peak demand from efficiency by more than 1.75 percentage points.

NET LIFETIME SAVINGS AS A PERCENTAGE OF TOTAL SALES

Lifetime savings are an important indicator of a utility's investment in long-term energy efficiency. Higher net lifetime savings indicate that the measures installed or programs run by the utility will continue to provide savings over a longer useful life. Addressing climate change requires continued savings. Focusing on long-term energy savings allows utilities to include energy efficiency as a low-carbon resource in the time frame of other investments in future planning processes like physical infrastructure (Gold and Nowak 2019).

Many utilities do not report on lifetime savings or measure lives. Our research finds that most utilities and program administrators have goals and incentives focused on first-year savings, leading to an emphasis on programs with low costs on a first-year basis (Gold and Nowak 2019). Others do focus more heavily on long-life measures. For example, DTE and Consumers Energy value both incremental and lifetime savings, responding to performance incentives set by the Michigan Public Service Commission that encourage both short- and long-lived measures. This encourages the utilities to value long-term savings in addition to measures that may achieve greater savings in a single year but will not provide savings over a longer period. Massachusetts also includes lifetime savings goals in its recently adopted EERS (Gold, Gilleo, and Berg 2019).

Methodologies for calculating measure lives for technologies and programs vary across utilities. We relied on annual reports, other filings, and data requests for either lifetime savings or a weighted average useful life for the total portfolio. For utilities that provided neither lifetime savings nor a weighted average useful life, we used an average useful life of 11.25 years to multiply with net annual savings.[22]

Utilities could earn up to 3.5 points for net lifetime savings as a percentage of 2018 retail sales. We reduced the available points for this metric from 4 to 3.5 because of issues with data consistency and availability; as mentioned above, we had to make assumptions for a number of utilities regarding their weighted average measure lives. In the future, we may increase the available points for this metric to reflect its importance in achieving deep energy savings. We present net lifetime savings data as a percentage of retail sales to allow comparison across utilities of different sizes. Table 13 shows the scoring for this metric.

Table 13. Scoring for net lifetime savings as a percentage of retail sales

% of retail sales	Score
26.25+	3.5
22.50–26.24	3.0
18.75–22.49	2.5
15.00–18.74	2.0
11.25–14.99	1.5
7.50–11.24	1.0
4.75–7.49	0.5
0.00–4.74	0.0

Table 14 shows the scores for net lifetime savings as a percentage of retail sales.

[22] We used 11.25 years because this is the average of effective useful lives for utilities that provided lifetime savings or weighted average useful life. We used this average for seven utilities.

Table 14. Scores for net lifetime savings in 2018

Utility	Weighted average measure life	Net lifetime savings as % of sales	Points
NG MA	8.76	32.73%	3.5
Eversource MA	10.79	31.52%	3.5
SDG&E	13.21	29.03%	3.5
LADWP	16.06	26.18%	3
PGE [a]	14.26	20.65%	2.5
Xcel MN	12.80	19.63%	2.5
ComEd	9.90	19.56%	2.5
SCE	12.40	19.25%	2.5
PG&E	11.85	19.04%	2.5
Xcel CO	12.90	18.96%	2.5
DTE	12.60	18.87%	2.5
Consumers	11.72	17.72%	2
MidAm IA	13.60	17.25%	2
Eversource CT	10.59	16.26%	2
Entergy AR	14.74	15.95%	2
BGE	10.10	15.73%	2
PSE	13.16	14.43%	1.5
SRP [c, d]	11.25	13.63%	1.5
OH Edison [c]	11.25	12.59%	1.5
Duke OH	9.31	12.26%	1.5
PacifiCorp UT	11.00	12.09%	1.5
AEP OH	12.02	12.00%	1.5
Ameren IL	11.80	11.58%	1.5
Ameren MO [c]	11.25	11.58%	1.5
We Energies [a]	15.00	11.34%	1.5
Duke SC	8.20	10.87%	1
Duke NC	8.20	10.83%	1
LIPA	9.89	10.21%	1
ConEd [a, c, e]	11.25	9.71%	1
NG NY [a, e]	7.00	9.53%	1
PPL	10.30	8.42%	1
APS	11.69	8.36%	1
OG&E	10.83	7.41%	0.5
West Penn	9.57	7.20%	0.5
CPS	12.53	6.73%	0.5
Duke IN	7.70	6.43%	0.5
PECO	7.29	6.17%	0.5
Duke Progress	6.60	5.99%	0.5
GA Power	12.00	5.53%	0.5
PSE&G [a]	13.79	5.49%	0.5
Nevada Power	9.58	5.39%	0.5
JCP&L [a]	15.12	4.38%	0
SCE&G	10.77	2.65%	0
AEP TC [c]	11.25	2.19%	0
Oncor	16.00	2.07%	0
TECO	20.00	1.81%	0
CenterPoint [c]	11.25	1.67%	0
Duke FL	8.50	1.53%	0
Dominion	10.57	0.85%	0
FP&L [c]	11.25	0.71%	0
Entergy LA	17.33	0.18%	0
AL Power [b]	10.00	0.17%	0
Average		**11.39%**	

Savings are net at the generator level. We adjusted EIA retail sales data (shown in table 1) for line loss factors to be consistent with the generator-level reporting of savings. See Appendix B for meter-level savings and loss factors. [a] Includes savings separately allocated from a third-party administrator. [b] Data from EIA 2019d. [c] We were unable to confirm weighted average measure life (WAML) data from public information and so applied 11.25 years WAML. This is the average of utilities reporting either lifetime savings or WAML. [d] SRP achieves almost half of its savings from prepay electricity programs. For those savings, we apply a WAML of 1. For more information on prepay programs, see Sussman et al. 2018. [e] The WAML shown is specific to the utility itself. The third-party administrators (NYPA and NYSERDA) had WAMLs of around 15, which was accounted for in calculating lifetime savings for both NG NY and ConEd.

There is a large variation in the savings achieved in this metric, with a difference of more than 32 percentage points between the top and bottom performers. The average achieved net lifetime savings was 11.4% of retail sales, and the median was 10.85%. Eleven utilities earned no points while only three earned the full 3.5 points, showing a substantial opportunity to achieve deeper, longer-lived savings. Five utilities had lifetime savings of more than 20% of sales, and NG MA and Eversource MA both topped 30%.

SDG&E and LADWP increased their lifetime savings the most since 2015, by 13.9% and 9.3% of retail sales, respectively. Eversource MA and PG&E both decreased their lifetime savings by more than 10 percentage points, although both continued to achieve high lifetime savings. The average lifetime savings increased by only about 1% of retail sales from 2015 to 2018.

2018 ENERGY SAVINGS TARGET ACHIEVEMENT

Energy efficiency targets are an effective tool for encouraging higher levels of energy savings by utilities (Gold, Gilleo, and Berg 2019; Molina and Kushler 2015). They provide long-term market signals for utilities to invest in energy efficiency. In some states, utilities are further encouraged to meet their targets through the opportunity to earn monetary performance incentives aligned with target achievement. While many targets are driven by state or regulatory commission directives, others are utility specific. We used targets as reported by utilities in the data request and confirmed them through a review of their filings. We adjusted targets to be net at the generator level using line loss factors and NTGRs, as we did for other metrics. While there is overlap, we considered utility-specific targets instead of mandated targets, and therefore this metric is not a review of EERS.[23]

In the 2017 *Scorecard*, we found that the utilities achieving the highest percentage of their target were some of the lowest scoring utilities overall and included those with the lowest targets as a percentage of sales. Although some regulatory and performance incentive structures may encourage savings achievement by rewarding utilities that exceed their target by a large margin; for example, Massachusetts historically has awarded its maximum incentive at 125% of target achievement or greater (Gold, Gilleo, and Berg 2019). However we aim to reward utilities that achieve a high percentage of more challenging targets. To do so this year, we indexed target achievement to the magnitude of the target itself. We also increased the available points for this metric from 1 to 2 points.

To index the scores, we multiplied the utility's achieved savings by the percentage of its target achieved. We then normalized by dividing by total sales. For example, a utility that achieved 10 MWh of savings with 1,000 MWh of total sales and a target of 6.67 MWh would have an indexed achievement of 1.5%:

(10 MWh savings achieved * 150% of target achieved)/1,000 MWh sales = 1.5%

Table 15 shows how points were awarded for this metric.

[23] For more information on EERS, see aceee.org/topics/energy-efficiency-resource-standard-eers.

Table 15. Scoring for achievement toward 2018 energy savings target

Energy savings target achievement, indexed to magnitude of target (%)	Score
2.0+	2.0
1.5–1.99	1.5
1.0–1.49	1.0
0.5–0.99	0.5
0–0.49, no target	0.0

Table 16 shows scores for the percentage achievement of an energy target.

Table 16. Scores for percentage achievement of 2018 energy target, indexed to target as a % of sales

Utility	2018 target (MWh)	% of target achieved	% of target achieved indexed to target as % of sales	Points
SDG&E	211,050	220%	5.2%	2.0
NG MA	794,886	98%	3.7%	2.0
Eversource MA	713,195	107%	3.4%	2.0
BGE	419,484	147%	2.9%	2.0
Eversource CT	186,116	186%	2.9%	2.0
Xcel MN	359,533	157%	2.7%	2.0
Ameren MO	159,960	228%	2.3%	2.0
ComEd	1,902,273	109%	2.3%	2.0
SRP	587,352	106%	2.2%	2.0
SCE	1,009,050	140%	2.2%	2.0
PG&E	1,032,150	131%	2.1%	2.0
OH Edison	160,226	179%	2.0%	2.0
LADWP	343,394	115%	1.9%	1.5
Consumers	547,663	117%	1.8%	1.5
Entergy AR	160,181	160%	1.7%	1.5
LIPA	259,000	113%	1.6%	1.5
Duke OH	244,075	120%	1.6%	1.5
DTE	754,778	103%	1.5%	1.5
Xcel CO	429,348	106%	1.5%	1.5
Ameren IL	397,899	102%	1.0%	1.0
PPL	270,143	121%	0.99%	0.5
NG NY [a, b]	445,486	89%	0.96%	0.5
PECO	309,443	113%	0.95%	0.5
AEP OH	533,794	88%	0.9%	0.5
We Energies [a]	182,888	111%	0.9%	0.5
Duke Progress	275,463	111%	0.8%	0.5
PacifiCorp UT	240,790	96%	0.8%	0.5
Duke IN	166,101	120%	0.8%	0.5
CPS	111,950	113%	0.6%	0.5
APS	251,436	85%	0.6%	0.5
TECO	13,345	305%	0.6%	0.5
ConEd [a, b]	509,139	84%	0.6%	0.5
GA Power	384,942	108%	0.5%	0.5
Nevada Power	157,144	86%	0.48%	0.0
CenterPoint	93,238	151%	0.2%	0.0
AEP TC	53,635	99%	0.2%	0.0
Oncor	167,811	109%	0.1%	0.0
FP&L	41,118	177%	0.1%	0.0

Utility	2018 target (MWh)	% of target achieved	% of target achieved indexed to target as % of sales	Points
West Penn	89,875	181%	1.4%	1.0
PGE [a]	332,276	91%	1.3%	1.0
MidAm IA	310,419	104%	1.3%	1.0
OG&E	99,515	188%	1.3%	1.0
PSE	245,372	107%	1.2%	1.0
Duke SC	218,201	107%	1.1%	1.0
Duke NC	594,256	105%	1.0%	1.0
Duke FL	113,876	60%	0.1%	0.0
Dominion	67,435	104%	0.1%	0.0
Entergy LA	25,094	24%	0.0%	0.0
AL Power	-	0%	0.0%	0.0
JCP&L [a]	-	0%	0.0%	0.0
PSE&G [a]	-	0%	0.0%	0.0
SCE&G	-	0%	0.0%	0.0

Savings and targets are net at the generator level. See Appendix B for meter-level savings and loss factors. Blanks indicate no data were found. [a] Includes savings separately allocated from a third-party administrator. Target includes the portion of the third-party administrator's target for that utility's territory. [b] Targets include the portion of NYSERDA's target for that utility's territory but do not include the portion of NYPA's target, as these data were not available.

Twelve utilities earned full points for this metric, and the majority of the utilities (37) achieved or surpassed their target. The average achievement was 115%. This increased slightly from the 2017 *Scorecard*, when average target achievement was 105%.

SDG&E had the highest indexed achievement. Its target was more than 1% of sales, and it achieved 220% of the target. Notably, NG MA had a 2018 target of almost 3.8% of sales and achieved 98% of its target. At the other end of the spectrum, Entergy LA had a target of just 0.04% of sales and achieved only 24% of the target. We provide additional information on targets as a percentage of sales in our discussion of Category 3. Some utilities had targets that we were unable to score. In 2018 New Jersey had a statewide energy savings target that we could not allocate to individual utilities.

ENERGY EFFICIENCY PROGRAM PARTICIPATION (HOME RETROFITS)

We included a new metric on energy efficiency program participation in this edition of the *Scorecard*. Participation is an important indicator of an effective efficiency portfolio. Utilities with higher program participation increase savings and improve cost effectiveness by spreading fixed costs over a greater number of customers. Data on participation are also critical for planning and developing programs and for assessing a jurisdiction's energy efficiency potential (York et al. 2015). Reaching new customers also increases program equity and helps to ensure that all customers reap the benefits of efficiency including lower energy bills, healthier homes, and more comfortable living spaces.

Despite the importance of participation, comprehensive program participation analyses remain sparse, and the availability and consistency of participation data vary widely. There is no common definition of a participant across utilities and even across programs within a single utility portfolio. Programs may track various metrics including customer meters, customer accounts, products sold or rebated, and others.

This year we asked utilities to provide information on how they measure and track participation and on 2018 participation results. To score this metric we used participation in home retrofit programs as a proxy for overall portfolio participation. These programs are widespread across the utilities included in the *Scorecard* and are critical to equitably delivering programs. High participation in home and building retrofits is also critical to meeting climate goals, because a large portion of the homes that will be standing in 2050 already exist. Home retrofit programs typically save 20–30% of energy usage, and can even save up to 50% or more in certain cases. Three percent of the emissions reductions required to get the United States halfway to its climate goals by 2050 could come from home retrofits alone. However these programs need to be scaled up substantially, as they are currently reaching only a very limited number of eligible customers, less than 2% on average (Nadel and Ungar 2019).

As with program participation in general, we found that utilities report retrofit participation inconsistently. Some report the number of homes retrofitted; others, the number of energy audits or assessments conducted. Some offer multiple retrofit programs, such as for market-rate and low-income customers. We aimed to include all retrofit programs but may not have identified every program for every utility. We decided to score utilities on two different scales, one for retrofits and one for audits. Utilities can reach a much higher percentage of customers with audits at a lower cost than with whole-home retrofits, but they realize much lower savings from audits or assessments alone. We used the total number of households served with electricity as a denominator to normalize the results across utilities of different sizes. We will continue to refine our scoring for program participation in future editions of the report and hope to expand its role, including by increasing available points, as improved data become available.

Utilities could earn up to 1.5 points for program participation (home retrofits). Table 17 shows the scoring.

Table 17. Scoring for program participation (home retrofits)

Description	Score
• At least 0.5% of residential customers' homes retrofitted • At least 2.0% of residential customers' homes audited	1.5
• Up to 0.49% of residential customers' homes retrofitted • Up to 1.99% of residential customers' homes audited	1 .0
Reported participation data but no retrofit program	0.5
No participation data	0.0

Table 18 shows the scores.

Table 18. Scores for program participation

Utility	Participants in home retrofit program	Description of participants	Participation as % of residential customers	Points
Participants measured as number of homes retrofitted				
We Energies	13,165	Homes retrofitted	1.30%	1.5
AEP TC	8,255	Customers in residential retrofit programs	1.14%	1.5
PPL	12,340	Homes retrofitted	0.98%	1.5
Ameren IL	3,220	Single-family homes	0.74%	1.5
Entergy LA	5,884	Homes in the Home Performance with ENERGY STAR program	0.63%	1.5
OG&E	3,611	Homes weatherized	0.54%	1.5
CPS	7,721	Homes in the home energy assessment	0.48%	1
APS	4,778	Completed homes	0.43%	1
PacifiCorp UT	3,313	Whole homes	0.41%	1
PGE	1,518	Sites weatherized	0.20%	1
PECO	2,359	Whole homes	0.16%	1
Consumers	7,453	Homes in the Home Performance with ENERGY STAR program; low-income retrofits	0.46%	1
Xcel CO	177	Homes in the Home Performance with ENERGY STAR program	0.01%	1
PSE	90	Units in the multifamily retrofit air sealing program	0.01%	1
Xcel MN	35	Whole homes	0.00%	1
Participants measured as number of assessments or audits				
Nevada Power	178,735	Energy assessment participants	21.66%	1.5
AEP OH	225,260	Air sealing and insulation	17.43%	1.5
BGE	69,959	Home optimization and retrofits	6.01%	1.5
DTE	103,793	Audit and weatherization program; low-income multifamily	5.21%	1.5
Duke SC	15,241	Residential energy assessments	3.08%	1.5
Eversource MA	34,241	Participants in multiple retrofit programs	2.78%	1.5
Duke Progress	32,447	Residential energy assessments	2.70%	1.5

Utility	Participants in home retrofit program	Description of participants	Participation as % of residential customers	Points
Eversource CT	29,483	No description	2.59%	1.5
Duke IN	17,678	Residential energy assessments	2.44%	1.5
Duke NC	40,703	Residential energy assessments	2.37%	1.5
NG MA	27,158	Participants in multiple retrofit programs	2.35%	1.5
Duke FL	34,900	Audits conducted	2.19%	1.5
GA Power	42,722	Residential home participants, including assessments	1.94%	1
FP&L	66409	Participants in residential home energy survey	1.51%	1
ComEd	48,503	No description	1.33%	1
Entergy AR	7,007	Home energy assessments	1.18%	1
TECO	7,983	Low-income homes weatherized and participants in ceiling insulation program	1.18%	1
MidAm IA	6,893	Assessments in HomeCheck program	1.17%	1
ConEd	21,621	Multifamily and residential	0.74%	1
Oncor	19,713	Participants in multiple retrofit programs	0.64%	1
Duke OH	2,956	Home energy assessments	0.46%	1
PG&E	19,102	No description	0.40%	1
LADWP	9,065	No description	0.68%	1
SRP	1,277	Multifamily retrofit program participation	0.13%	1
SDG&E	489	Energy Upgrade California; middle-income direct install.	0.04%	1
No retrofit program or no data				
NG NY	870,892	Customers served	58.00%	0.5
SCE&G	272736	Total portfolio participation/measures (no retrofit program)	43.64%	0.5
CenterPoint	43,172	Number of customer meters (no retrofit program)	1.98%	0.5
PSE&G	23,385	Participants	1.20%	0.5
Dominion	23,888	Gross participants (no retrofit program)	1.08%	0.5
AL Power		No participation data		0
Ameren MO		No retrofit program, no participation data		0
JCP&L		No participation data		0
LIPA		No participation data		0

Utility	Participants in home retrofit program	Description of participants	Participation as % of residential customers	Points
OH Edison		No participation data		0
SCE		No participation data		0
West Penn		No participation data		0

Eighteen of the utilities earned full points for this metric, and 22 earned 1 point. Utilities that measure assessments or audits conducted are typically reaching more than 1% of residential customers; utilities that report the number of whole homes retrofitted are reaching less than 1%. Only seven utilities do not report any participation data for their energy efficiency programs. However the low quality and inconsistency of data reported for this metric suggest the need for more rigorous participation measurement and reporting.[24]

COST-EFFECTIVENESS RESULTS

Most utility-sector energy efficiency program portfolios undergo cost-effectiveness screening during planning and evaluation. Many utilities still rely on the traditional tests in the *California Standard Practice Manual*, with most states using the total resource cost (TRC) test as the primary metric (NESP 2019). The National Efficiency Screening Project released a standard practice manual for screening tests in 2017. It offers guidance for states to tailor cost tests to their state policies (NESP 2017).

While we were able to gather relevant cost-effectiveness testing data for 2018, we did not use the results as a scoring metric, primarily because of the differences in assumptions used in the standard tests. For example, tests may include different benefits, and the methodologies to estimate them vary substantially.[25] Additionally, avoided costs such as capacity and energy prices vary across the country due to many factors, including each region's resource mix and historical investment in energy efficiency, which helps to keep energy affordable. Because of these differences, comparing the results among the utilities in our study would not have proved useful. In future editions, we may consider scoring on the structure or design of cost-effectiveness tests. It is critical that these tests capture all relevant costs and benefits of energy efficiency to help ensure that beneficial programs pass testing screens and are implemented.

We collected benefit–cost ratios from utility data request responses and demand side management filings. Table 19 presents portfolio-level cost-effectiveness results for each utility, including scores and the primary and secondary tests used.

[24] For more information on achieving high participation rates, see York et al. 2015.

[25] For more on these differences, see Baatz 2015 and Kushler, Nowak, and Witte 2012.

Table 19. Utility cost-effectiveness tests and portfolio results

Utility	Primary test	Primary test portfolio benefit/cost ratio	Secondary test	Secondary test portfolio benefit/cost ratio
AEP OH	TRC	2.3	UCT	5.6
AEP TC				
AL Power				
Ameren IL	TRC	2.52		
Ameren MO	TRC	2.01	UCT	3.27
APS	SCT	1.4		
BGE	TRC	2.27		
CenterPoint	PACT	2.8		
ComEd	TRC	1.78	UCT	1.85
ConEd				
Consumers	UCT	2.9		
CPS	PA Benefit–Cost Ratio	2.95		
Dominion				
DTE	USRCT	4.8	TRC	2.44
Duke FL	RIM	1.3		
Duke IN	UCT	3.91	TRC	2.37
Duke NC	UCT	3.2	TRC	3.49
Duke OH	TRC	2.9	UCT	4.5
Duke Progress	UCT	3.69	TRC	2.86
Duke SC	UCT	3.97	TRC	4.3
Entergy AR	TRC	1.96		
Entergy GS+LA	TRC	4.59		
Eversource CT	UCT	1.75	Modified UCT	1.81
Eversource MA	TRC	2.65		
FP&L				
GA Power	TRC	2.6 res, 5.6 commercial	RIM	RIM<1
JCP&L				
LADWP	TRC	1.2	PAC	2.29
LIPA	SCT	1.9		
MidAm IA	SCT	4.7	TRC	2.97

Utility	Primary test	Primary test portfolio benefit/cost ratio	Secondary test	Secondary test portfolio benefit/cost ratio
Nevada Power	TRC	1.43	NTRC	1.57
NG MA	TRC	2.36		
NG NY	SCT (modified TRC)	2	RIM	2.12
OG&E	TRC	2.5	PACT, RIM, PCT, SCT	3.64, 0.85, 3.61, 3.35
OH Edison	TRC	2.82		
Oncor	UCT	2.5		
PacifiCorp UT	UCT	1.73		
PECO	Results not broken out by test			
PG&E	TRC	1.43	PACT, RIM, PCT, SCT	4.15
PGE	TRC	1.95	UCT	2.23
PPL	Gross TRC	1.54	Net TRC	1.46
PSE	TRC	1.69	UCT	2.17
PSE&G				
SCE	PAC	5.74	TRC	1.79
SCE&G	TRC	2.26	UCT	2.95
SDG&E	TRC	1.73	PAC	4.54
SRP				
TECO	Reported at measure level			
WE Energies	Modified TRC	3.66		
West Penn	TRC	1.38		
Xcel CO	MTRC	1.5		
Xcel MN	SCT	1.98	Utility, RIM, TRC, Participant	

Category 2. Energy Efficiency Programs

In Category 2 we review several areas of program implementation (defined in greater detail below): comprehensiveness of energy efficiency portfolios, emerging programs or measure offerings, low-income programs, and electric vehicles. A total of 12.5 points were available for this category. Table 20 summarizes the scores for Category 2 metrics.

Table 20. Category 2 scores by metric

Utility	Portfolio comprehensiveness (4 pts)	Emerging areas (3 pts)	Low-income programs (3 pts)	Electric vehicles (2.5 pts)	Total (12.5 pts)	% of category
DTE	3.5	2.5	3	2.5	11.5	92%
Eversource MA	4	3	3	1.5	11.5	92%
LADWP	3.5	3	3	2	11.5	92%
NG MA	3.5	3	3	1.5	11	88%
PECO	3.5	2.5	3	2	11	88%
Consumers	3	2.5	2.5	2.5	10.5	84%
PG&E	3.5	2	2.5	2.5	10.5	84%
BGE	3.5	2.5	2	2	10	80%
Eversource CT	3.5	3	2.5	1	10	80%
NG NY	3.5	3	1	2.5	10	80%
PGE	3.5	3	2	1.5	10	80%
We Energies	4	1.5	2.5	1	9	72%
ComEd	3.5	2.5	2.5	0	8.5	68%
GA Power	3	1.5	1.5	2.5	8.5	68%
SDG&E	3.5	1.5	1.5	2	8.5	68%
Xcel MN	3.5	1.5	1	2.5	8.5	68%
MidAm IA	3.5	2	1.5	1	8	64%
OG&E	2.5	2	2.5	1	8	64%
SCE	2	1	2.5	2.5	8	64%
Xcel CO	3.5	1.5	2	1	8	64%
AEP OH	3.5	1.5	1.5	1	7.5	60%
PPL	3.5	1	3	0	7.5	60%
APS	3	1.5	1.5	1	7	56%
Nevada Power	3	2	1	1	7	56%
Ameren IL	3	0.5	3	0	6.5	52%
CPS	2.5	1	3	0	6.5	52%
Duke NC	3	1	2	0.5	6.5	52%

Utility	Portfolio comprehensiveness (4 pts)	Emerging areas (3 pts)	Low-income programs (3 pts)	Electric vehicles (2.5 pts)	Total (12.5 pts)	% of category
Duke SC	3	1	2	0.5	6.5	52%
PSE	3	1	1.5	1	6.5	52%
Ameren MO	2.5	0.5	2	1	6	48%
ConEd	2.5	1.5	1	1	6	48%
CenterPoint	2	1	2.5	0	5.5	44%
Entergy AR	2	1	2.5	0	5.5	44%
Entergy LA	3	0.5	2	0	5.5	44%
TECO	2	1	2.5	0	5.5	44%
Duke FL	2	0.5	2.5	0	5	40%
OH Edison	3	1	1	0	5	40%
Oncor	1.5	0.5	3	0	5	40%
Duke Progress	3	1	1	0	5	40%
SCE&G	2	0.5	2.5	0	5	40%
Duke IN	3	0	1.5	0	4.5	36%
AEP TC	1	0.5	2.5	0	4	32%
Duke OH	3	0	1	0	4	32%
PacifiCorp UT	2	0	1	1	4	32%
PSE&G	3	0.5	0	0.5	4	32%
SRP	1.5	0.5	1	1	4	32%
West Penn	2	0.5	1.5	0	4	32%
AL Power	2	0.5	0	1	3.5	28%
JCP&L	2.5	0.5	0.5	0	3.5	28%
LIPA	2.5	0.5	0	0	3	24%
Dominion	0.5	0	1	1	2.5	20%
FP&L	1	0	0	1	2	16%

Figure 4 shows the distribution of scores in Category 2.

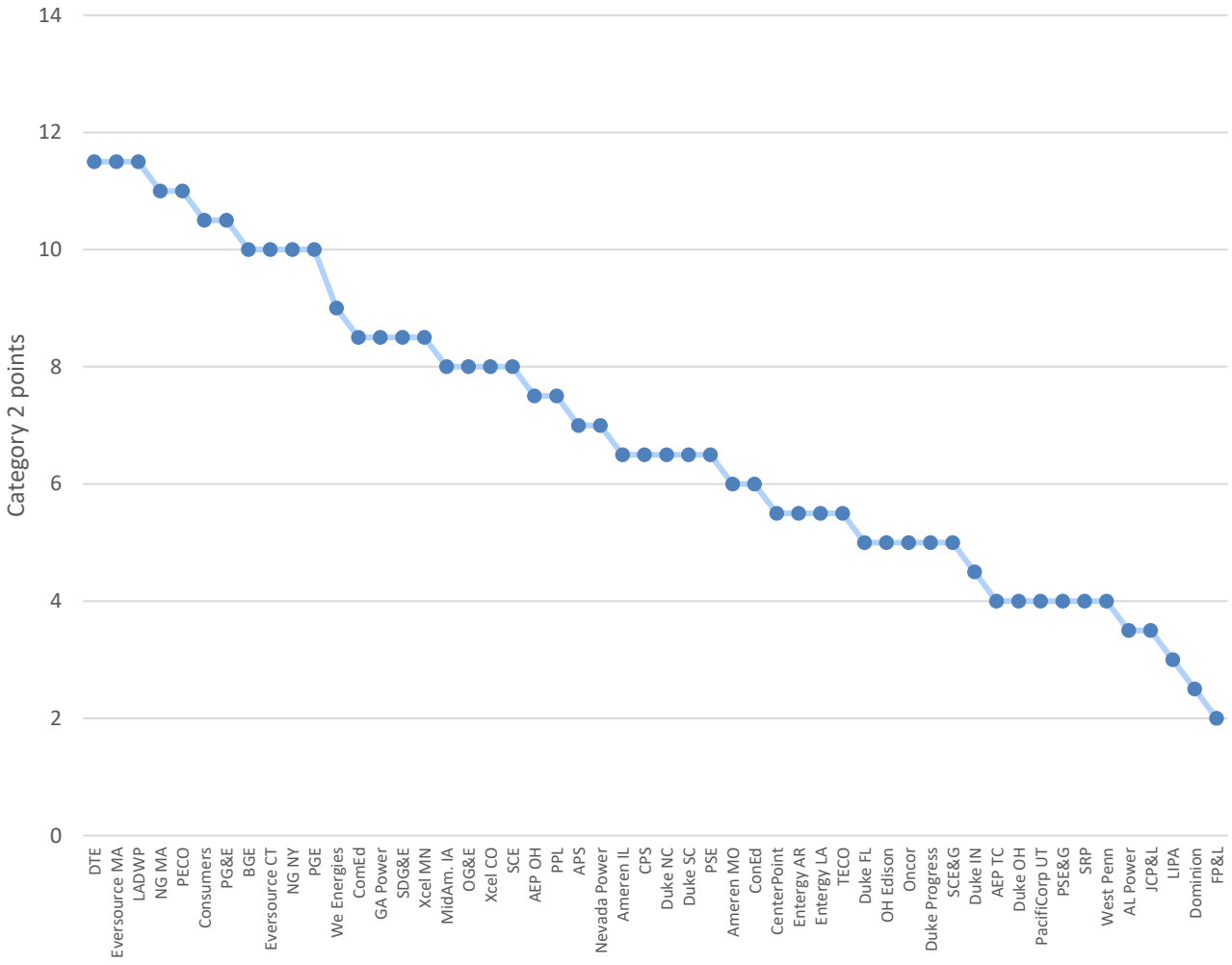

Figure 4. Distribution of Category 2 scores

No utility received all available points for Category 2. DTE, Eversource MA, and LADWP earned 11.5 points, and NG MA and PECO earned 11. Eleven utilities earned 10 or more points in this category. Both the median and the average scores were about 6.5 points.

Portfolio comprehensiveness is the most heavily weighted metric in Category 2, with 4 points. This is because offering a broad range of programs allows utilities to reach more customers, which increases program equity and leads to deeper savings (Nowak 2016; Cluett, Amann, and Ou 2016; Johnson 2013). Two utilities, Eversource MA and We Energies, offered all 24 programs on our checklist and earned full points for this metric. The most common programs are residential and commercial HVAC and industrial and commercial custom; the least common are appliance recycling (residential) and combined heat and power (CHP).

Six utilities earned full points for emerging areas by covering 12 or more new technologies or programs. Thirty-three utilities offer midstream programs, while only seven offer energy-efficient fuel switching programs. Details are provided in Appendix D.

While we do not consider pilot programs as a stand-alone metric in this edition of the report, utilities could earn credit for them under the emerging areas metric. Thirty-two utilities piloted new programs in 2018. Programs are described in Appendix E. One common pilot offers marketplace websites where consumers can shop for energy-efficient appliances and technologies and can receive instant rebates. These programs can help reduce the administrative burden, the cost of processing rebates, and transaction costs for customers and can encourage greater adoption of efficient technologies.

The low-income metric assesses annual low-income program savings per residential customer, spending on low-income programs as a percentage of total efficiency spending, and the comprehensiveness of programs. While savings per customer is an important indicator of achievement, it should be noted that this metric represents a simplified approach. Ideally savings would be normalized on the basis of the number of low-income customers served by a utility, but these data are not readily available and are inconsistent due to varying definitions of "low-income," so we use residential customers instead. We evaluated program savings per residential customer rather than per participating household because participation data were not readily available.

Low-income energy efficiency performance has increased since the last edition of the report. The 10 utilities that saved the most through low-income programs averaged about 25 kWh per residential customer, which is an increase of almost 55% from the previous edition of the *Scorecard*. The overall average also increased by over 50%. Median savings were lower than the average. Similarly, utilities used an average of about 11% of their efficiency spending on low-income programs while the 10 utilities that spent the most on low-income programs as a percentage of total portfolios averaged about 30%. Thirty-one utilities have comprehensive low-income programs, which we defined as offering more than one low-income program and offering programs that go beyond direct install.

Twenty-five utilities promoted a rate option to encourage EV adoption or off-peak charging, six more than in the previous edition of the *Scorecard*. Sixteen utilities had at least one program approved to promote the development of electric vehicle charging infrastructure, a new consideration in this edition.

UTILITY SPOTLIGHTS: PROGRAM OFFERINGS

Wisconsin Electric Power (We Energies)

We Energies earned the top spot in the portfolio comprehensiveness metric, as it did in 2017. With 24 programs, We Energies is one of two utilities with the maximum number of program offerings, administered by Focus on Energy. We Energies partners with Focus on Energy to provide incentives and rebates on appliance recycling, smart thermostats, and energy-efficient equipment such as heat pump water heaters and lighting, among other residential products.

Focus on Energy also offers a number of commercial programs, such as strategic energy management services for large customers. Through the Large Energy Users Program, participants have access to their energy usage data along with technical training and financial incentives for energy management. For midsize and small commercial customers, the utility offers custom services like hourly energy usage data and bill savings estimates for modified consumption behavior. In a more unique offering, Focus on Energy's Agriculture, Schools, and Government (AgSG) program offers tailored energy efficiency solutions to a variety of customers such as schools and universities, farms, wastewater treatment plants, and government facilities. For example, the Grain Dryer Tune-Up and Extended Agriculture Equipment programs are dedicated to reducing farm energy use by offering bonuses to customers for installing energy-efficient equipment.

DTE Electric (DTE)

DTE was the second-most improved utility in the portfolio comprehensiveness metric from 2017 to 2020. In the 2017 *Scorecard* we evaluated programs offered in 2015, of which DTE had just 8. DTE added 13 more programs by 2018 for a total of 21. This reflects the utility's renewed emphasis on energy efficiency, as it aims to meet 50% of energy customer demand through renewable energy resources and energy waste reduction (energy efficiency) by 2030. To achieve this goal, DTE plans to increase its energy efficiency savings targets beyond the mandated level of 1% of energy sales (Michigan Legislature 2016). It has set a goal of 1.45% of sales, as shown in Category 3.

In particular, DTE has added a number of commercial and industrial (C&I) program offerings since the last *Scorecard*. For example, in 2018 it rolled out prescriptive and nonprescriptive C&I programs including retrocommissioning, energy management controls, programs for small businesses, and incentives for energy-efficient equipment such as LEDs, HVAC, and food and refrigeration, among others. On the residential side, DTE added appliance recycling, smart thermostats, lighting, and new construction programs.

Los Angeles Department of Water and Power (LADWP)

LAWDP is the most-improved utility in the *Scorecard* this year, rising by 12 points and 13 places overall in the 2020 *Scorecard* relative to the 2017 edition. Much of this is due to improvements in portfolio comprehensiveness; it is the second-most improved utility in the emerging program offerings metric. LAWDP had only 3 emerging program offerings in 2017 but now has 13, demonstrating its commitment to energy efficiency and to offering program solutions for a more diverse range of customers and end uses.

Since the last *Scorecard* data year, 2015, California has enacted more-ambitious GHG reduction legislation, including Senate Bill 350, which directs publicly owned utilities to double energy efficiency targets by 2030 and begin submitting integrated resource plans to meet those goals (CEC 2019). These targets include increases in energy efficiency savings from utility programs, codes and standards, financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors. To meet these goals, LAWDP has undertaken unique programs such as free home upgrades and a residential energy efficiency loan (REEL) program to assist customers with financing energy efficiency improvements.

Among the programs included in the emerging programs metric, LAWDP has some less common offerings, like high-efficiency ceiling fans and zero net energy buildings. For example, LAWDP's California Advanced Home Program, offered in partnership with the local gas utility, SoCalGas, is designed to help the building industry develop environmentally friendly communities and to support state efforts for new homes to reach zero net energy by 2020.

National Grid Massachusetts (NG MA)

NG MA earned 1.5 points for its electric vehicle offerings. The utility's EV programs include incentives for electric vehicle charging equipment, line extensions, and make-ready site improvement programs. National Grid has stated its commitment to EVs across its service territories in Massachusetts, New York, and Rhode Island, including a commitment to installing and managing publicly available charging stations, purchasing EVs for its own fleet, and providing employees with workplace charging options (National Grid 2019). The company has awareness campaigns and a make-ready program that will fund 100% of the electrical infrastructure for approved charging projects. It will also provide rebates for some customer charging equipment (National Grid 2019). Figure 5 shows these options.

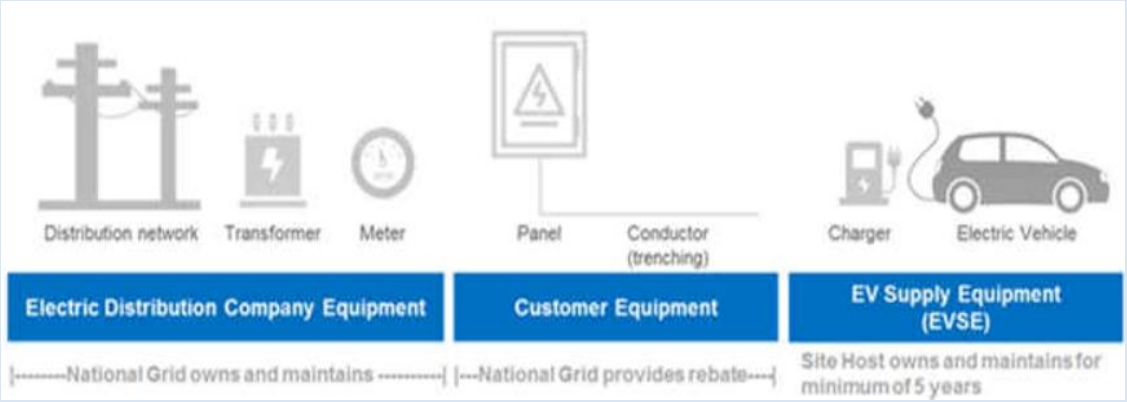

Figure 5. National Grid MA's EVSE program options

National Grid is focused on minimizing grid impacts of EVs by monitoring the load impacts of EVs on a granular level. These efforts ensure that increased EV adoption does not lead to increased peak demand and help to maintain EVs' GHG emission reductions and energy savings benefits.

Now we review each metric in greater detail. We present information on why each is important, our data sources and assumptions, and scoring.

ENERGY EFFICIENCY PORTFOLIO COMPREHENSIVENESS

The breadth and types of energy efficiency programs are essential determinants of utility energy efficiency capability and performance. ACEEE research into program best practices in areas such as small business, low income, multifamily, and others demonstrates that when utilities offer programs for specific customer segments and targeted energy end uses, energy savings increase (Nowak 2016; Cluett, Amann, and Ou 2016; Johnson 2013). Aiming programs at all these major customer segments and end uses is also a strategy utility managers can use to ensure the equity of their portfolio of offerings. Our goal is not to capture all program types but to assess the breadth of portfolios at a high level.

For this metric we used a checklist of 24 program types, 11 residential and 13 commercial and industrial.[26] In selecting these program types, our objective was to include programs that serve particular important market segments and programs that have high potential for energy savings, potential for nonenergy benefits, and long-term or lifetime savings

[26] We reviewed other literature on program types including Hoffman et al. 2013.

potential. We moved three programs from the emerging programs metric to the portfolio comprehensiveness metric for this edition of the *Scorecard*; they are offered by more than half the utilities, so we no longer view them as emerging. These include heat pump water heaters and/or condensing gas heaters, learning thermostats, and upstream programs. Low-income programs are covered in a separate metric. Utilities were given credit in this metric for energy efficiency programs offered by statewide program administrators in their state.

We scored these residential program types (program definitions are given in Appendix C):

- Appliance recycling
- Behavior-based/feedback
- Education
- Home appliances
- Home retrofit
- Heat pump water heaters
- HVAC equipment
- Lighting
- Learning thermostats
- Multifamily
- New construction

We also scored these commercial and industrial program types:

- Agriculture
- Combined heat and power
- Custom
- Efficient motor systems
- HVAC
- Kitchens and restaurants
- Lighting
- Lighting systems and controls
- Retrocommissioning
- Small business
- Strategic energy management
- Upstream programs
- Whole-building retrofits

We scored utilities using an even distribution of points based on the total number of programs or program/technology types covered in their utility portfolios in 2018. For a utility to score the maximum 4 points, it needed to offer all of the 24 areas on the list, as shown in table 21. We provided utilities with program definitions in recognition of the fact that utilities may categorize program types differently or may offer multiple types of programs under a single program name. While there are still limitations to categorizing programs, this approach provides a broad review of a portfolio's comprehensiveness. See Appendix C for a listing of all program types offered by each utility, by sector.

For utilities in states with statewide program administrators, program types were counted for the utilities wherever the administrators' programs were available in the utility service

territory in 2018. For example, in 2018 some energy efficiency programs in Illinois were offered through the Department of Commerce and Economic Opportunity (DCEO). We counted those program types when scoring Ameren IL and ComEd on portfolio comprehensiveness. Table 21 shows scoring for the portfolio comprehensiveness metric.

Table 21. Scoring for portfolio comprehensiveness

Number of specified programs	Score
24	4.0
21–23	3.5
18–20	3.0
15–17	2.5
12–14	2.0
9–11	1.5
6–8	1.0
3–5	0.5
0–2	0.0

Table 22 shows the scores for portfolio comprehensiveness.

Table 22. Scores for portfolio comprehensiveness (2018 programs)

Utility	Number of programs	Score	Utility	Number of programs	Score
Eversource MA	24	4.0	PSE&G [a, b]	19	3.0
WE Energies [a]	24	4.0	APS	18	3.0
AEP OH	23	3.5	Entergy LA	18	3.0
Eversource CT	23	3.5	Nevada Power	18	3.0
MidAm IA	23	3.5	OH Edison	18	3.0
PECO	23	3.5	PSE	18	3.0
PPL	23	3.5	CPS	17	2.5
BGE	22	3.5	JCP&L[a]	17	2.5
PGE [a]	22	3.5	LIPA	17	2.5
SDG&E	22	3.5	OG&E	17	2.5
ComEd	21	3.5	Ameren MO	16	2.5
DTE	21	3.5	ConEd [a]	16	2.5
LADWP	21	3.5	AL Power	14	2.0
NG MA	21	3.5	Entergy AR	14	2.0

Utility	Number of programs	Score
NG NY [a]	21	3.5
PG&E	21	3.5
Xcel CO	21	3.5
Xcel MN	21	3.5
Consumers	20	3.0
Duke NC	20	3.0
Duke SC	20	3.0
GA Power	20	3.0
Ameren IL	19	3.0
Duke IN	19	3.0
Duke OH	19	3.0
Duke Progress	19	3.0

Utility	Number of programs	Score
SCE&G	13	2.0
TECO	13	2.0
West Penn	13	2.0
CenterPoint	12	2.0
Duke FL	12	2.0
PacifiCorp UT	12	2.0
SCE	12	2.0
Oncor	11	1.5
SRP	11	1.5
AEP TC	7	1.0
FP&L	7	1.0
Dominion [c]	3	0.5

[a] In states with statewide program administrators, we counted program types offered by administrators for the utilities in that state. [b] PSE&G proposed a portfolio of 22 new energy efficiency programs in 2018, but these have not yet been approved (PSEG 2019). [c] In 2019, regulators approved 11 new energy efficiency programs for Dominion, but these had not yet been implemented in 2018.

Two utilities earned full points for covering all the program areas in 2018. Of the programs on the list, both residential and commercial HVAC were the most prevalent, with 50 out of 52 utilities offering them in 2018. Additionally, 49 utilities had custom commercial and industrial programs, and 48 offered commercial lighting programs. Only 23 utilities offered CHP programs, the least common program type of the group.

Overall, the 52 utilities offered more than 900 programs or measure types in 2018. While not directly comparable to 2015 information because we added new programs and removed others, this is still a far greater number of programs than the 600 or so that were offered in 2015. Many new programs have clearly been developed, but the increase may also stem from our asking utilities to identify their own programs this year (then confirmed by us). Utility representatives are more familiar with their offerings and better able to classify them than we are.

EMERGING PROGRAM AREAS

Technological and programmatic innovations lead to greater energy savings and often become standard practice as technology and implementation improve. Utilities that undertake the most cutting-edge programs and technologies show that they are committed to energy efficiency in the long run and clearly understand the value that investments in energy-efficient technologies and programs provide. They are also well positioned to more quickly adopt new measures or programs as they gain market penetration and become more cost effective.

This metric includes 17 emerging program areas that are important to the future of energy efficiency in the utility sector. To replace items that we moved to the portfolio comprehensiveness metric, we added three new emerging areas this year: energy-efficient fuel switching, data disaggregation, and grid-interactive buildings. We also moved pilot programs, which was a stand-alone category in the 2017 edition, into the emerging programs category. Pilots fit well here since they signal a future-oriented approach to energy efficiency. They are an important way to test new program ideas on a small scale and can provide valuable data to inform the design and administration of a full-scale program. Emerging technologies and program areas push the bounds of what is currently standard and widely implemented across the utility sector. Some of the technologies lead directly to greater energy and demand savings, while others make energy efficiency programs run more effectively.

To assess whether the utilities were undertaking programs in the selected areas, including pilot programs, we asked them to provide information on the programs they ran in 2018 and to list any pilots that they offered. We used utility filings and websites to confirm program and measure offerings. Table 23 shows the areas we selected as important emerging technologies and programs for the utility sector, based on current research and new trends in the industry.

Table 23. Emerging program areas

Emerging area	Description
Advanced space-heating heat pumps	Encouraging the adoption of cold- or warm-climate heat pumps with heating seasonal performance factor (HSPF) above 10. Must provide extra incentives for advanced heat pumps relative to those provided for moderate-efficiency heat pumps.
Commercial and industrial geo-targeting	Targeting businesses in specific geographic locations that will yield high savings. Does not include geo-targeted marketing efforts or comparative business energy report programs.
Conservation voltage reduction or volt/var optimization	Improving the efficiency of a utility's transmission and distribution system through voltage reduction systems, whether explicitly included in the utility's energy efficiency portfolio or not.
Data centers	Incentivizing measures to improve data center energy efficiency, such as through high-efficiency cooling systems, servers, and other equipment.
Energy-efficient fuel switching	Encouraging fuel switching that delivers overall BTU energy savings, GHG reductions, and customer cost savings.
Energy use feedback to consumers in real time	Allowing consumers to better understand their energy usage behavior and react to increase savings. Includes programs that provide feedback in near real time. Typically requires advanced metering infrastructure (AMI) installation.

Emerging area	Description
Grid-interactive efficient buildings	Incentivizing buildings that reduce energy waste and carbon emissions while offering flexible building loads to the grid. May include integrating energy efficiency and demand response to better value the many benefits of grid-interactive efficient buildings.
High-efficiency ceiling fans	Promoting the installation of high-efficiency ceiling fans, either stand-alone or included as a part of another program.
High-efficiency consumer electronics (residential)	Promoting the purchase and use of high-efficiency consumer electronics, including through rebates, midstream and upstream programs, and the use of smart strips with consumer electronics.
High-efficiency residential clothes dryers	Offering rebates for high-efficiency clothes dryers, or participation in the Super-Efficient Dryer Initiative. Does not include advocacy for dryer efficiency standards.
Midstream programs	Transforming the market for energy-efficient products by targeting midstream retailers and partners to improve choices and reduce costs for consumers. Includes midstream lighting, high-efficiency HVAC, heat pump water heater, and appliance programs.
Programs using data disaggregation	Extracting end-use and/or appliance-level data from an aggregate or whole-building energy signal to engage consumers and to target relevant programs to specific customers.
Quality HVAC installation	Improving and ensuring the quality installation of HVAC equipment, such as incentivizing installation to ANSI/ACCA Standard 5.
Reduction of plug and other miscellaneous load in commercial buildings	Reducing plug or other loads in commercial buildings, including midstream and upstream programs for equipment like advanced power strips (tier 1 and 2) and smart plugs.
Residential geo-targeting	Targeting residents in specific geographic locations that will yield high or particularly valuable savings. Does not include geo-targeted marketing efforts or comparative home energy reports.
Zero net energy buildings	Developing zero-energy buildings through codes and standards or other methods. Could also include a tiered approach, such as a zero-energy "step codes." Does not include programs or participation in zero net energy forums or coalitions.
Pilot programs	Any pilot programs run by the utility in 2018.

Utilities could earn a total of 3 points for the emerging areas metric. We reduced the available points for this metric by 0.5 since the last *Scorecard* and added that to the electric vehicles category in recognition of the large efficiency and GHG reduction potential in the transportation sector. Table 24 shows the scoring breakdown.

Table 24. Scoring for emerging program areas

Number of programs	Score
12+	3.0
10–11	2.5
8–9	2.0
6–7	1.5
4–5	1.0
2–3	0.5
0–1	0.0

Table 25 shows the scores for the emerging areas metric.

Table 25. Scores for emerging areas in 2018

Utility	Number of programs	Score
Eversource MA	14	3.0
PGE [a]	14	3.0
Eversource CT	13	3.0
LADWP	13	3.0
NG MA	13	3.0
NG NY [a]	13	3.0
PECO	11	2.5
BGE	10	2.5
ComEd	10	2.5
Consumers	10	2.5
DTE	10	2.5
MidAm IA	9	2.0
Nevada Power	9	2.0
OG&E	8	2.0
PG&E	8	2.0
ConEd [a]	7	1.5
SDG&E	7	1.5
AEP OH	6	1.5
APS	6	1.5
GA Power	6	1.5
WE Energies [a]	6	1.5

Utility	Number of programs	Score
TECO	5	1.0
SCE	5	1.0
CenterPoint	4	1.0
Duke NC	4	1.0
Duke SC	4	1.0
Entergy AR	4	1.0
OH Edison	4	1.0
Duke Progress	4	1.0
AL Power	3	0.5
Ameren IL	3	0.5
JCP&L [a]	3	0.5
PSE&G [a]	3	0.5
AEP TC	2	0.5
Ameren MO	2	0.5
Duke FL	2	0.5
Entergy LA	2	0.5
LIPA	2	0.5
Oncor	2	0.5
SCE&G	2	0.5
SRP	2	0.5
West Penn	2	0.5

Utility	Number of programs	Score
Xcel CO	6	1.5
Xcel MN	6	1.5
CPS	5	1.0
PPL	5	1.0
PSE	5	1.0

Utility	Number of programs	Score
Dominion	1	0.0
Duke IN	1	0.0
Duke OH	1	0.0
PacifiCorp UT	1	0.0
FP&L	-	-

[a] In states with statewide program administrators, we counted program types offered by administrators for the utilities in that state.

No utility on this list was undertaking all 17 of the selected emerging program areas in 2018. Six utilities earned full points with 12 or more programs or technologies offered. This indicates a commitment to advancing and transforming the energy efficiency market. Of the programs on the list, midstream programs are the most prevalent, with 33 utilities implementing them in 2018. Additionally, 32 utilities offered data center programs, a new program type we included this year. On the other hand, only seven utilities offered energy-efficient fuel switching programs, and eight had grid-interactive efficient building programs. Overall, the 52 utilities offered 298 emerging programs or measure types in 2018. While not directly comparable to 2015 information because we added new programs and removed others, this is still a far greater number of programs than the 168 offered in 2015. As with portfolio comprehensiveness, it is clear that many new programs have been developed, but the increase may also stem from our asking utilities to identify their own programs for this version of the report (then confirmed by us). See Appendix D for a full list of the emerging programs each utility offered in 2018.

LOW-INCOME PROGRAM IMPLEMENTATION

Installing energy efficiency measures helps consumers reduce the amount they spend on energy every month, a particularly valuable benefit for low-income customers, who often face higher energy burdens.[27] These customers are also the least able to participate in programs requiring customer investment in energy efficiency measures (Drehobl and Castro-Alvarez 2017). The existence of programs directed at low-income customers is important because it helps promote equity in program offerings.

To assess utility performance in administering low-income energy efficiency programs, we collected savings and spending data for programs that target low- or limited-income customers from annual reports. We also relied on utility contacts for additional information. It is important to note that utilities use varying definitions of "low income" and "limited income." They may employ different methods of calculating qualifying incomes or include different types of customers such as age-qualifying or commercial customers.

Three points were available to utilities for this metric. They could earn 1 point each for savings achieved per residential customer, spending on low-income energy efficiency

[27] Energy burden is the percentage of a household's income spent on home energy bills (Drehobl and Ross 2016).

programs, and program offering comprehensiveness.[28] While achieved savings demonstrate the actual performance of low-income programs, we feel it is important to consider spending as well. Low-income programs are not always cost effective using traditional cost-effectiveness tests that don't capture their additional benefits. In fact, these programs are often exempt from cost-effectiveness screening (Berg et al. 2019). Low-income offerings may require additional investment, compared with market-rate programs, to address an older building stock or to cover measures that reduce risks to health and safety (Drehobl and Ross 2016). Therefore spending can indicate a robust program.

We used EIA data to determine the total number of residential customers served by a utility in order to normalize low-income savings figures across utilities. Ideally these would be normalized on the basis of the number of low-income customers served by a utility, but these data are not readily available and are inconsistent due to varying definitions of "low-income." Additionally, we normalized low-income spending by assessing the percentage of total spending (as defined in the efficiency program spending metric in Category 1) that went to low-income programs. This also poses certain challenges, such as differences in how utilities attribute administration costs to low-income programs.

To assess comprehensiveness of the low-income program being offered, we awarded half a point to any utility offering more than one low-income program and another half point to a utility whose measures go beyond direct install to address the whole building envelope. These factors indicate a broad and coordinated effort to reach low-income customers with efficiency programs. Table 26 shows the scoring criteria for this metric.

Table 26. Scoring for low-income programs

Low-income kWh savings per residential customer	Low-income spending as % of total spending	Comprehensiveness of low-income program	Score (3 pts total)
6.00+	10.00+	Offers multiple low-income programs and measures beyond direct install	1.0 each
2.00–5.99	3.00–9.99	Either offers multiple low-income programs or measures beyond direct install	0.5 each
0.00–1.99	0.00–2.99	Neither offers multiple low-income programs nor measures beyond direct install	0.0 each

Table 27 shows the scores for low-income programs.

[28] In this report low-income programs do not include bill assistance programs.

Table 27. Scores for low-income programs in 2018

Utility	Annual LI electric savings (MWh)	LI savings per residential customer (kWh)	Savings per customer points	LI spending ($1,000's)	LI spending as a % of total spending	% spending on LI points	More than one program offered	Measures beyond direct install	Comprehensive-ness score	Total LI points
Ameren IL	31,685	72.84	1.0	$25,672,329	25.75%	1.0	Yes	Yes	1	3.0
CPS	13,463	18.08	1.0	$18,453,718	41.50%	1.0	Yes	Yes	1	3.0
DTE	28,309	14.21	1.0	$13,752,866	10.75%	1.0	Yes	Yes	1	3.0
Eversource MA	23,866	19.39	1.0	$30,024,372	11.27%	1.0	Yes	Yes	1	3.0
LADWP	29,079	21.73	1.0	$18,077,831	13.37%	1.0	Yes	Yes	1	3.0
NG MA	24,043	20.83	1.0	$42,436,141	15.93%	1.0	Yes	Yes	1	3.0
Oncor	18,708	6.09	1.0	$10,335,223	26.86%	1.0	Yes	Yes	1	3.0
PECO	19,187	13.00	1.0	$8,800,000	14.40%	1.0	Yes	Yes	1	3.0
PPL	21,535	17.13	1.0	$11,401,789	21.45%	1.0	Yes	Yes	1	3.0
AEP TC	4,276	5.91	0.5	$2,596,250	20.08%	1.0	Yes	Yes	1	2.5
CenterPoint	8,349	3.83	0.5	$5,319,615	20.49%	1.0	Yes	Yes	1	2.5
ComEd	117,911	32.44	1.0	$34,887,470	9.88%	0.5	Yes	Yes	1	2.5
Consumers	15,127	9.44	1.0	$5,437,604	4.61%	0.5	Yes	Yes	1	2.5
Duke FL	7,951	4.98	0.5	$2,592,953	12.47%	1.0	Yes	Yes	1	2.5
Entergy AR	5,007	8.44	1.0	$2,177,777	4.28%	0.5	Yes	Yes	1	2.5
Eversource CT	13,708	12.06	1.0	$11,599,848	11.14%	1.0	No	Yes	0.5	2.5
OG&E	13,820	20.74	1.0	$5,252,102	14.46%	1.0	No	Yes	0.5	2.5
PG&E	66,389	13.83	1.0	$124,956,059	42.42%	1.0	No	Yes	0.5	2.5
SCE	49,584	11.11	1.0	$67,817,718	34.35%	1.0	No	Yes	0.5	2.5
SCE&G	4,295	6.87	1.0	$1,391,090	10.24%	1.0	No	Yes	0.5	2.5

Utility	Annual LI electric savings (MWh)	LI savings per residential customer (kWh)	Savings per customer points	LI spending ($1,000's)	LI spending as a % of total spending	% spending on LI points	More than one program offered	Measures beyond direct install	Comprehensive-ness score	Total LI points
TECO	8,353	12.33	1.0	$4,361,381	29.22%	1.0	No	Yes	0.5	2.5
We Energies [a]	2,591	2.56	0.5	$17,872,648	32.02%	1.0	Yes	Yes	1	2.5
Ameren MO	11,806	11.13	1.0	$5,109,576	7.69%	0.5	Yes	No	0.5	2.0
BGE	1,799	1.54	0.0	$16,764,710	14.63%	1.0	Yes	Yes	1	2.0
Duke NC	3,790	2.20	0.5	$4,719,611	5.05%	0.5	Yes	Yes	1	2.0
Duke SC	1,419	2.86	0.5	$1,760,645	5.04%	0.5	Yes	Yes	1	2.0
Entergy LA	184	0.20	0.0	$266,006	16.24%	1.0	Yes	Yes	1	2.0
PGE [a b]	2,831	3.65	0.5	$4,567,291	5.33%	0.5	Yes	Yes	1	2.0
Xcel CO	5,999	4.75	0.5	$3,779,035	4.75%	0.5	Yes	Yes	1	2.0
AEP OH	3,974	3.07	0.5	$5,755,596	9.16%	0.5	No	Yes	0.5	1.5
APS	992	0.90	0.0	$3,394,557	12.02%	1.0	No	Yes	0.5	1.5
Duke IN	3,349	4.62	0.5	$600,065	2.12%	—	Yes	Yes	1	1.5
GA Power	—	—	0.0	$2,002,144	3.53%	0.5	Yes	Yes	1	1.5
MidAm. IA	3,995	6.75	1.0	$1,343,056	2.10%	—	No	Yes	0.5	1.5
PSE	1,658	1.64	0.0	$5,052,281	5.55%	0.5	Yes	Yes	1	1.5
SDG&E	5,790	4.47	0.5	$12,851,046	15.64%	1.0	No	No	0	1.5
West Penn	7,979	12.80	1.0	$98,800	0.99%	—	No	Yes	0.5	1.5
ConEd [a]	1,856	0.63	0.0	$1,225,142	0.65%	—	Yes	Yes	1	1.0
Dominion	7,347	3.31	0.5	$0	0.00%	—	No	Yes	0.5	1.0
Duke OH	1,255	1.96	0.0	$660,754	2.06%	—	Yes	Yes	1	1.0
NG NY [a]	1,690	1.13	0.0	$982,185	0.93%	—	Yes	Yes	1	1.0

Utility	Annual LI electric savings (MWh)	LI savings per residential customer (kWh)	Savings per customer points	LI spending ($1,000's)	LI spending as a % of total spending	% spending on LI points	More than one program offered	Measures beyond direct install	Comprehensive-ness score	Total LI points
Nevada Power	8,336	10.10	1.0	$0	0.00%	–	No	No	0	1.0
OH Edison	2,828	3.03	0.5	$0	0.00%	–	No	Yes	0.5	1.0
PacifiCorp UT	2,611	3.20	0.5	$714,217	1.70%	–	No	Yes	0.5	1.0
Duke Progress	1,950	1.62	0.0	$1,579,230	2.71%	–	Yes	Yes	1	1.0
SRP	–	–	0.0	$0	0.00%	–	Yes	Yes	1	1.0
Xcel MN	1,920	1.67	0.0	$2,408,363	2.24%	–	Yes	Yes	1	1.0
JCP&L [a]	1,003	1.00	0.0	$2,193,630	8.66%	0.5	No	No	0	0.5
AL Power	–	–	0.0	$0	0.00%	–	No	No	0	–
FP&L	1,299	0.30	0.0	$354,000	0.42%	–	No	No	0	–
LIPA	972	0.96	0.0	$2,039,234	2.84%	–	No	No	0	–
PSE&G [a]	–	–	0.0	$0	0.00%	–	No	No	0	–

Savings are net at the generator level, using a NTGR of 100%. Blanks indicate no data were found. [a] Includes performance separately allocated from a third-party administrator. [b] PGE's low-income data are from July 2018 to June 2019.

Nine utilities earned full points for this metric, compared with five utilities in the previous edition, although how we evaluated program comprehensiveness changed slightly. On average, utilities reported 8.4 kWh of low-income energy savings per residential customer and spent about 10.7% of total energy efficiency program funds on low-income programs. However the medians for both of these categories are lower, at 4.5 kWh per residential customer and 8.2% spending on low-income programs. Notably, Ameren Illinois saved more than 70 kWh per residential customer and ComEd saved more than 32 kWh per residential customer by offering eight low-income programs. PG&E and CPS devoted more than 40% of total expenditures to low-income programs. Thirty-one utilities offer comprehensive programs, including more than one low-income program and measures beyond direct install that address the building envelope. Forty-four utilities have low-income programs that go beyond direct-install measures. This indicates that they are offering critical measures to low-income customers, such as air sealing. We were unable to locate low-income savings and spending data for several utilities, indicating either a lack of publicly available data or an absence of these programs from these utilities' portfolios.

ELECTRIC VEHICLES

Although electric vehicles increase the need for electricity production, they are more energy efficient than conventional gasoline-fueled vehicles, even when power generation and distribution losses are taken into account (Khan and Vaidyanathan 2018). For this metric, we considered two ways that utilities can promote electric vehicle adoption: by supporting electric vehicle supply equipment (EVSE) deployment and by offering rate options that benefit electric vehicle owners. These include not only EV-specific rates but also nonspecific options like time-of-use rates promoted to EV owners.

In the previous edition of the *Scorecard*, we awarded 1 point to utilities for providing customer education on EVs on informational web pages. Forty-five out of the 51 utilities included in the 2017 report had EV-related educational material on their websites, indicating that this aspect of utility EV promotion is well covered. For this reason, we did not give points for EV education in this edition.

Having convenient and accessible EVSE, or charging stations, is critical to increasing EV adoption. For the equipment metric, we considered three ways in which utilities can facilitate increased EVSE deployment: with make-ready programs, direct financial incentives, and line extensions. We did not score on EVSE ownership, as this is not allowed in every state, and it may not make sense for utilities to own EVSE in contexts where the competitive market may serve the need more efficiently (Allen et al. 2017). We credited utilities that include EV support as a part of their demand-side management program portfolios as well as those that support EVs separately. The activities we considered for scoring are:

- *Make-ready programs.* Utilities create a site that is completely ready for installation of charging equipment by another organization by upgrading electrical equipment on the customer side of the meter (Colorado PUC 2019).
- *Financial incentives.* Utilities offer incentives for the hardware, network services, or other aspects of charging equipment installation in a variety of forms such as rebates, grants, or loans (PGE 2019; PUCO 2018).
- *Line extensions.* Utilities install new distribution equipment or make equipment upgrades to facilitate serving electric vehicle charging loads (PGE 2019).

We awarded 1 point to utilities with programs approved for any of the above three categories and 1.5 points for utilities with more than one of the three. We awarded 0.5 points to utilities that have only proposed programs that have not yet been approved. To find EVSE-related information, we primarily used utility filings collected on AtlasEVHub as well as on utility websites (EV Hub 2019).

For the EV rate metric, we relied on the National Renewable Energy Laboratory (NREL) database of utility rate schedules as well as current utility tariffs (OpenEI 2019). We focused on whether the utility has a rate encouraging customers to adopt EVs through electricity discounts, or a rate that encourages them to charge EVs (or otherwise use electricity) during off-peak periods. Such time-varying rates encourage customers to charge during periods of low overall system demand. This can reduce the carbon intensity of electricity generation, help to facilitate the integration of variable renewable energy resources, and reduce the need for utilities to build new infrastructure to meet EV power demand (Khan and Vaidyanathan 2018). We credited any residential time-varying rates targeted to EV owners as well as EV-specific rates for which customers have to prove ownership of an EV.

Utilities could earn up to 2.5 points for this metric. Table 28 shows the scoring criteria.

Table 28. Scoring for electric vehicles

Description	Score (2.5 points total)
EVSE programs	
Offers 2 or more approved EVSE programs	1.5
Offers 1 approved EVSE program	1.0
Has filed for EVSE program approval, but none yet approved	0.5
EV rate options	
Offers a rate option that promotes EVs	1.0

Table 29 shows the scores for this metric.

Table 29. Scores for electric vehicles

Utility	EVSE: incentive	EVSE: line extension	EVSE: make-ready	EVSE programs filed (not yet approved)	Points (EVSE programs)	Points (EV rates)	Total points
Consumers	•		•	○	1.5	1	2.5
DTE	•		•	○	1.5	1	2.5
NG NY	•	•		○	1.5	1	2.5
PG&E	•	•	•	○	1.5	1	2.5
SCE	•		•	○	1.5	1	2.5
GA Power	•			○	1.5	1	2.5
Xcel MN	•			○	1.5	1	2.5
BGE	•			○	1	1	2
SDG&E	•				1	1	2
LADWP	•				1	1	2
PECO	•				1	1	2
NG MA	•	•	•	○	1.5	0	1.5
Eversource MA	•	•	•	○	1.5	0	1.5
PGE				○	0.5	1	1.5
AEP OH	•				1	0	1
Ameren MO	•			○	1	0	1
PSE	•			○	1	0	1
AL Power					0	1	1
APS					0	1	1
ConEd					0	1	1
Dominion					0	1	1
Eversource CT					0	1	1
FP&L					0	1	1
MidAm IA					0	1	1
Nevada Power					0	1	1
OG&E					0	1	1
PacifiCorp UT					0	1	1
SRP					0	1	1
Xcel CO					0	1	1
WE Energies					0	1	1
Duke NC				○	0.5	0	0.5
Duke SC				○	0.5	0	0.5

Utility	EVSE: incentive	EVSE: line extension	EVSE: make-ready	EVSE programs filed (not yet approved)	Points (EVSE programs)	Points (EV rates)	Total points
PSE&G				○	0.5	0	0.5
AEP TC					0	0	0
Ameren IL					0	0	0
CenterPoint					0	0	0
ComEd					0	0	0
CPS					0	0	0
Duke FL					0	0	0
Duke IN					0	0	0
Duke OH					0	0	0
Entergy AR					0	0	0
Entergy LA					0	0	0
JCP&L					0	0	0
LIPA					0	0	0
OH Edison					0	0	0
Oncor					0	0	0
PPL					0	0	0
Duke Progress					0	0	0
SCE&G					0	0	0
TECO					0	0	0
West Penn					0	0	0

Data are from EV HUB 2019, OpenEI 2019, and utility websites and tariffs.

Only 16 out of 52 utilities had approved filings for at least one EVSE program. Another four utilities had no EVSE programs but did have filings that were yet to be approved, earning them 0.5 points. Twenty-five utilities promoted a rate option to encourage EV adoption or off-peak charging. Of these, 18 promoted rate options that were specific to electric vehicles, meaning that customers needed to document ownership to participate in the rate and often needed to install a second electric meter. Among the other 7 utilities that earned rate points, the great majority offered time-of-use under which customers paid less for charging an electric vehicle during off-peak periods, typically at night.

Some utilities face extra regulatory barriers to providing EV incentives. For example, Texas does not allow utilities to implement rates specifically for electric vehicles. Other utilities take unique approaches to EV promotion. ComEd, for instance, promoted the use of its real-time pricing program for EVs, and DTE offered a flat rate so that customers were able to pay a flat fee for unlimited charging. This rate promotes EV adoption but does not necessarily encourage off-peak charging.

Category 3. Enabling Mechanisms

In Category 3 we review several metrics related to key enabling mechanisms to scale energy efficiency. These include metrics around advanced metering, data access, energy savings targets, residential rate design, utility business models, program evaluation, and resource planning. A total of 11.5 points are available in Category 3. Table 30 presents the scores.

Table 30. Category 3 scores by metric

Utility	Advanced metering (1 pt)	Data access (1 pt)	Energy savings targets (2.5 pts)	Customer charge (1 pt)	Time-of-use rates (1 pt)	Utility business model (2 pts)	EM&V (2 pts)	Resource planning (1 pt)	Total (11.5 pts)	% of category
SDG&E	1	1	1.5	1	1	2	2	1	10.5	91%
PG&E	1	1	1	1	1	2	2	1	10	87%
ComEd	1	1	2.5	0	0.5	2	2	0.5	9.5	83%
Consumers	1	0.5	2	0.5	1	1	2	1	9	78%
DTE	1	0.5	2	0.5	1	1	2	1	9	78%
LADWP	0	0.5	2	1	0.5	2	2	1	9	78%
SCE	1	1	1	1	1	2	2	0	9	78%
NG MA	0	0.5	2.5	1	0	2	2	0.5	8.5	74%
Eversource MA	0	0.5	2.5	0.5	0	2	2	1	8.5	74%
NG NY	0	1	2	0	0.5	2	2	1	8.5	74%
BGE	1	0.5	1.5	0.5	0.5	1	2	1	8	70%
Duke OH	1	0	1	1	0.5	2	2	0.5	8	70%
Eversource CT	0	0.5	1.5	0.5	0.5	2	2	1	8	70%
PGE	1	0.5	2	0	0.5	1	2	1	8	70%
Ameren IL	1	0.5	0.5	0	1	2	2	0.5	7.5	65%
ConEd	0	1	1	0	0.5	2	2	1	7.5	65%
APS	1	0.5	1.5	0.5	1	1	1	0.5	7	61%
Xcel CO	0	1	2	1	0.5	1	1	0.5	7	61%
Xcel MN	0	0.5	1.5	0.5	0.5	2	1	1	7	61%
Duke NC	1	0.5	1	0	0.5	1	2	0.5	6.5	57%
Duke SC	1	0.5	1	0	0.5	1	2	0.5	6.5	57%
GA Power	1	0.5	0.5	0	0.5	1	2	0.5	6	52%
AEP OH	0.5	0.5	1.5	0.5	0.5	2	0	0.5	6	52%
OG&E	1	0	0.5	0	1	1	2	0.5	6	52%
PacifiCorp UT	0	0.5	1	1	0.5	0	2	1	6	52%
PECO	1	0.5	1	0.5	0	0	2	1	6	52%
SRP	1	0	2.5	0	1	1	0	0.5	6	52%

Utility	Advanced metering (1 pt)	Data access (1 pt)	Energy savings targets (2.5 pts)	Customer charge (1 pt)	Time-of-use rates (1 pt)	Utility business model (2 pts)	EM&V (2 pts)	Resource planning (1 pt)	Total (11.5 pts)	% of category
We Energies	0.5	0.5	0.5	0	1	1	2	0.5	6	52%
Ameren MO	0	0.5	0.5	0.5	0.5	1	2	0.5	5.5	48%
Duke IN	0.5	0	0.5	0.5	0	1	2	1	5.5	48%
LIPA	0	0	1.5	0	0.5	2	1	0.5	5.5	48%
Nevada Power	1	0.5	1	0	0.5	0	2	0.5	5.5	48%
Duke Progress	0	0.5	1	0	0.5	1	2	0.5	5.5	48%
CPS	1	0	0.5	0.5	0	1	1	1	5	43%
Entergy AR	0	0	0.5	0.5	0.5	1	2	0.5	5	43%
West Penn	1	0	0.5	0.5	1	0	2	0	5	43%
CenterPoint	0	0.5	0	1	0	1	2	0	4.5	39%
Oncor	1	0.5	0	1	0	1	1	0	4.5	39%
PPL	1	0	1	0	0	0	2	0.5	4.5	39%
PSE	0	0.5	0.5	0.5	0	1	1	1	4.5	39%
SCE&G	0	0	0	0.5	0.5	1	2	0.5	4.5	39%
PSE&G	0	0.5	0	1	0.5	0	1	1	4	35%
AEP TC	0	0.5	0	1	0	1	1	0	3.5	30%
Dominion	0	0	0	1	0.5	0	1	1	3.5	30%
MidAm IA	0	0	1	0.5	0.5	1	0	0.5	3.5	30%
OH Edison	0	0	0	1	0.5	1	1	0	3.5	30%
JCP&L	0	0	0	1	1	0	1	0	3	26%
FP&L	1	0	0	0.5	0.5	0	0	0.5	2.5	22%
Entergy LA	0	0	0	0.5	0	0	1	0.5	2	17%
AL Power	1	0	0	0	0.5	0	0	0	1.5	13%
TECO	0	0.5	0	0	0	0	0	1	1.5	13%
Duke FL	0	0	0	0.5	0	0	0	0.5	1	9%

Figure 6 shows the distribution of scores in Category 3.

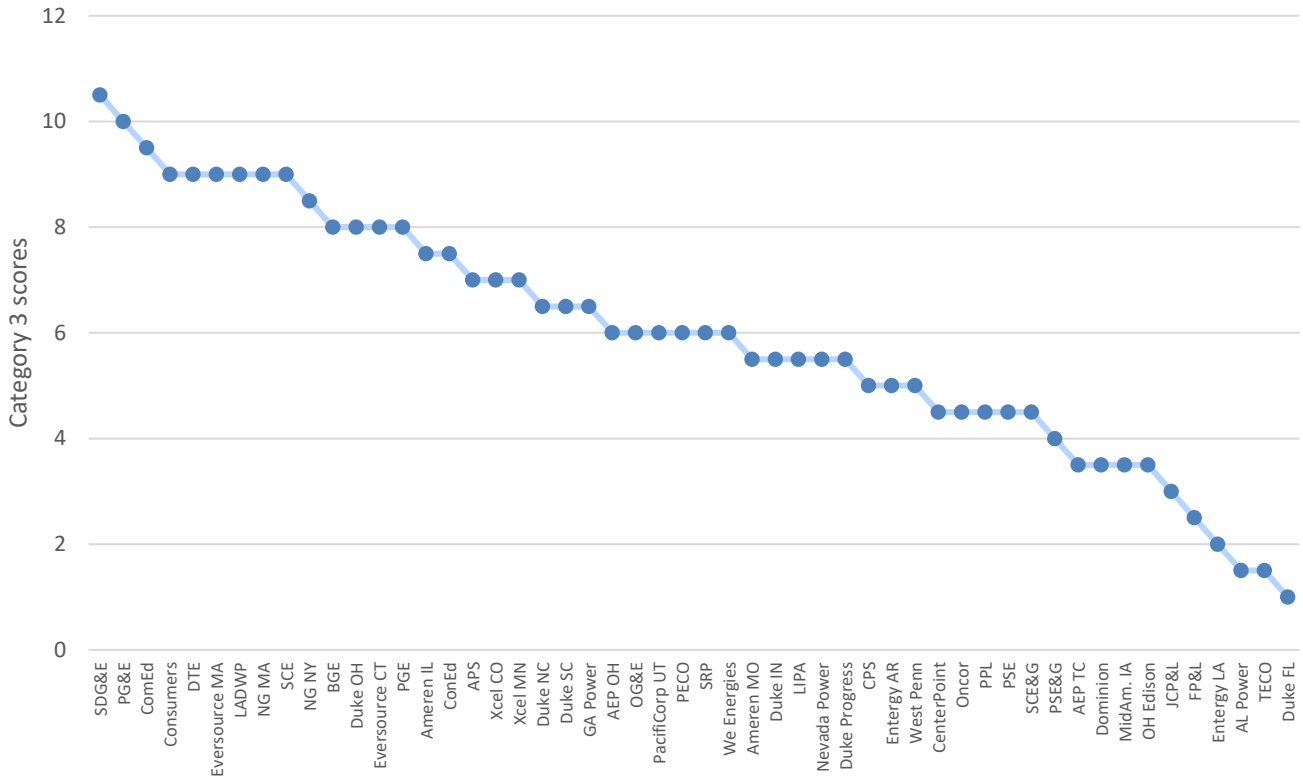

Figure 6. Distribution of Category 3 scores

No utility earned full points in Category 3. On average, the 52 utilities earned just over half the available points, indicating that they could do more to enable and scale their energy efficiency efforts. For example, only 7 utilities earned full credit for providing customers with accessible energy usage data, and only 11 have deployed AMI to 100% of their residential customers.

To score energy savings targets, we evaluated 2018–2020 targets on how aggressive they were as a percentage of sales. Eversource MA and NG MA led in this area with goals of more than 2% of sales for all three years, and both had one year with a target of 3% or higher. But while some utilities are setting very aggressive targets, the average for 2018 was 0.87%, only about 0.1 percentage point higher than in 2015. Research indicates that annual savings ramp-up rates of 0.25% are reasonable, so targets are not growing fast enough (Nowak et al. 2015). For all 52 utilities, three years' worth of energy savings targets totaled only 2.4% of 2018 sales, on average. This is the same figure as in the previous edition.

Rate design provides customers with signals to engage in energy-efficient behavior. Utilities could earn a total of 2 points for beneficial residential rate design. All three California IOUs earned full points, as did JCP&L in New Jersey.

The rest of the metrics in Category 3 score utilities on business models, independent evaluations, and resource planning. Eighteen utilities have revenue decoupling in place, and 36 have performance incentives; only 15 have both. These figures have increased by 2 and 4,

respectively, since 2015, although this is due to methodology changes as described below.[1] Rigorous evaluation processes are critical to effective efficiency program administration, and most utilities have room for improvement here. In order to evaluate the rigor of a utility's EM&V process, we assessed whether it calculates net savings and whether there is an additional level of review beyond a third-party evaluator. More than half (32) of the utilities earned full points on this metric; 7 earned no points.

[1] We gave We Energies credit for performance incentives in this edition. This mechanism was in place in the previous edition, but we did not award it credit because it goes to the administrator rather than the utility. Performance incentives are not typically applicable to municipal utilities' business models. In this edition of the *Scorecard* we exempt municipal utilities from demonstrating that they have performance incentives so as not to disadvantage them. In future editions we aim to track where municipal utilities build a performance basis into their energy efficiency administration through implementer contracts or other tools. Illinois utilities have formula rates that meet our definition of full decoupling.

UTILITY SPOTLIGHTS: ENABLING MECHANISMS

Portland General Electric (PGE)

PGE has 100% penetration of advanced metering infrastructure (AMI, or smart meters) and is making use of the technology to further its energy efficiency efforts. Its smart grid strategy is focused on minimizing power outages, maintaining electricity affordability, and increasing clean energy in the system (PGE 2019). While AMI does not in itself produce energy or demand savings, there are many ways that utilities can use the technology to do so. PGE is undertaking all five of the approaches we identify in the *Scorecard*: rate design, data disaggregation, direct feedback to customers, behavior-based feedback, and grid-interactive efficient buildings (GEBs). To take one example, PGE provides customers with insights about their energy use so they can optimize consumption.

PGE offers two energy monitoring systems for businesses in conjunction with their smart meters: Energy Tracker for small business and Energy Expert for larger operations and businesses with multiple sites. These systems provide automatic detailed reports on meter-level energy consumption as frequently as the user desires. The systems are compatible with mobile phones and produce visual aids (PGE 2019). They also provide customized recommendations on how to save energy with savings estimates. Figure 7 presents a detailed analysis of energy consumption at a single site, showing where actual use deviates from expected consumption (PGE 2019).

Figure 7. Sample chart from PGE's Energy Expert data for a single business site

Xcel Minnesota (Xcel MN)

Xcel MN earned full points in the new resource planning metric by including energy efficiency as a supply-side resource in its integrated resource plan (IRP). Xcel MN's goal is to provide 100% carbon-free energy to its customers by 2050. In July 2019 the utility released a 2020–2034 IRP that lays out the preferred resource mix for achieving this goal as well as other objectives like maintaining reliability, increasing energy affordability, and minimizing risk.

Xcel considers energy efficiency a supply-side resource, a change from its previous plan. The utility continues to present its load forecast with and without energy efficiency but does not embed efficiency in the forecast used for modeling. Instead, Xcel treats energy efficiency as a supply-side resource by creating bundles of measures that achieve a certain estimated amount of avoided load per year at a cost that blends the estimated measure costs. Figure 8 shows the utility's reference case peak demand adjusted in 2019 for energy efficiency using two bundles and the effect this has on its forecasting from 2016. (Xcel found that two bundles would mostly likely be selected under any scenario it ran.)

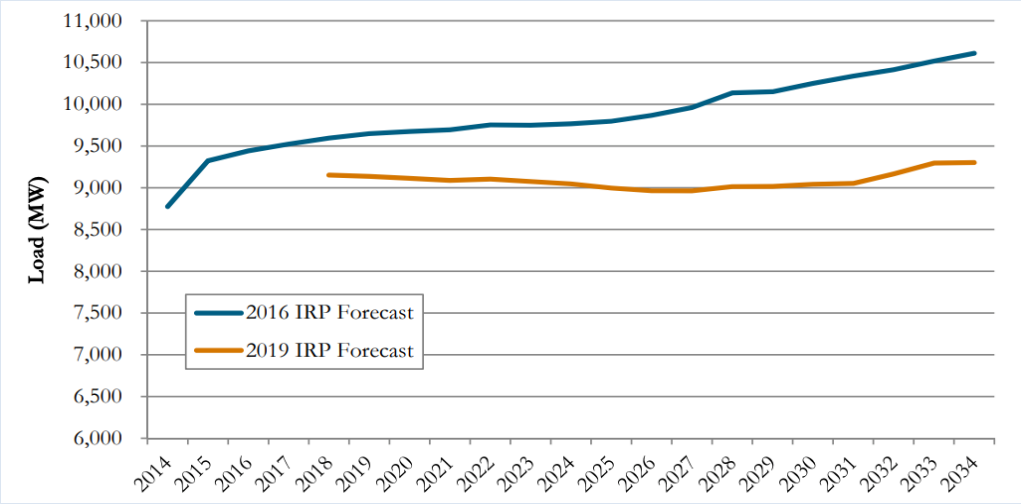

Figure 8. Xcel MN's forecast peak load, after energy efficiency adjustments

These bundles are considered along with all other resources in the software Xcel uses to optimize its resources based on cost and other goals. Its preferred resource plan features ambitious demand-side management including both energy efficiency and demand response (Xcel Energy 2019). Substantial increases in efficiency investment will create more than 780 GWh of savings annually, compared with about 444 GWh in the previous plan. This level of efficiency represents up to 2.5% of sales and is based on a potential study conducted in 2018. In addition, the utility states that it will achieve more than 800 MW of demand savings by 2034 from energy efficiency (Xcel Energy 2019). While these estimates of efficiency are largely for planning purposes and do not represent exact future deployments, Xcel's planning models good practices for including efficiency. For example, it gives efficiency equal opportunity to compete with supply-side resources, bases modeling assumptions on potential studies, and recognizes efficiency's role in a low-carbon and affordable energy future.

Nevada Power Company (Nevada Power)

Nevada Power earned full points for the advanced metering infrastructure metric. The utility has 100% smart meter coverage and uses the infrastructure in four of the five use cases we track (EIA 2019a). In 2018 Nevada Power offered a full program providing home energy reports to residential customers who had at least 13 months of consecutive AMI data and who had not previously interacted with the utility online. Like the reports offered by 37 other utilities in the *Scorecard*, the Nevada Power reports provided customers with comparative energy usage information relative to similar households as a motivational tool for behavior change. Using 15-minute disaggregated load information, the reports also provided customers with personalized energy-saving tips and recommendations for specific products and services based on their usage patterns and needs. The program reached more than 129,000 residential customers and provided each with five reports. Nevada Power spent about $760,000 on the program in 2018 and achieved more than 11,000 MWh and 4 MW in savings from residential customers (Nevada Power 2019).

Now we go into more detail on each metric.

ADVANCED METERING INFRASTRUCTURE

AMI enables two-way communication between the utility and the customer through customer-sited smart meters, communication networks, and data management systems. Smart meters collect customer usage data every 5 to 60 minutes, often every 15 minutes. While smart meters do not save energy or reduce peak demand by themselves, AMI is part of the foundation of a more efficient electricity grid and improved efficiency programs.[2]

To score this metric, we gathered the number of AMI meters and total number of meters for all 52 electric utilities from EIA (EIA 2019a). Table 31 shows the scoring.

Table 31. Scoring for smart meter installations

% of customers with AMI	Score
75.00+	1.0
25.00–74.99	0.5
0–24.99	0.0

Table 32 shows the scores for smart meter installations.

[2] For more information, see Gold, Waters, and York 2019.

Table 32. Scores for smart meter installations

Utility	% of customers with AMI meters	Score	Utility	% of customers with AMI meters	Score
AL Power	100%	1	AEP OH	43%	0.5
ComEd	100%	1	ConEd	22%	0
DTE	100%	1	Dominion	17%	0
GA Power	100%	1	PSE	16%	0
Nevada Power	100%	1	LIPA	11%	0
OG&E	100%	1	TECO	10%	0
Oncor	100%	1	Xcel CO	8%	0
PECO	100%	1	Duke FL	5%	0
PGE	100%	1	LADWP	3%	0
PPL	100%	1	SCE&G	3%	0
SDG&E	100%	1	NG MA	1%	0
Consumers	99%	1	Entergy LA	1%	0
FP&L	99%	1	PSE&G	1%	0
APS	99%	1	AEP TC	0%	0
SRP	99%	1	Ameren MO	0%	0
SCE	99%	1	CenterPoint	0%	0
PG&E	98%	1	Entergy AR	0%	0
Duke OH	98%	1	Eversource CT	0%	0
Duke SC	98%	1	Eversource MA	0%	0
BGE	96%	1	JCP&L	0%	0
Duke NC	94%	1	MidAm IA	0%	0
West Penn	91%	1	NG NY	0%	0
Ameren IL	88%	1	OH Edison	0%	0
CPS	79%	1	PacifiCorp UT	0%	0
Duke IN	67%	0.5	Duke Progress	0%	0
We Energies	57%	0.5	Xcel MN	0%	0

We gave a full point to the 24 utilities with greater than 75% smart meters. Three utilities fell in the 25% to 75% half-point range, indicating a deployment in progress or an installation for a subset of customers. The 25 utilities below 25% scored zero points.

The average AMI penetration was 50%, an increase of 9 percentage points over the 2017 *Scorecard*. The median was also 50%. Of the 52 utilities, 22 have penetration of 90% or higher, and 16 have less than 1.5%. Many with a small percentage are piloting smart meters.

High AMI penetration is important, but it is also important to leverage AMI to save energy in the following ways:

Use data to provide direct feedback and relevant insights to customers about their energy use. Utilities can leverage AMI data to give customers energy usage feedback in real time or periodically. Understanding their electricity usage patterns can motivate customers to increase savings. Feedback can be online or on paper through energy use comparison reports for residential and small-business customers. These reports present users with their energy and demand levels relative to similar customers, indicating whether they are above or below their peers. More granular data collected in shorter time intervals can be used for more sophisticated analyses to identify energy and demand savings opportunities for large energy users. Where data disaggregation data are available, utilities can use them to provide relevant technical assistance, especially large commercial and industrial customers.

Use AMI data to inform rate design. Utilities can encourage energy-efficient behaviors through time-varying rate structures that price electricity differently depending on the time of day or season. More granular data from AMI support the successful implementation of time-varying rates. The time-of-use rate metric below discusses these rates in more detail.

Use disaggregated data to identify, target, and market programs to customers. Utilities can extract end-use and/or appliance-level data from an aggregate or whole-building energy signal. These data can be used to engage consumers and to target relevant programs to specific customer groups. AMI data can also be analyzed to model load shapes and energy usage patterns for customers of different sizes, rate classes, and building types. It is important to understand the unique needs of different customer groups to improve program design, marketing, and customer service. This information is useful not only for energy efficiency and demand response programs, but also for integrating these with generation, transmission, and distribution decisions, which can improve system-level efficiency.

Link or automate DERs and smart technologies. AMI can enable the use of DERs such as demand response, which, when integrated with energy efficiency, can lead to greater energy savings, lower peak demand, and enhanced grid reliability. Utilities can incentivize building owners to reduce energy and carbon emissions while offering flexible building loads to the grid. Buildings with linked or automated DERs and smart technologies are known as grid-interactive efficient buildings (GEBs) (DOE 2020).

New uses for AMI data continue to emerge. For example, efforts to enhance savings measurement and verification are underway in California, where AMI data are being used to help verify savings using normalized metered energy consumption (NMEC). NMEC provides evaluators with new tools for determining baselines and savings using granular AMI data. This effort is still in early stages, but it could prove to be a valuable tool for estimating savings from less standard programs (Opinion Dynamics 2018). Utilities and stakeholders should continue to explore ways to use AMI to enhance energy efficiency.

Table 33 shows how each utility leverages AMI data. We present this information to show how utilities are using AMI to enable energy efficiency but do not score them on these efforts. We include only utilities with AMI penetration greater than 25%. Many of these uses of AMI data, such as rate design and behavior-based feedback, can proceed with less

granular monthly data but are enhanced by AMI; others, such as data disaggregation and GEBs, require AMI or the addition of sensors or other home or building energy management or sensing technologies.

Table 33. Uses of AMI data

Utility	Real-time energy usage feedback to customers	Behavior-based feedback	Rate design	Data disaggregation	GEBs
AEP OH	●	●	●	●	
AL Power			●		
Ameren IL		●	●		
APS	●	●	●	●	
BGE	●	●	●	●	
ComEd	●	●	●	●	
Consumers	●	●	●		●
CPS	●	●			●
DTE	●	●	●	●	
Duke IN		●			
Duke NC		●	●		
Duke OH		●	●		
Duke SC		●	●		
FP&L			●		
GA Power	●	●	●		
Nevada Power		●	●	●	●
OG&E			●		
Oncor					
PECO	●	●		●	
PG&E		●	●		
PGE	●	●	●	●	●
PPL		●			
SCE	●	●	●	●	●
SDG&E	●	●	●		
SRP	●	●	●		
We Energies	●	●	●		
West Penn			●		
Total	14	22	22	9	5

UTILITY CUSTOMER DATA ACCESS

Customers with access to information regarding energy usage are better able to manage consumption and engage with energy efficiency. Utilities that provide energy usage information to residential households, owners and managers of large buildings, and communities allow these customers to better plan budgets, select and evaluate energy efficiency programs, and reduce overall energy consumption. Allowing customers to track their reduction in energy usage and corresponding dollar savings demonstrates the value of energy efficiency and encourages further investments in it (Mission:data Coalition 2019).

As shown in Table 34, utilities could receive up to 1 point for the data access metric. They could receive 0.5 points for implementing benchmarking services for use with ENERGY STAR and 0.5 points for implementing Green Button Connect My Data (CMD) services. We also gave credit to utilities with commission-approved plans to implement CMD.

Table 34. Scoring for data access

Description	Score
Implementation of both benchmarking services and Green Button CMD	1.0
Implementation of either benchmarking services or Green Button CMD	0.5
Implementation of neither benchmarking services nor Green Button CMD	0.0

While these are not the only options, ENERGY STAR and Green Button CMD are standardized ways to provide energy consumption data to residential customers and owners and managers of large buildings. Benchmarking services for use with ENERGY STAR include Benchmarking with Portfolio Manager, Portfolio Manager Web Services, Aggregate Whole Building Data Downloads, and Building Performance with ENERGY STAR. These four programs include features like automated benchmarking services (ABS) for ENERGY STAR Portfolio Manager, which automatically inputs utility data into the EPA's Portfolio Manager tool. This tool is commonly used for energy benchmarking in commercial buildings. It reduces the time building owners and managers spend collecting data and allows them to recognize usage patterns and prioritize energy usage reduction efforts, as well as to track progress in energy savings.

Green Button CMD services similarly provide energy usage data at regular intervals to metered customers, including residential households, in a way that ensures customer privacy. This gives households the opportunity to understand their energy usage patterns and reduce their consumption and spending on energy. Additionally, customers can share data directly and automatically with contractors and other service providers who are able to interpret it and recommend priority actions.

In the previous edition of the *Scorecard*, we scored utilities largely on the same set of criteria for the data access metric. However in this edition we gave credit to utilities that have

implemented Green Button CMD services (or have commission-approved plans to do so), rather than Green Button Download My Data (DMD). CMD is a new service that allows automated and secure transfer of customer data to third parties. To score this metric, we relied on a data set from Mission Data and asked utilities to document their services (Mission:data Coalition 2019).[3]

Table 35 shows the scores for data access.

Table 35. Scores for data access

Utility	ABS	Green Button Connect	Score
ComEd	Yes	Yes	1
ConEd	Yes	Yes	1
NG NY	Yes	Yes	1
PG&E	Yes	Yes	1
SCE	Yes	Yes	1
SDG&E	Yes	Yes	1
Xcel CO	Yes	Yes	1
AEP OH	No	Yes	0.5
AEP TC	No	Yes	0.5
Ameren IL	No	Yes	0.5
Ameren MO	Yes	No	0.5
APS	Yes*	No	0.5
BGE	Yes	No	0.5
CenterPoint	No	Yes	0.5
Consumers	No	Yes	0.5
DTE	Yes*	No	0.5
Duke NC	Yes*	No	0.5
PECO	Yes	No	0.5
PGE	Yes*	No	0.5
Duke Progress	Yes*	No	0.5
PSE	Yes	No	0.5
PSE&G	No	Yes	0.5
TECO	Yes*	No	0.5
We Energies	Yes*	No	0.5
Xcel MN	Yes	No	0.5
AL Power	No	No	0
CPS	No	No	0
Dominion	No	No	0
Duke FL	No	No	0
Duke IN	No	No	0
Duke OH	No	No	0
Entergy AR	No	No	0
Entergy LA	No	No	0
FP&L	No	No	0

[3] We previously relied on data from the Green Button website, which listed utilities that were implementing or had plans to implement any Green Button service. These included services that may not have come to fruition, and also considered both CMD and DMD. This change in data sources means that some utilities earning credit in the 2017 *Scorecard* may not have done so this year. In any case there remain issues with ascertaining which utilities are implementing data access services, and also with ensuring private and effective customer data access. For example, customers may have problems with gaining access to their data in a timely manner, incorrect data, unplanned outages of the data access system, and data not conforming to Green Button standards. Additionally, even when a utility states that it has data access services, it remains difficult to assess whether it has truly implemented Green Button services that are up and running for customer use, as it can be a challenge to confirm this information on the public portions of utility websites.

Utility	ABS	Green Button Connect	Score
Duke SC	Yes*	No	0.5
Eversource CT	No*	Yes	0.5
Eversource MA	Yes	No	0.5
GA Power	Yes	No	0.5
LADWP	Yes	No	0.5
Nevada Power	Yes*	No	0.5
NG MA	Yes	No	0.5
Oncor	No	Yes	0.5
PacifiCorp UT	Yes	No	0.5

Utility	ABS	Green Button Connect	Score
JCP&L	No	No	0
LIPA	No	No	0
MidAm IA	No	No	0
OG&E	No	No	0
OH Edison	No	No	0
PPL	No	No	0
SCE&G	No	No	0
SRP	No	No	0
West Penn	No	No	0

Sources: ENERGY STAR 2019; Mission:data Coalition 2019. * Utility has implemented a platform other than ABS with the same functions.

In total, 7 utilities earned the full point value for this metric, 27 earned half a point, and 18 utilities received no points. This indicates that standardized and automated data access can be expanded for the majority of utilities included in this report.

ENERGY SAVINGS TARGETS

Some states have binding energy efficiency resource standards (EERS) mandating that regulated utilities achieve MWh energy savings targets at or beyond a set percentage of retail sales. State-established savings targets are important because they demonstrate an intent to build a substantial energy efficiency resource over time. ACEEE research finds that EERS is the state policy most highly correlated with energy savings impacts when compared with other policies including revenue decoupling, performance incentives, and lost revenue adjustment mechanisms (Molina and Kushler 2015).

The correlation holds true at the utility level as well. For this metric, we included not only targets mandated by policy, but any planned MWh annual savings for the years 2018 to 2020 published in regulatory filings or other plan documents. A state or a utility may not have a mandatory, binding target but may have identified some type of goal for one or multiple years. We give credit for such goals because they indicate a future-oriented, longer-term commitment to energy efficiency. These softer future savings levels might be expressed as "planned," "estimated," or "forecast" savings. In cases where there were both mandated and non-mandated targets, we generally used the former for scoring, but if the utility proposed lower targets that were approved by regulators, then we used those targets instead. This metric complements the 2018 target achievement metric in Category 1; it is just as important to set strong targets as to achieve them.

We compiled annual incremental savings targets estimated as net savings at the generator level. If targets were expressed as gross, we applied an NTGR of 83.1% to normalize it unless a utility-specific ratio was available. We then took the sum of the targets for 2018, 2019, and 2020 and divided by total 2018 sales. For example, if a utility's sales for 2018 were 1,000,000 MWh and its annual savings target was 10,000 MWh for 2018, 2019, and 2020, we

would calculate that as 3%. If that utility had planned for only two years, we would score it as 2%.

Many utilities have a multiple-year energy efficiency planning cycle, most commonly three years. This does not necessarily mean that the planning cycle lines up with 2018–2020. If a utility's most recent planning period covers years other than 2018–2020, we included those years' targets and specified the years covered in the footnotes below table 37. Previously, we considered the stringency of a utility's current-year target (e.g., 2018) in a separate metric. We considered current and future year targets together in this edition but allowed more flexibility in the years covered, as described above, to reflect differences in utility planning cycles.

We credited utilities with savings targets from statewide third-party program administrators. We allocated the target to the utility if possible. For example, planned savings from NYSERDA were allocated to the New York utilities NG NY and ConEd using the prior proportion of savings achieved in respective utility territories. The New Jersey statewide targets were not available.

Table 36 shows the scoring for this metric.

Table 36. Scoring for 2018–2020 savings targets

Sum of incremental savings targets for each year	Score
5%+	2.5
4–4.99%	2.0
3–3.99%	1.5
2–2.99%	1.0
1–1.99%	0.5
<1%	0.0

Table 37 shows the scores along with the corresponding three-year savings targets.

Table 37. Scores for 2018–2020 savings targets

	2018 target		2019 target		2020 target			
Utility	MWh	%	MWh	%	MWh	%	Total %	Points
NG MA	794,886	3.79%	597,622	2.85%	542,863	2.59%	9.23%	2.5
Eversource MA	713,195	2.96%	559,304	2.32%	788,578	3.27%	8.54%	2.5
SRP	587,352	1.93%	587,352	1.93%	618,500	2.03%	5.89%	2.5
ComEd	1,902,273	1.92%	1,724,199	1.74%	1,693,267	1.71%	5.36%	2.5
NG NY [a, c]	445,486	1.20%	543,678	1.47%	676,411	1.83%	4.50%	2
Xcel CO	429,348	1.37%	502,022	1.61%	501,679	1.61%	4.58%	2
DTE	754,778	1.45%	750,644	1.45%	811,636	1.56%	4.46%	2
Consumers	547,663	1.32%	592,677	1.43%	691,092	1.67%	4.42%	2
PGE [a]	332,276	1.59%	299,330	1.43%	234,313	1.12%	4.13%	2
LADWP	343,394	1.41%	328,940	1.36%	297,845	1.23%	4.00%	2
BGE	419,484	1.33%	416,068	1.32%	413,522	1.31%	3.96%	1.5
LIPA	259,000	1.24%	227,978	1.09%	246,442	1.18%	3.52%	1.5
SDG&E	211,050	1.07%	231,000	1.17%	236,250	1.20%	3.44%	1.5
AEP OH	533,794	1.14%	532,922	1.14%	532,922	1.14%	3.42%	1.5
Xcel MN	359,533	1.10%	372,047	1.14%	377,252	1.16%	3.40%	1.5
APS	251,436	0.84%	355,115	1.19%	355,115	1.19%	3.23%	1.5
Eversource CT	186,116	0.83%	259,172	1.15%	247,025	1.10%	3.07%	1.5
Nevada Power	157,144	0.66%	277,076	1.16%	251,734	1.05%	2.87%	1
PacifiCorp UT	240,790	0.91%	255,190	0.96%	259,032	0.98%	2.84%	1
ConEd [a, c]	509,139	0.85%	542,940	0.91%	690,077	1.16%	2.92%	1
Duke SC	218,201	0.94%	211,198	0.91%	188,529	0.81%	2.67%	1
Duke NC	594,256	0.94%	566,822	0.90%	503,490	0.80%	2.65%	1
PG&E	1,032,150	1.23%	1,132,950	1.35%	–	0.00%	2.57%	1
MidAm IA	310,419	1.22%	143,090	0.56%	146,625	0.58%	2.36%	1
SCE	1,009,050	1.11%	1,064,700	1.17%	–	0.00%	2.27%	1
PECO	309,443	0.74%	309,443	0.74%	309,443	0.74%	2.23%	1
Duke OH	244,075	1.10%	234,069	1.06%	–	0.00%	2.16%	1
Duke Progress	275,463	0.68%	290,488	0.72%	283,295	0.70%	2.11%	1
PPL	270,143	0.68%	290,500	0.73%	278,869	0.70%	2.10%	1
Ameren IL	397,899	0.96%	396,253	0.96%	–	0.00%	1.92%	0.5
PSE	245,372	1.03%	199,533	0.84%	–	0.00%	1.86%	0.5
We Energies [a]	182,888	0.70%	123,094	0.47%	123,094	0.47%	1.64%	0.5

	2018 target		2019 target		2020 target			
Utility	MWh	%	MWh	%	MWh	%	Total %	Points
Ameren MO [b]	159,960	0.45%	214,156	0.61%	196,865	0.56%	1.61%	0.5
OG&E	99,515	0.36%	170,270	0.62%	170,352	0.62%	1.61%	0.5
Entergy AR	160,181	0.68%	178,179	0.75%	–	0.00%	1.43%	0.5
CPS	111,950	0.47%	106,397	0.45%	114,993	0.49%	1.41%	0.5
GA Power	384,942	0.43%	391,880	0.44%	453,100	0.50%	1.37%	0.5
West Penn	89,875	0.42%	89,875	0.42%	89,875	0.42%	1.25%	0.5
Duke IN	166,101	0.54%	148,759	0.48%	–	0.00%	1.02%	0.5
Duke FL	113,876	0.27%	131,306	0.32%	143,922	0.35%	0.94%	0
OH Edison	160,226	0.63%	-	0.00%	–	0.00%	0.63%	0
AEP TC	53,635	0.20%	48,995	0.18%	48,995	0.18%	0.55%	0
Oncor	167,811	0.12%	184,670	0.13%	210,302	0.15%	0.41%	0
CenterPoint	93,238	0.10%	94,043	0.10%	95,388	0.10%	0.30%	0
FP&L	41,118	0.04%	42,779	0.04%	44,606	0.04%	0.11%	0
Entergy LA	25,094	0.04%	25,094	0.04%	–	0.00%	0.09%	0
Dominion	67,435	0.08%	–	0.00%	–	0.00%	0.08%	0
TECO	13,345	0.06%	–	0.00%	–	0.00%	0.06%	0
AL Power	–	0.00%	–	0.00%	–	0.00%	0.00%	0
JCP&L [a]	–	0.00%	–	0.00%	–	0.00%	0.00%	0
PSE&G [a]	–	0.00%	–	0.00%	–	0.00%	0.00%	0
SCE&G	–	0.00%	–	0.00%	–	0.00%	0.00%	0

Savings, targets, and 2018 sales are net at the generator level. Blanks indicate that no data were found. [a] Includes targets separately allocated from a third-party program administrator. [b] Ameren MO's targets are for 2016–2018 because its planning cycle goes through 2018. [c] Targets include the portion of NYSERDA's target for that utility's territory but do not include portion of NYPA's target, as these data were not available.

Utilities in states with strong EERS policies, such as Massachusetts, tended to score highest. Thirty-seven utilities had targets published for all three years, and only four had no targets. Of the 37 utilities reporting savings goals for all three years, 9 had targets with year-to-year percentage increases, while most others had a consistent percentage savings target for all three years. This suggests that policy ramp-up requirements have leveled off for these utilities or that they are held accountable for results only at the end of each planning cycle.

RESIDENTIAL RATES: CUSTOMER CHARGES

Residential rates provide price signals to customers to reduce consumption and engage in energy efficiency (Baatz 2017). Here we examined three metrics: the size of the monthly customer charge, the existence of a time-of-use rate, and demand charges (unscored).

Customer charges, also known as fixed monthly charges, are intended to cover metering, billing, and customer service costs. Utility proposals to increase customer charges have

proliferated in recent years (Whited, Woolf, and Daniel 2016). This is problematic for several reasons. Higher customer charges result in a lower variable (per kWh) charge because of the fixed revenue requirement for each customer class, and therefore they reduce the price signal for customers to engage in energy efficiency—or actually provide a price signal to increase overall consumption. They also result in higher relative costs for low-usage customers.

For this metric, we collected customer charges for all 52 electric utilities. We focused on the default rate for residential customers or the rate with the highest adoption based on data reported in FERC Form 1. We collected customer charges from the most recently available active utility tariffs; some of these values may have changed. Most of the customer charges were expressed as monthly amounts. Those expressed as a daily amount were converted to monthly, assuming a 30-day month. To score this metric we utilized a tiered approach, awarding utilities 1 point for a customer charge of $6.99 per month or less, 0.5 points for a customer charge between $7.00 and $9.99 per month, and 0 points for $10 or more per month. Table 38 shows the scoring for this metric.

Table 38. Scoring for customer charge

Description	Score
$6.99 and under	1.0
$7.00 to $9.99	0.5
$10.00+ per month	0.0

Table 39 shows the scores for the customer charge metric.

Table 39. Scores for monthly customer charge

Utility	Customer charge	Score	Utility	Customer charge	Score
PG&E	$0.00	1	Entergy AR	$8.40	0.5
SDG&E	$0.00	1	MidAm IA	$8.50	0.5
SCE	$0.93	1	CPS	$8.75	0.5
LADWP	$1.75	1	Ameren MO	$9.00	0.5
JCP&L	$2.78	1	SCE&G	$9.00	0.5
Oncor	$3.42	1	Duke IN	$9.01	0.5
OH Edison	$4.00	1	Eversource CT	$9.44	0.5
PSE&G	$4.64	1	Duke FL	$9.66	0.5
Xcel CO	$5.41	1	PECO	$9.97	0.5
CenterPoint	$5.47	1	GA Power	$10.00	0
NG MA	$5.50	1	PGE	$11.00	0
Duke OH	$6.00	1	Duke SC	$11.96	0
PacifiCorp UT	$6.00	1	LIPA	$12.00	0

Utility	Customer charge	Score
AEP TC	$6.74	1
Dominion	$6.85	1
Eversource MA	$7.00	0.5
Entergy LA	$7.04	0.5
APS	$7.41	0.5
West Penn	$7.44	0.5
PSE	$7.49	0.5
Consumers	$7.50	0.5
DTE	$7.50	0.5
BGE	$7.90	0.5
Xcel MN	$8.00	0.5
FP&L	$8.28	0.5
AEP OH	$8.40	0.5

Utility	Customer charge	Score
Ameren IL	$12.32	0
OG&E	$13.00	0
Duke NC	$14.00	0
Duke Progress	$14.00	0
AL Power	$14.50	0
TECO	$15.12	0
NPC	$15.25	0
ConEd	$15.76	0
We Energies	$15.78	0
ComEd	$16.46	0
NG NY	$17.00	0
PPL	$17.78	0
SRP	$20.00	0

The median residential customer charge for our utilities is $8.40 and the average is $9.06. The average charge has gone up by about $0.40 since 2015. SRP has the highest customer charge at $20.00 per month. Only 8 of the 52 utilities have a customer charge higher than $15 per month, and 17 have a charge that is $10 or higher.

RESIDENTIAL RATES: DEMAND CHARGES

Rates not only send price signals to customers about their energy usage but allow utilities to recover their costs. Demand charges are imposed on customers per kilowatt of demand based on their highest period of energy usage over a defined period of time (typically 15 minutes to an hour) during the billing period (typically a month). Proponents of demand charges argue that they are designed to cover utilities' costs for maintaining available capacity to meet peak demand and to reflect the costs of some local equipment needed to meet customer-specific demand (Baatz 2017). While demand charges for commercial and industrial customers are more common, in 2017 only 19 utilities across the country had residential demand charges, and only APS had a subscription rate of more than 1% for its optional residential demand charge rate (Baatz 2017). However with electricity demand flattening and declining in many areas of the country, utilities are increasingly concerned with revenue certainty and therefore are considering demand charges.

Residential demand charges are problematic for energy efficiency in many ways. Residential peak demand periods frequently do not coincide with utility peaks. A larger portion of utility costs are incurred by meeting system peak demand rather than individual customer peaks, indicating that residential demand charges do not track cost causation (Lazar 2016). Additionally, this type of charge can incentivize customers to shift their peak demand away from high-cost peak demand times. This can increase overall energy usage and may shift demand onto the utility system peak, contributing to higher system costs. The existence of demand charges also typically reduces volumetric rates, creating an incentive for customers

to use more energy overall. Additionally, residential demand charges are difficult for customers to understand and may make it harder for them to manage their energy use. Demand charges are particularly problematic when they are the default option for customers.

We did not score on demand charges in this edition but will consider doing so in future editions, in particular for default rates. For this metric we collected data on the design of residential demand charges among the 52 electric utilities, as well as subscription levels where available. Table 40 shows this information for the eight utilities with residential demand charge rates.

Table 40. Residential demand charges

Utility	Demand charge	Demand rate details	Subscription
APS	Yes	Multiple rates with TOU charges for energy and demand, $/kW rate varies, demand is highest 1 hour	166,129
GA Power	Yes	TOU energy charge, $6.64/kW, demand is highest 30 mins.	6,797
Dominion	Yes	TOU demand charge, $1.515/all on-peak kW, demand is highest 30 mins.	-
LADWP	Yes	Multiple demand rates, $/kW varies, demand is highest demand during past 12 months	-
Nevada Power	Yes	Multiple TOU rates, $/kW varies, demand is all kW	-
Duke Progress	Yes	TOU energy and demand charges, $/kW varies, demand is highest 30 mins.	-
SRP	Yes	TOU energy and demand charges, $/kW varies, demand is highest 30 mins.	-
Xcel CO	Yes	Multiple TOU rates, $/kW varies, demand is all kW	2,415

Blanks indicate no data were found.

Of the 52 utilities, 8 have residential rates that include a demand charge component. A few utilities have legacy rates with a demand charge component and fewer than 1,000 customers subscribed, but these are not accepting new customers. APS is the only utility with more than 100,000 customers subscribed to rates with a residential demand charge, although data are limited.

RESIDENTIAL RATES: TIME-OF-USE PRICING

Time-of-use rates charge different prices for electricity during different times of the day and year. Many time-of-use rates are higher for peak periods during the week in the summer months. Time-of-use rates are intended to send price signals to customers about how much

it actually costs to produce and deliver electricity at various times. This type of pricing has significant benefits in terms of reducing system peak demand. These rates also are demonstrated to reduce overall consumption (Baatz 2017). While few residential customers are on time-of-use rates, the proliferation of advanced metering infrastructure is driving more utilities and states to increase the number of customers on these rates (Baatz 2017).

For this metric, we reviewed residential tariffs for all 52 utilities to gather information on which ones offer a time-of-use rate. We considered the rate that was in place for the majority of 2018, and utilities must have offered the rate for a majority of the year to earn credit. We also reviewed relevant FERC Form 1 data to determine how many customers were subscribed to these rates. We awarded 1 point to utilities that offer a default (opt-out) time-of-use rate or whose rate has an adoption level of 1% or greater. We awarded 0.5 points to utilities with an optional time-of-use rate with adoption of less than 1% or for which we could not find adoption data. (Not all utilities report adoption information to the FERC). In future editions, we may consider scoring on additional design features of time-of-use rates that impact their effectiveness, such as minimum demand thresholds that may prevent customers from subscribing.

Table 41 presents the scores for the time-of-use metric. It also shows the percentage of total residential customers on these rates.

Table 41. Scores for time-of-use rates

Utility	TOU Rate	% of residential customers subscribed	Default?	Score
Ameren IL	Yes	2.77%	No	1
APS	Yes	54.35%	Yes	1
Consumers	Yes	3.30%	No	1
DTE	Yes	1.13%	No	1
JCP&L	Yes	1.52%	No	1
OG&E	Yes	14.88%	No	1
PG&E	Yes	8.64%	No	1
SCE	Yes	3.31%	No	1
SDG&E	Yes	8.90%	Yes	1
SRP	Yes	34.00%	Yes	1
We Energies	Yes	1.76%	No	1
West Penn	Yes	N/A	N/A	1
AEP OH	Yes	0.05%	No	0.5
AL Power	Yes	0.03%	No	0.5
LADWP	Yes	0.00%	No	0.5
LIPA	Yes	0.00%	No	0.5
MidAm IA	Yes	0.00%	No	0.5
NG NY	Yes	0.00%	No	0.5
Nevada Power	Yes	0.55%	No	0.5
OH Edison	Yes	0.00%	No	0.5
PacifiCorp UT	Yes	0.00%	No	0.5
PGE	Yes	0.24%	No	0.5
Duke Progress	Yes	0.00%	No	0.5
PSE&G	Yes	0.63%	No	0.5
SCE&G	Yes	0.01%	No	0.5
Xcel CO	Yes	0.36%	No	0.5
Xcel MN	Yes	0.05%	No	0.5
AEP TC	No	--	--	0

Utility	TOU Rate	% of residential customers subscribed	Default?	Score
Ameren MO	Yes	0.01%	No	0.5
BGE	Yes	0.00%	No	0.5
ComEd	Yes	0.68%	No	0.5
ConEd	Yes	0.00%	No	0.5
Dominion	Yes	0.00%	No	0.5
Duke NC	Yes	0.13%	No	0.5
Duke OH	Yes	0.00%	No	0.5
Duke SC	Yes	0.00%	No	0.5
Entergy AR	Yes	0.01%	No	0.5
Eversource CT	Yes	0.04%	No	0.5
FP&L	Yes	0.00%	No	0.5
GA Power	Yes	0.82%	No	0.5
CenterPoint	No	--	--	0
CPS	No	--	--	0
Duke FL	No	--	--	0
Duke IN	No	--	--	0
Entergy LA	No	--	--	0
Eversource MA	No	--	--	0
NG MA	No	--	--	0
Oncor	No	--	--	0
PECO	No	--	--	0
PPL	No	--	--	0
PSE	No	--	--	0
TECO	No	--	--	0

Blanks indicate no data were found. Texas restricts distribution companies from offering time-of-use rates to retail customers.

Of the 52 utilities, 39 offer residential time-of-use rates, the same number as in 2015. Among the utilities that reported data in FERC Form 1, adoption rates are generally low, with an average of 2.73% of all residential customers. This is about 1 percentage point higher than in 2015. APS had the highest percentage of customers enrolled in time-of-use rates in 2018, with 54.4% of residential customers. APS, SDG&E, and SRP are the only three utilities with default time-of-use rates. California is moving toward such defaults, but only SDG&E had one in place at the time of this review. Adoption rates are expected to grow as more utilities move toward default time-of-use and expand metering capabilities.

UTILITY BUSINESS MODEL

Among the critical drivers of utility-sector energy efficiency programs are policies that attempt to address the economic disincentives (lost sales revenues) that utilities face if customers use less electricity. Here we consider two important elements of utility business models: full revenue decoupling and performance incentives. We scored decoupling and performance incentives as separate metrics, presented in table 42.

Full Revenue Decoupling

Within the context of traditional revenue recovery, utility revenues and return on investment are based on sales volumes. This model provides a disincentive for utilities to promote reductions in consumption. Full revenue decoupling is a mechanism that disconnects revenue recovery from sales volumes, thereby reducing the utility disincentive

to promote customer conservation and energy efficiency.[4] In combination with energy savings targets and performance incentives, revenue decoupling positively correlates with energy efficiency results (Molina and Kushler 2015). For this metric, we considered full revenue decoupling only; we did not include partial decoupling mechanisms like lost revenue adjustment, another regulatory policy aimed at mitigating the utility disincentive to pursue energy efficiency, as research shows that these do not remove the throughput incentive (profits linked to increased energy sales) (Gilleo et al. 2015). We compiled information on decoupling from the ACEEE State and Local Policy Database at database.aceee.org/state.

Performance Incentives

Performance incentives offer a utility a financial return on its energy efficiency achievements. Incentives may take a variety of forms but are most commonly calculated as a percentage of the present value of the net benefits from energy efficiency (Nowak et al. 2015).

Scores

Utilities with full revenue decoupling in 2018 scored 1 point, and those with performance incentives in place scored 1 point. For utilities with hybrid models or program administrators, we awarded points whether the utility or the administrator is eligible for a performance incentive. Table 42 shows the results.

Table 42. Scores for utility business model

Utility	Revenue decoupling	Performance incentive	Total points
AEP OH	1	1	2
Ameren IL*	1	1	2
ComEd*	1	1	2
ConEd	1	1	2
Duke OH	1	1	2
Eversource CT	1	1	2
Eversource MA	1	1	2
LADWP	1	1	2
LIPA	1	1	2
NG MA	1	1	2
NG NY	1	1	2
PG&E	1	1	2
SCE	1	1	2
SDG&E	1	1	2
Xcel MN	1	1	2
Duke SC	0	1	1
Entergy AR	0	1	1
GA Power	0	1	1
MidAm IA	0	1	1
OG&E	0	1	1
OH Edison	0	1	1
Oncor	0	1	1
PGE	1	0	1
PSE	1	0	1
SCE&G	0	1	1
SRP	0	1	1
We Energies	0	1	1
Xcel CO	0	1	1
AL Power	0	0	0
Dominion	0	0	0

[4] See RAP 2016 for a full discussion of decoupling.

Utility	Revenue decoupling	Performance incentive	Total points
AEP TC	0	1	1
Ameren MO	0	1	1
APS	0	1	1
BGE	1	0	1
CenterPoint	0	1	1
Consumers	0	1	1
CPS	0	1	1
DTE	0	1	1
Duke IN	0	1	1
Duke NC	0	1	1
Duke Progress	0	1	1
Duke FL	0	0	0
Entergy LA	0	0	0
FP&L	0	0	0
JCP&L	0	0	0
Nevada Power	0	0	0
PacifiCorp UT	0	0	0
PECO	0	0	0
PPL	0	0	0
PSE&G	0	0	0
TECO	0	0	0
West Penn	0	0	0

Performance incentives are not typically applicable to municipal utilities' business models. In this edition of the *Scorecard*, we exempt municipal utilities from demonstrating that they have performance incentives so as not to disadvantage them. In future editions, we will aim to track where municipal utilities build a performance basis into their energy efficiency administration, through implementer contracts or other tools. *Illinois utilities have formula rates that meet our definition of full decoupling.

Of the 52 utilities, 18 have full revenue decoupling in place, and 36 are in states where a policy has been established for utility performance incentives (or are municipal utilities). One utility, We Energies, is in a state that provides performance incentives to be paid to the independent statewide third-party program administrator (Focus on Energy), not to the utility. Experience has shown that where such incentives are in place, utilities typically manage to earn them (Nowak et al. 2015). It is extremely rare for any utility to miss its energy-saving targets to such an extent that it does not receive any incentive at all.

EVALUATION, MEASUREMENT, AND VERIFICATION

Evaluation, measurement, and verification (EM&V) is another critical aspect of utility-sector energy efficiency programs. EM&V validates the energy and demand savings from programs, estimates how many customers would have installed the measures even without the program, and provides useful guidance on program performance and ways to improve. EM&V is a complex process involving sophisticated measurement and analysis of energy savings data. Since EM&V is not a standardized process across jurisdictions, the rigor of evaluation can vary by utility. For this metric, we focused on two important aspects of EM&V: the independence of the evaluation process and the estimation of net savings. While not yielding a complete picture of EM&V, a focus on these factors can lead to improved EM&V efforts.[5]

Independence of EM&V involves freedom from influence during the evaluation process. A utility often conducts program evaluations in house or hires a third-party contractor to complete the work. For this metric, we considered an evaluation process to be independent only when another layer of review or participation existed beyond the utility staff or

[5] For additional information and resources related to EM&V, see aceee.org/sector/state-policy/toolkit/emv.

contractor. It could occur through direct oversight of the evaluation process (including oversight of the third-party contractor) from an outside group, such as a government agency or stakeholder group. For example, in Maryland program evaluations are conducted by the utilities but are also verified by a consultant retained by the Maryland Public Service Commission.

To determine whether a utility's EM&V process was independent in 2018, we asked utilities on the data request and reviewed evaluation framework documents, public filings related to the evaluation process, technical resource manuals, and evaluation reports. We awarded 1 point for evidence of independence beyond a third-party contractor hired by a utility.

Estimation of net savings is important because it demonstrates energy savings directly attributable to a program. Several factors should be included in a net savings estimation, including free ridership, spillover, and market effects.[6] Not all utilities account for all factors. Estimation of net savings is useful in modifying program design after understanding how a market responds, assessing market transformation over time, and evaluating resource options in a procurement planning process (Violette and Rathbun 2017).

We awarded 1 point to utilities reporting net savings. We did not consider specific factors such as measurement of free ridership, spillover, or market effects. For states that assume net is equal to gross, we gave a point only if a study was completed in the past three years verifying that assumption.

Table 43 shows the scores for the independence of the evaluation process and net savings reporting.

[6] A free rider is a program participant who would have implemented the program measure or practice even in the absence of the program. Spillover refers to reductions in energy consumption and/or demand caused by the presence of an energy efficiency program, beyond the program-related gross savings of the participants and without financial or technical assistance from the program. Market effects are changes in the structure or functioning of a market, or the behavior of participants in a market, that result from one or more program efforts (NEEP 2011).

Table 43. Scores for independence of EM&V and net savings calculations

Utility	Independence	Net savings	Points	Utility	Independence	Net savings	Points
Ameren IL	1	1	2	Duke Progress	1	1	2
Ameren MO	1	1	2	SCE	1	1	2
BGE	1	1	2	SCE&G	1	1	2
CenterPoint	1	1	2	SDG&E	1	1	2
ComEd	1	1	2	WE Energies	1	1	2
ConEd	1	1	2	West Penn	1	1	2
Consumers	1	1	2	AEP TC	1	0	1
DTE	1	1	2	APS	1	0	1
Duke IN	1	1	2	CPS	0	1	1
Duke NC	1	1	2	Dominion	0	1	1
Duke OH	1	1	2	Entergy LA	0	1	1
Duke SC	1	1	2	JCP&L	1	0	1
Entergy AR	1	1	2	LIPA	0	1	1
Eversource CT	1	1	2	OH Edison	1	0	1
Eversource MA	1	1	2	Oncor	1	0	1
GA Power	1	1	2	PSE	1	0	1
LADWP	1	1	2	PSE&G	1	0	1
NG MA	1	1	2	Xcel CO	0	1	1
NG NY	1	1	2	Xcel MN	0	1	1
Nevada Power	1	1	2	AEP OH	0	0	0
OG&E	1	1	2	AL Power	0	0	0
PacifiCorp UT	1	1	2	Duke FL	0	0	0
PECO	1	1	2	FP&L	0	0	0
PG&E	1	1	2	MidAm IA	0	0	0
PGE	1	1	2	SRP	0	0	0
PPL	1	1	2	TECO	0	0	0

Of the 52 utilities, 39 had independent EM&V oversight in 2018. Thirty-eight reported net savings, and 32 utilities received points in both categories. We awarded both of these points based on publicly available data. Some utilities, such as APS and SRP, calculate net savings but do not report results publicly or have not updated the research within the past three years.

ENERGY EFFICIENCY IN RESOURCE PLANNING

The majority of states require some form of utility resource planning. Some utilities that own generation assets use a process called integrated resource planning to determine the least-cost resource portfolio to meet future customer demand. Many states doing integrated resource planning do not evaluate demand- and supply-side resources on a comparable basis. For example, many include energy efficiency or demand response as a reduction in future needs based on predetermined savings targets. This approach is better than not considering demand-side measures at all but is flawed because it does not allow energy efficiency to compete with other supply-side options on a cost basis and can lead to inefficient or suboptimal planning outcomes (Lamont and Gerhard 2013; Takahashi 2015).

Some utilities do not own generation assets. These utilities do not conduct integrated resource planning but do project future load growth to determine needs in the distribution system. Some, such as ConEd in New York and PG&E in California, do consider energy efficiency as a resource option in distribution planning, but this practice is not widespread (Baatz, Relf, and Nowak 2018).

The inclusion of energy efficiency in distribution system and integrated resource planning is critical because efficiency is a low-cost, clean-energy resource with other positive attributes including low risk to utilities and lower customer bills. Excluding or not properly considering energy efficiency in system planning can lead to higher utility system costs as utilities invest in unnecessary and expensive infrastructure instead of low-cost efficiency (Takahashi 2015).

For this metric, we asked utilities if they include energy efficiency in their resource planning processes or (for restructured states) if they provide information to others for these planning purposes. We awarded a full point to utilities that consider efficiency as a supply-side resource in their planning processes, as this allows efficiency to more directly compete with other resources. We awarded 0.5 points to utilities that consider efficiency as a reduction to their load forecast. We used integrated resource plans, other planning documents, and direct follow-up to confirm data request responses. Table 44 shows the scores for the resource planning metric.

Table 44. Scores for resource planning

Utility	Inclusion of efficiency in resource planning	Points
BGE*	Both	1
ConEd*	Both	1
Consumers*	Both	1
CPS*	Both	1
Dominion*	Both	1
DTE*	Both	1
Duke IN	Supply-side resource	1

Utility	Inclusion of efficiency in resource planning	Points
Duke NC	Reduction in forecast	0.5
Duke OH*	Reduction in forecast	0.5
Duke SC	Reduction in forecast	0.5
Entergy AR	Reduction in forecast	0.5
Entergy LA	Reduction in forecast	0.5
FP&L	Reduction in forecast	0.5
GA Power	Reduction in forecast	0.5

Utility	Inclusion of efficiency in resource planning	Points
Eversource CT*	Supply-side resource	1
Eversource MA*	Supply-side resource	1
LADWP*	Both	1
NG NY*	Supply-side resource	1
PacifiCorp UT	Supply-side resource	1
PECO*	Supply-side resource	1
PG&E*	Supply-side resource	1
PGE*	Both	1
PSE	Supply-side resource	1
PSE&G*	Supply-side resource	1
SDG&E*	Both	1
TECO	Supply-side resource	1
Xcel MN	Supply-side resource	1
AEP OH*	Reduction in forecast	0.5
Ameren IL*	Reduction in forecast	0.5
Ameren MO	Reduction in forecast	0.5
APS	Reduction in forecast	0.5
ComEd*	Reduction in forecast	0.5
Duke FL	Reduction in forecast	0.5
LIPA*	Reduction in forecast	0.5
MidAm IA	Reduction in forecast	0.5
NG MA*	Reduction in forecast	0.5
Nevada Power	Reduction in forecast	0.5
OG&E	Reduction in forecast	0.5
PPL*	Reduction in forecast	0.5
Duke Progress	Reduction in forecast	0.5
SCE&G	Reduction in forecast	0.5
SRP	Reduction in forecast	0.5
WE Energies	Reduction in forecast	0.5
Xcel CO	Reduction in forecast	0.5
AEP TC*	No	0
AL Power	-	0
CenterPoint*	No	0
JCP&L*	-	0
OH Edison*	-	0
Oncor*	-	0
SCE*	-	0
West Penn*	-	0

Blanks indicate no data were found. *Indicates that this utility was in a restructured state in 2018.

Twenty-four utilities consider energy efficiency only as a reduction to their load forecast in their planning processes. Eleven consider efficiency only as a supply-side resource, and nine include efficiency in both ways.

Practices of Leading Energy-Saving Utilities

The utilities represented in *The 2020 Utility Energy Efficiency Scorecard* include a diversity of US investor-owned utilities as well as a few with other public ownership models. They vary in how they are regulated, the parts of the energy value chain they serve, and the characteristics of their customer base. Nonetheless, at their core all of the utilities analyzed in this report deliver energy services at a regulated rate in exchange for an obligation to serve. We do see an evolution in utilities' relationships with new entrants to the market such as energy service companies, rooftop solar photovoltaic (PV) providers, and independent power producers. However utilities and program administrators remain the most important players in facilitating energy efficiency investment for customers.

The utilities featured in this report can seize the opportunity to provide efficiency offerings to customers and to serve as a pricing, procurement, and information platform to facilitate a broader marketplace for energy efficiency. This section synthesizes the best practices of the leading energy-saving utilities, or model utilities, and considers the future evolution of energy efficiency policy, offerings, and performance. Model utilities have three success factors:

- A base of policy support and enabling mechanisms approved by the regulators and legislators that grant distribution utility monopolies
- Programs provided by the utility or third parties that leverage those policies and infrastructure
- Results: multiple benefits for customers, the system, and society at large

Policy Support and Enabling Mechanisms

Leading energy-saving utilities have the policy support and enabling mechanisms required to make efficiency a core part of their business (Molina and Kushler 2015). Historically, utilities have lacked robust planning and pricing mechanisms that value energy efficiency, business models that reward investment in it, and the enabling technology to understand customers' energy needs in real time. Some of these enabling mechanisms require utility investment, process changes, or reorganization; others require a combination of policy, regulatory, and utility action.

Energy efficiency can serve to displace or delay more expensive ways to provide energy services to customers. As states and utilities recognize the changing costs of resources, they are moving toward all-source procurement of generation; assessing the utility's energy, capacity, and flexibility needs; and identifying the portfolios of resources, including energy efficiency, that together can meet system needs at least cost. Demand-side resources including energy efficiency will be critical for these clean portfolios. More than $90 billion in investment in new gas is projected from IRPs and announcements to begin operation before 2025 (Teplin et al. 2019). The Rocky Mountain Institute (RMI) finds that 90% of that new gas can be replaced economically with clean resources, including energy efficiency and demand flexibility. However ignoring energy efficiency and demand flexibility shrinks the near-term market for clean resources to replace new gas by 70% (Teplin et al. 2019). Some states are moving to distribution planning processes that enable energy efficiency (as well as other distributed resources) to compete with traditional distribution system infrastructure upgrades to meet local distribution-level needs (Baatz, Relf, and Nowak 2018).

To recognize the importance of planning, this edition of the *Scorecard* added a planning metric in Category 3. But planning changes alone are not sufficient (Molina and Kushler 2015). Model utilities are pairing good planning with robust EERS and other energy savings and clean energy targets. This year's *Scorecard* continues to include savings targets metrics in Categories 1 and 3.

Beyond planning, leading energy-saving utilities make energy efficiency a profit center with the help of cost recovery, decoupling, and performance-based incentives. We included a metric to track these policies in Category 3. In addition to the utility revenue side of the business model, customer-facing rate design for leading utilities can support increasing

energy efficiency. Model utilities minimize residential customer charges and demand charges while increasing the availability of time-varying pricing. This gives customers the price signals that encourage them to save (Baatz 2017). We added information on residential demand charges to Category 3 this year to reflect the challenges that such charges present for customers and our concern about the increasing number of proposals for these rates.

To extend the reach of ratepayer funded energy efficiency, leading utilities are increasingly finding ways to leverage other sources of capital. They provide financing programs in addition to direct incentives. (This represents a potential future metric for next editions of the *Scorecard*, as we found financing programs in a number of utilities' portfolios of pilots.) Model utilities increasingly braid funding sources, leveraging low-income, health-care, insurance, and municipal funding to increase the availability of energy efficiency beyond cost-effectiveness limits.

The leading energy-saving utilities also provide advanced metering functionality to all customers, typically through AMI, as measured in Category 3. Usage data are accessible to customers and easy to share with third parties who can help them better manage their energy use, and utilities can also leverage those data to target programs, provide direct feedback, and deliver advanced rates.

Meeting Customer Needs through Portfolio Comprehensiveness

Leading energy-saving utilities provide a variety of programs that address a multiplicity of customer needs and end uses. These include programs that serve traditional customer classes (e.g., residential, commercial, and industrial) and ones that target traditional end uses like new construction and retrofits. (The latter fall under the portfolio comprehensiveness metric of Category 2.) They also include emerging program areas and strategies that address increasingly prevalent end uses (e.g., data centers), explore new ways of engaging customers (e.g., with real-time energy feedback and data disaggregation), and bring in new technologies like advanced heat pumps. Emerging program areas like geo-targeting and grid-interactive efficient buildings also address new ways of procuring energy efficiency and bundling it with other resources.

Leading utilities also demonstrate the best in customer service, and their offerings are simple, accessible, and hassle free to maximize participation and engagement of busy customers. These offerings are aimed at the best part of the value chain for that market, sometimes delivering incentives to distributors and manufacturers rather than directly to end-user customers. We include these programs in our portfolio comprehensiveness and emerging programs metric of Category 2. Online marketplaces, one-stop-shop designs, and customer engagement techniques borrowed from industry are central to the way successful utilities scale energy efficiency. We gathered information on participation (in home retrofit programs) for the first time this year, scoring utilities on how they collect data for this critical metric in the hope that we can capture it more robustly in future editions.

Energy-saving utilities also integrate efficiency programs with other, sometimes more visible resources customers are interested in, like efficient electric vehicles and rooftop solar PV. Integrated programs that bring together these resources alongside demand flexibility measures can offer further value to the grid and to customers. Category 2 includes grid-interactive efficient buildings programs that capture these dual value streams.

Delivering on the Promise of Multiple Benefits for Customers

Leveraging policy and infrastructure, successful efficiency programs achieve energy savings for all customers as well as nonenergy benefits such as bill savings, comfort, health, and productivity (Baatz 2015).

Energy efficiency portfolio managers at leading utilities assess their success by measuring actual energy savings across the year, at peak times, and over the lifetime of investments. Category 1 of the *Scorecard* measures incremental, net lifetime, and peak demand savings to recognize the value of each of these metrics. Reflecting the importance of delivering savings to all customers, the new program participation metric of Category 1 joins an existing metric that assesses delivery to low-income customers.

Over time these metrics are likely to evolve beyond energy savings toward GHG emissions savings. These will require efficiency available at particular times and locations and enablement of beneficial electrification.[7] They will also require envelope measures that maximize the value of both. New York and Massachusetts have changed their goals to fuel-neutral metrics as a first step toward measuring GHG reductions. We include energy-efficient fuel switching as a new metric under emerging programs, and we continue to include home and whole-building retrofits to capture the importance of envelope measures.

We will also likely see states and utilities move to better value the nonenergy participant benefits of energy efficiency, including health, productivity, and comfort. Leading utilities will be able to use these benefits to attract funding for programs and increase their reach beyond the scale of what can be achieved with ratepayer dollars. Future editions of the *Scorecard* may assess utilities' success at valuing these hard-to-measure but critical benefits.

Areas for Future Research

There are several areas of utility operations and energy efficiency program implementation we did not include in this report or that we would like to assess in a more comprehensive way. The primary reason for excluding them or not assessing them fully is a lack of publicly available data. Many of the potential metrics would require significant levels of research to adequately score, and this research was beyond the scope of this report. However these are important metrics that should be reviewed, and we may consider them in a future *Scorecard*. Here we list some of these metrics. The first four (total annual energy savings, electric vehicles, beneficial building electrification, and underserved sectors) are particularly important for achieving deep savings to mitigate climate change, while the remaining four (distribution system efficiency, research and development, integrated efficiency with DERs, and the time value of efficiency) maximize energy efficiency's value as a grid resource.

[7] Electrification is a form of fuel switching that either fully or partially displaces direct fossil fuel use with electricity use, for example shifting to electric heat pumps to heat homes and businesses. It is beneficial when it provides net societal and participant benefits, such as grid management and environmental benefits on the one hand and bill savings on the other. It can also be a form of energy efficiency when it saves total primary energy and meets customer savings and emission-reduction criteria.

TOTAL ANNUAL ENERGY SAVINGS

Total annual energy savings are the total energy savings in a given year from all programs and measures installed in that year *and* those installed in previous years that continue to save energy (i.e., have not yet reached the end of their useful life). Some measures save energy for decades, meaning the total annual energy savings in 2018 could contain savings from programs put in place as far back as the mid-1990s. Some states, such as Arizona and Illinois, have utility-sector energy efficiency targets based on total annual savings. While we did not include total annual energy savings as a metric for this report due to a lack of data, we do consider it to be an important metric because it indicates energy savings from longer-lived measures and a longer history of program implementation. If we can obtain sufficient data, we will likely add this to future *Scorecard*s.

ELECTRIC VEHICLES

Utilities play an important role in the integration of electric vehicles into the distribution system. We examined a limited set of metrics related to this role. The number of public chargers per customer is a metric we plan to use in ACEEE's *State Scorecard* and may be a future metric to include in this report. Demand response or managed charging programs targeted to electric vehicle owners to shift charging times and optimize grid operation can provide value to both the grid and vehicle owners. Other measures worth exploring include utility outreach and education about electric vehicles, incentives for electric vehicle adoption, and the promotion of electric mobility for low-income and other underserved communities.

BENEFICIAL BUILDING ELECTRIFICATION

As the carbon intensity of the electric grid continues to decrease, electrification of transportation, industry, and buildings becomes an important strategy for climate mitigation (see Bloomberg Philanthropies 2019; Haley et al. 2019; Gowrishankar and Levin 2017; and Williams et al. 2015). In 2017 emissions from commercial businesses and residential homes, primarily from burning fossil fuels for heat, made up more than 11% of US emissions (EPA 2019). While this contribution is small relative to transportation and industry, states with ambitious climate goals will need to address these emissions to support subnational efforts to meet Paris climate targets.

The *Utility Scorecard* currently includes transportation electrification metrics (e.g., electric vehicle charging infrastructure incentives) but considers building electrification in a more limited way. The program diversity metric includes energy-efficient fuel switching programs that deliver overall BTU energy savings, GHG reductions, and customer cost savings. Policymakers and utilities are starting to explore other policies and actions that can enable beneficial electrification; we may consider these in future editions of the report. For example, regulators can clarify rules to allow and encourage utilities to pursue beneficial electrification. They can also restructure their energy efficiency goals to measure success via outcome-based metrics, such as greenhouse gas reductions or fuel-neutral BTU energy savings, often initially by tracking those metrics or establishing multiple parallel goals or incentives (Gold, Gilleo, and Berg 2019).

UNDERSERVED SECTORS

Strong energy efficiency program portfolios will offer energy efficiency incentives to all customer segments. Program measures, incentives, and services can be designed in ways that make them accessible to particular customer groups. Some segments require more tailored approaches than others, such as renters, low-income households, rural areas, and multifamily building owners. For these groups, varying responsibility for utility bills and varying access to up-front capital often hinder participation in programs that are available for single-family homes and/or commercial buildings. Research suggests that these markets are often overlooked by utility programs and as a result have fewer energy efficiency upgrades (Drehobl and Ross 2016). Utility programs can accelerate energy savings in these sectors. In this edition of the *Scorecard*, we assessed utilities' performance regarding administration of low-income energy efficiency programs, and we will aim to assess other hard-to-reach sectors in future editions.

DISTRIBUTION SYSTEM EFFICIENCY

End-use energy efficiency is the primary focus of this report. However utilities also have significant opportunity to improve system efficiency at the distribution, generation, and transmission levels. On the distribution system, utilities can reduce line losses and install higher-efficiency transformers, such as amorphous core transformers. This type of improvement can greatly increase distribution system efficiency, reducing the need for generation infrastructure. We included conservation voltage reduction as an emerging program area but did not otherwise consider distribution system efficiency as a metric in this report, primarily due to data limitations in this area. We hope to collect more data on these issues for future *Scorecard*s.

RESEARCH AND DEVELOPMENT

Utility research and development can be an indicator of future-oriented energy efficiency innovation, program and portfolio expansion, and market transformation efforts. Utilities fund internal research but also provide financial support to, or collaborate in other ways with, outside organizations such as the Consortium for Energy Efficiency, Electric Power Research Institute, Department of Energy, national laboratories, and Edison Electric Institute.

We considered measuring research and development in conjunction with other metrics we scored, such as emerging areas and pilot programs, to emphasize innovative, future-focused efficiency. However this year we did not award points for R&D due to lack of data and inconsistency of available metrics. A possible measure for the future may be annual budgets or spending on R&D line items including emerging technologies, market development, program investigation, and demonstration.

INTEGRATED ENERGY EFFICIENCY AND DERS

Emerging technologies, evolving customer preferences, and the increasing penetration of DERs are driving changes in how utilities can reliably meet demand in a flexible and low-cost way. This changing landscape is also creating new opportunities to deliver energy efficiency to customers. While not yet prevalent, utilities are beginning to offer programs that offer energy efficiency and other DERs like solar PV and demand response simultaneously. This edition of the *Scorecard* considers such integrated programs in a

preliminary way by evaluating programmatic approaches and technologies that can enable them. The former includes GEBs, strategic energy management, and programs using data disaggregation; enabling technologies include learning thermostats and advanced water heaters.[8] We may more explicitly consider integrated programs that deliver increased benefits in future editions of the *Scorecard*.

TIME VALUE OF ENERGY EFFICIENCY

Peak demand is a major contributor to electricity system costs borne by a utility and its customers. Peak demand drives investment in new generation, transmission, and distribution infrastructure, and it is often met with resources that are emissions intensive. In addition to continuous energy savings, energy efficiency provides energy and demand savings at peak times, creating additional value for the electric system and its operators. This value varies according to the load shape of the end use that is targeted and on the characteristics of the overall system (Frick, Eckman, and Goldman 2017). Programs that target efficiency measures for their time value are increasingly important as DERs alter the load shape in some areas of the country and contribute to more distinct peak demand periods. The *Scorecard* currently considers geo-targeted efficiency programs; future editions may include programs that target efficiency for its time value.

Conclusion

Utilities show their commitment to energy efficiency by their actual performance and by including efficiency in future planning through pilot programs, emerging areas, and strong targets. *The 2020 Utility Energy Efficiency Scorecard* provides information on what programs and regulations are effective for high energy efficiency achievement. It aims to help utilities across the country assess and improve their current efforts and continue to realize efficiency's many benefits. This year's *Scorecard* shows a clear commitment to energy efficiency on the part of many utilities. It also recognizes substantial opportunities to realize additional benefits by implementing more rigorous efficiency programs. Utilities and their regulators should increase their efforts to encourage high levels of savings and deliver multiple benefits to customers, the grid, and program administrators. Well-rounded portfolios that maximize efficiency's benefits can achieve all of these goals. We encourage you to use this report and forthcoming related materials to evaluate growth opportunities for energy efficiency, and we invite you to reach out to ACEEE for support in implementing them.

[8] For definitions of these programs and technologies, see the Emerging Areas metric and Appendix C.

References

ACEEE. 2019. "Evaluation, Measurement, & Verification." aceee.org/sector/state-policy/toolkit/emv.

AEP Ohio. 2019. *2018 Portfolio Status Report of the Energy Efficiency and Peak Demand Response Programs.* Case No. 19-1099-EL-EEC, May 14. Columbus: Ohio PUC (Public Utilities Commission). dis.puc.state.oh.us/TiffToPDf/A1001001A19E14B25118C02745.pdf.

Allen, P., G. Van Horn, M. Goetz, J. Bradbury, and K. Zyla. 2017. *Utility Investment in Electric Vehicle Charging Infrastructure: Key Regulatory Considerations*. Washington, DC: M.J. Bradley & Associates and Georgetown Climate Center. www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf.

Baatz, B. 2015. *Everyone Benefits: Practices and Recommendations for Utility System Benefits of Energy Efficiency*. Washington, DC: ACEEE. aceee.org/everyone-benefits-practices-and-recommendations.

——. 2017. *Rate Design Matters: The Intersection of Residential Rate Design and Energy Efficiency*. Washington, DC: ACEEE. aceee.org/research-report/u1703.

Baatz, B., G. Relf, and S. Nowak. 2018. *The Role of Energy Efficiency in a Distributed Energy Future*. Washington, DC: ACEEE. aceee.org/research-report/u1802.

Berg, W., S. Vaidyanathan, E. Junga, E. Cooper, C. Perry, G. Relf, A. Whitlock, M. DiMascio, C. Waters, and N. Cortez. 2019. *2019 State Energy Efficiency Scorecard*. Washington, DC: ACEEE. aceee.org/research-report/u1908.

CEC (California Energy Commission). 2019. "Doubling Energy Efficiency Savings." Accessed December. ww2.energy.ca.gov/sb350/doubling_efficiency_savings/.

Chernick, P., and J. Plunkett. 2014. "Price Effects as a Benefit of Energy-Efficiency Programs." In *Proceedings of the 2014 ACEEE Summer Study on Energy Efficiency in Buildings* 5: 57–69. aceee.org/files/proceedings/2014/data/papers/5-1047.pdf.

Cluett, R., J. Amann, and S. Ou. 2016. *Building Better Energy Efficiency Programs for Low-Income Households*. Washington, DC: ACEEE. aceee.org/research-report/a1601.

Colorado PUC (Public Utilities Commission). 2019. *Colorado PUC Electric Vehicle Working Group Report 2019.* Denver: Colorado PUC. emotorwerks.com/images/azura-pages/utilities/2019-01_CoPUC_Electric_Vehicle_Report.pdf.

DOE (US Department of Energy). 2020. *Grid-Interactive Efficient Buildings.* Accessed February 3. energy.gov/eere/buildings/grid-interactive-efficient-buildings.

Dominion South Carolina. 2019. *Request for Approval of an Expanded Portfolio of Demand Side Management Programs and a Modified Demand Side Management Rate Rider*. Docket No. 2019-239-E, June 28. Columbia: South Carolina PSC (Public Service Commission). dms.psc.sc.gov/Web/Matters/Detail/285614.

Drehobl, A., and F. Castro-Alvarez. 2017. *Low-Income Energy Efficiency Programs: A Baseline Assessment of Programs Serving the 51 Largest Cities*. Washington, DC: ACEEE. aceee.org/white-paper/low-income-ee-baseline.

Drehobl, A., and L. Ross. 2016. *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*. Washington, DC: ACEEE. aceee.org/sites/default/files/publications/researchreports/u1602.pdf.

EIA (Energy Information Administration). 2018. *Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files: Sales to Ultimate Customers*. Washington, DC: EIA. www.eia.gov/electricity/data/eia861/.

——. 2019a. *Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files: Advanced Meters*. Washington, DC: EIA. www.eia.gov/electricity/data/eia861/.

——. 2019b. *Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files: Energy Efficiency*. Washington, DC: EIA. www.eia.gov/electricity/data/eia861/.

——. 2019c. *Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files: Operational Data*. Washington, DC: EIA. www.eia.gov/electricity/data/eia861/.

——. 2019d. *Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files: Sales to Ultimate Customers*. Washington, DC: EIA. www.eia.gov/electricity/data/eia861/.

——. 2019e. "How Much Electricity Is Lost in Electricity Transmission and Distribution in the United States?" eia.gov/tools/faqs/faq.php?id=105&t=3.

ENERGY STAR. 2018. *Utilities Providing Energy Data for Benchmarking in ENERGY STAR Portfolio Manager*. Washington, DC: ENERGY STAR. www.energystar.gov/buildings/tools-and-resources/utilities_increase_access_energy_data_help_commercial_customers_benchmark.

EPA (Environmental Protection Agency). 2019. "Emissions & Generation Resource Integrated Database (eGRID)." epa.gov/energy/emissions-generation-resource-integrated-database-egrid.

EV Hub. 2019. "Electric Utility Filings." www.atlasevhub.com/materials/electric-utility-filings/.

Frick, N., T. Eckman, and C. Goldman. 2017. *Time-Varying Value of Electric Energy Efficiency*. Prepared by Berkeley Lab. Washington, DC: DOE. emp.lbl.gov/publications/time-varying-value-electric-energy.

Frick, N., I. Hoffman, C. Goldman, G. Leventis, S. Murphy, and L. Schwartz. 2019. *Peak Demand Impacts from Electricity Efficiency Programs*. Prepared by Berkeley Lab. Washington, DC: DOE. emp.lbl.gov/publications/peak-demand-impacts-electricity.

Gilleo, A., M. Kushler, M. Molina, and D. York. 2015. *Valuing Efficiency: A Review of Lost Revenue Adjustment Mechanisms*. Washington, DC: ACEEE. aceee.org/research-report/u1503.

Gold, R., A. Gilleo, and W. Berg. 2019. *Next Generation Energy Efficiency Resource Standards*. Washington, DC: ACEEE. aceee.org/research-report/u1905.

Gold, R., and S. Nowak. 2019. *Energy Efficiency over Time: Measuring and Valuing Lifetime Energy Savings in Policy and Planning*. Washington, DC: ACEEE. aceee.org/research-report/u1902.

Gold, R., C. Waters, and D. York. 2020. *Leveraging Advanced Metering Infrastructure to Save Energy*. Washington, DC: ACEEE. aceee.org/leveraging-advanced-metering-infrastructure-save.

Hayes, S., and C. Kubes. 2018. *Saving Energy, Saving Lives: The Health Impacts of Avoiding Power Plant Pollution with Energy Efficiency*. Washington, DC: ACEEE. aceee.org/research-report/h1801.

Hoffman, I., M. Billingsley, S. Schiller, C. Goldman, and E. Stuart. 2013. *Energy Efficiency Program Typology and Data Metrics: Enabling Multi-State Analyses through the Use of Common Terminology*. Prepared by Berkeley Lab. Washington, DC: DOE. emp.lbl.gov/publications/energy-efficiency-program-typology.

Holden, C. 2019. "More States Explore Performance-Based Ratemaking, but Few Incentives Are in Place." *Greentech Media*, June 13. www.greentechmedia.com/articles/read/more-states-explore-performance-based-ratemaking-but-few-incentives-in-plac.

Johnson, K. 2013. *Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings*. Washington, DC: ACEEE. aceee.org/research-report/e13n.

Khan, S., and S. Vaidyanathan. 2018. *Strategies for Integrating Electric Vehicles into the Grid*. Washington, DC: ACEEE. aceee.org/research-report/t1801.

Kushler, M., S. Nowak, and P. Witte. 2012. *A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs*. Washington, DC: ACEEE. aceee.org/research-report/u122.

Lamont, D., and J. Gerhard. 2013. *The Treatment of Energy Efficiency in Integrated Resource Plans: A Review of Six State Practices*. Montpelier, VT: RAP (Regulatory Assistance Project). www.raponline.org/wp-content/uploads/2016/05/rap-lamont-gerhard-treatementofeeinirp-2013-jan-28.pdf.

Lazar, J. 2016. *Use Great Caution in Design of Residential Demand Charges*. Montpelier, VT: RAP. www.raponline.org/wp-content/uploads/2016/05/lazar-demandcharges-ngejournal-2015-dec.pdf.

Maryland General Assembly. 2017. "Energy Efficiency Programs—Calculation of Program Savings and Consideration of Cost-Effectiveness." SB184. mgaleg.maryland.gov/mgawebsite/legislation/details/sb0184?ys=2017rs.

Michigan Legislature. 2016. *Enrolled Senate Bill No. 437, Act No. 341*. Lansing: Michigan Legislature. www.legislature.mi.gov/documents/2015-2016/publicact/pdf/2016-PA-0341.pdf.

Mission:data Coalition. 2019. *Energy Data Portability: Assessing Utility Performance and Preventing "Evil Nudges."* Seattle: Mission:data Coalition. static1.squarespace.com/static/52d5c817e4b062861277ea97/t/5c3a849b562fa75d70fd7953/1547338949271/Energy+Data+Portability.pdf.

Molina, M. 2019. "Efficiency Makes Clean Energy Cost-Competitive with New Gas Power Plants." *ACEEE blog*, September 23. aceee.org/blog/2019/09/efficiency-makes-clean-energy-cost.

Molina, M., and M. Kushler. 2015. *Policies Matter: Creating a Foundation for an Energy-Efficient Utility of the Future.* Washington, DC: ACEEE. aceee.org/policies-matter-creating-foundation-energy.

Nadel, S., and L. Ungar. 2019. *Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050*. Washington, DC: ACEEE. aceee.org/research-report/u1907.

National Grid. 2019. "National Grid and Electric Vehicles." Accessed December. www.nationalgridus.com/new-energy-solutions/Smart-Technology/EVs-and-Clean-Transportation/National-Grid-and-Electric-Vehicles.

NEEP (Northeast Energy Efficiency Partnerships). 2011. *Glossary of Terms Version 2.1: A Project of the Regional Evaluation, Measurement and Verification Forum*. Lexington, MA: NEEP. issuu.com/neepenergy/docs/emv_glossary_version_2.1.

NESP (National Efficiency Screening Project). 2017. *National Standard Practice Manual*. Framingham, MA: NESP. nationalefficiencyscreening.org/national-standard-practice-manual/.

——. 2019. *Database of State Efficiency Screening Practices (DSESP)*. Framingham, MA: NESP. nationalefficiencyscreening.org/state-database-dsesp/.

Nowak, S. 2016. *Big Opportunities for Small Business: Successful Practices of Utility Small Commercial Energy Efficiency Programs*. Washington, DC: ACEEE. aceee.org/research-report/u1607.

Nowak, S., B. Baatz, A. Gilleo, M. Kushler, M. Molina, and D. York. 2015. *Beyond Carrots for Utilities: A National Review of Performance Incentives for Energy Efficiency*. Washington, DC: ACEEE. aceee.org/beyond-carrots-utilities-national-review.

OpenEI (Open Energy Information). 2019. "Electric Utility Rates." Accessed December. openei.org/wiki/Utility_Rate_Database.

Opinion Dynamics. 2018. "Normalized Metered Energy Consumption: It's All about Context." *Opinion Dynamics Blog*, February 26. opiniondynamics.com/2018/02/nmec/.

Pennsylvania PUC (Public Utility Commission). 2015. *Energy Efficiency and Conservation Program Phase III Final Implementation Order*. Docket No. M-2014-2424864, June 11. Harrisburg: Pennsylvania PUC. puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx.

PGE (Portland General Electric Company). 2019. *PGE Electric Vehicle Charging Pilot Program Proposals*. Docket No. UM 1811, February 15. Salem: Oregon PUC (Public Utility Commission). edocs.puc.state.or.us/efdocs/HAD/um1811had151943.pdf.

PSEG (Public Service Enterprise Group). 2019. "Energy Efficiency." Accessed December. psegpoweringprogress.com/energy-efficiency/.

PUCO (Public Utilities Commission of Ohio). 2018. *Power Forward: A Roadmap to Ohio's Electricity Future*. Columbus: PUCO. puco.ohio.gov/industry-information/industry-topics/powerforward/powerforward-a-roadmap-to-ohios-electricity-future/.

RAP (Regulatory Assistance Project). 2016. *Revenue Regulation and Decoupling: A Guide to Theory and Application*. Montpelier, VT: RAP. raponline.org/wp-content/uploads/2016/11/rap-revenue-regulation-decoupling-guide-second-printing-2016-november.pdf.

Relf, G., and B. Baatz. 2017. *Energy Efficiency in Capacity Auctions: A Historical Review of Value*. Washington, DC: ACEEE. aceee.org/research-report/u1714.

SEPA (Smart Electric Power Alliance). 2019. "Utility Carbon Reduction Tracker." Accessed December. sepapower.org/utility-carbon-reduction-tracker/.

Sussman, R., J. LeZaks, A. Drehobl, M. Kushler, and A. Gilleo. 2018. *Examining Potential for Prepay as an Energy Efficiency Program in Minnesota*. Prepared by ACEEE and Seventhwave. St. Paul: Minnesota Department of Commerce. www.cards.commerce.state.mn.us/CARDS/security/search.do?documentId=%7BF29970F3-1148-4889-9715-8C92E05F0A7F%7D.

Takahashi, K. 2015. *Searching for Best Practices for Modeling Energy Efficiency in Integrated Resource Planning*. Cambridge, MA: Synapse Energy Economics Inc. www.synapse-energy.com/sites/default/files/Modeling-EE-in-IRP.pdf.

Teplin, C., M. Dyson, A. Engle, and G. Glazer. 2019. *The Growing Market for Clean Energy Portfolios: Economic Opportunities for a Shift from New Gas-Fired Generation to Clean Energy across the United States Electricity Industry*. Boulder: RMI (Rocky Mountain Institute). rmi.org/cep-reports.

Violette, D., and P. Rathbun. 2014. "Chapter 23: Estimating Net Savings." *The Uniform Methods Project Methods for Determining Energy Efficiency Savings for Specific Measures*. Prepared by NREL (National Renewable Energy Laboratory). Washington, DC: DOE. nrel.gov/docs/fy14osti/62678.pdf.

Walton, R. 2019a. "New CPUC Efficiency Goals Are Equivalent to Reducing 658,000 Cars-Worth of GHGs." *Utility Dive*, August 19. utilitydive.com/news/new-cpuc-efficiency-goals-are-equivalent-to-reducing-658000-cars-worth-of/561163/.

——. 2019b. "Virginia Approves $226M Suite of Dominion Efficiency, DR Programs through June 2024." *Utility Dive*, May 3. www.utilitydive.com/news/virginia-approves-226m-suite-of-dominion-efficiency-dr-programs-through-j/553999/.

Whited, M., T. Woolf, and J. Daniel. 2016. *Caught in a Fix: The Problem with Fixed Charges for Electricity*. Prepared by Synapse Energy Economics, Inc. Yonkers, NY: Consumers Union. consumersunion.org/wp-content/uploads/2016/02/Caught-in-a-Fix-FINAL-REPORT-20160208-2.pdf.

Williams, J., B. Haley, F. Kahrl, J. Moore, A. Jones, M. Torn, and H. McJeon. 2015. *Pathways to Deep Decarbonization in the United States – US 2050 Vol. 1 Technical Report*. Prepared by E3 (Energy and Environmental Economics, Inc.), Berkeley Lab, and PNNL (Pacific Northwest National Laboratory). Paris: IDDRI (Institute for Sustainable Development and International Relations). usddpp.org/downloads/2014-technical-report.pdf.

Xcel Energy. 2019. *Upper Midwest Integrated Resource Plan: 2020–2034*. Docket No. E002/RP-19-368, July 1. St. Paul: Minnesota PUC (Public Utilities Commission). www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/The-Resource-Plan-No-Appendices.pdf.

York, D., M. Neubauer, S. Nowak, and M. Molina. 2015. *Expanding the Energy Efficiency Pie: Serving More Customers, Saving More Energy through High Program Participation*. Washington, DC: ACEEE. aceee.org/research-report/u1501.

York, D., G. Relf, and C. Waters. 2019. *Integrated Energy Efficiency and Demand Response Programs*. Washington, DC: ACEEE. aceee.org/research-report/u1906.

Appendix A. Data Sources

UTILITY REGULATORY FILINGS

AEP Ohio. 2019. *2018 Portfolio Status Report of the Energy Efficiency and Peak Demand Response Programs.* Case No. 19-1099-EL-EEC, May 14. Columbus: Ohio PUC (Public Utilities Commission). dis.puc.state.oh.us/TiffToPDf/A1001001A19E14B25118C02745.pdf.

AEP Texas Central. 2019. *AEP Texas Inc. 2019 Energy Efficiency Plan and Report*. Project No. 49297, May 31. Austin: Texas PUC (Public Utility Commission). interchange.puc.texas.gov/Documents/49297_16_1020489.PDF.

Ameren Illinois. 2019. *Ameren Illinois Company 2018 Integrated Impact Evaluation Report*. Prepared by Opinion Dynamics. St. Louis: Ameren Illinois. ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIC_Evaluation_Reports_2018/2018_AIC_Integrated_Impact_Evaluation_Report_FINAL_2019-05-15.pdf.

Ameren Missouri. 2019. *Ameren Missouri's Demand-Side Program Annual Report for 2018.* Case No. EO-2019-0372, May 29. Missouri PSC (Public Service Commission). efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=EO-2019-0372&attach_id=2019017972.

Arizona Public Service Company. 2019. *2018 Demand Side Management Annual Progress Report*. Docket No. E-00000U-18-0055, March 1. Phoenix: Arizona Corporation Commission. docket.images.azcc.gov/0000196482.pdf.

BGE (Baltimore Gas and Electric Company). 2019. *2018 Year-End EmPOWER Maryland Report of the Baltimore Gas and Electric Company.* Case No. 9494, February 15. Baltimore: Maryland PSC (Public Service Commission). (webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/9400-9499/9494/\103.pdf.

CenterPoint Energy Houston Electric, LLC. 2019. *2019 Energy Plan and Report*. Project No. 49297, April 1. Austin: Texas PUC (Public Utility Commission). interchange.puc.texas.gov/Documents/49297_5_1013050.PDF.

Commonwealth Edison. 2019. *ComEd Summary Impact Evaluation Report – Energy Efficiency/Demand Response Plan: Program Year 2018 (CY2018)*. Prepared by Navigant Consulting. Springfield: Illinois Commerce Commission. s3.amazonaws.com/ilsag/ComEd_CY2018_Summary_Evaluation_Report_2018-04-30_Final.pdf.

Consolidated Edison. 2019. *Resubmission: Con Edison Q4 2018 Clean Energy Dashboard Scorecard Report.* Matter No. 15-00990, Case Nos. 15-M-0252 and 16-E-0060, March 6. Albany: New York PUC (Public Service Commission). documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-M-0252&submit=Search+by+Case+Number.

Consumers Energy. 2019. *Supplemental Direct Testimony of Theodore A. Ykimoff on Behalf of Consumers Energy Company*. Case No. U-20365, September 16. Lansing: Michigan PSC

(Public Service Commission). mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000006VIRoAAO.

Cope, B., and E. Lemei. 2019. *Energy Efficiency in California's Public Power Sector*. 13th edition. Glendale: SCPPA (Southern California Public Power Authority). Roseville: NCPA (Northern California Power Agency). scppa.org/file.axd?file=/2019/07/2019%20POU%20EE%20Report_13th%20Edition.pdf.

CPS Energy. 2019. *Evaluation, Measurement & Verification of CPS Energy's FY 2019 DSM Programs.* Prepared by Frontier Energy. San Antonio, TX: City of San Antonio. sanantonio.gov/Portals/0/Files/Sustainability/STEP/CPS-FY2019.pdf.

Dominion Virginia Power. 2019. *Evaluation, Measurement, and Verification Report for Virginia Electric and Power Company (Dominion Energy)*. Case No. PUE-2017-00129, May 1. Richmond: SCC (State Corporation Commission). scc.virginia.gov/docketsearch#/caseDetails/137786.

DTE Energy. 2019. *DTE Electric Company's Application for Approval of the Reconciliation of Its Energy Waste Reduction Plan Expenses for the Plan Year 2018.* Case No. U-20366, May 31. Lansing: Michigan PSC (Public Service Commission). mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000004n98cAAA.

Duke Energy Carolinas. 2019. *Duke Energy Carolinas, LLC's Application for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider*. Docket No. E-7, Sub 1192, February 26. Raleigh: North Carolina Utilities Commission. starw1.ncuc.net/NCUC/ViewFile.aspx?Id=7ef72466-ed10-4587-89bd-e19bf2b175cc.

Duke Energy Florida. 2019. *Demand Side Management Annual Report for Calendar Year 2018.* Undocketed, March 1. Florida PSC (Public Service Commission). nationalefficiencyscreening.org/wp-content/uploads/2019/12/SACE-comments-6.10.2019.pdf.

Duke Energy Ohio. 2019. *In the Matter of the Annual Energy Efficiency Status Report of Duke Energy Ohio, Inc.* Case No. 19-621-EL-EEC, March 29. Columbus: PUCO (Public Utilities Commission of Ohio). dis.puc.state.oh.us/TiffToPDf/A1001001A19C29B13241I04490.pdf.

Duke Energy Progress. 2019. *Duke Energy Progress, LLC's Application for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider.* Docket No. 2019-89-EE-2, Sub 1206, June 11. Columbia: South Carolina PSC (Public Service Commission). dms.psc.sc.gov/Web/Dockets/Detail/117032.

Energize Connecticut. 2020. "Connecticut Statewide Energy Efficiency Dashboard." ctenergydashboard.com/Public/PublicHome.aspx.

Energy Trust of Oregon. 2019. "2018 Annual Report." energytrust.org/2018-annual-report/.

Entergy Arkansas. 2019. *Arkansas Energy Efficiency Program Portfolio Annual Report.* Docket No. 07-085-TF, May 2. Little Rock: Arkansas PSC (Public Service Commission).

apscservices.info/Efilings/Docket_Search_Documents.asp?Docket=07-085-TF&DocNumVal=561.

Entergy Louisiana. 2019. *Rulemaking to Study the Possible Development of Financial Incentives for the Promotion of Energy Efficiency by Jurisdictional Electric and Gas Utilities.* Docket No. R-31106, May 1. Baton Rouge: Louisiana PSC (Public Service Commission). lpscstar.louisiana.gov/star/ViewFile.aspx?Id=044de35a-db1f-450c-b82d-1712c238affb.

Florida Power & Light Company. 2019. *Florida Power & Light Company 2018 DSM Annual Report*. Docket 20190000-OT, March 1. Tallahassee: Florida PSC (Public Service Commission. www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/ARDemandSide/2018/Florida%20Power%20and%20Light.pdf.

Focus on Energy. 2019. *Focus on Energy Calendar Year 2018 Evaluation Report.* Prepared by Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute. Madison: Wisconsin PSC (Public Service Commission). focusonenergy.com/sites/default/files/WI_FOE_CY_2018_Volume_I.pdf.

Georgia Power Company. 2019. *Certified Demand-Side Management Programs Fourth Quarter 2018 Programs Status Report*. Docket 40162, February 15. Georgia PSC (Public Service Commission). psc.ga.gov/search/facts-document/?documentId=175745.

Mass Save. 2019. "Mass Save Data." masssavedata.com/Public/TimeSeries.

MidAmerican Energy Company. 2019. *Energy Efficiency Plan*. Docket No. EEP-2012-0002, May 1. Des Moines: Iowa Utilities Board. efs.iowa.gov/cs/groups/external/documents/docket/mdax/odq2/~edisp/1846096.pdf.

National Grid. 2019. *Niagara Mohawk Power Corporation d/b/a National Grid 2017 and 2018 Energy Efficiency Plan ("ETIP") Annual Report – Revised*. Case 15-M-0252, June 17. Albany: New York PSC (Public Service Commission). documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-M-0252&submit=Search+by+Case+Number.

NJBPU (New Jersey Board of Public Utilities). 2019. *New Jersey's Clean Energy Program Report Submitted to the New Jersey Board of Public Utilities: 4QFY19 Final Report.* Trenton: NJBPU. njcleanenergy.com/files/file/FINAL%20REPORT%20-%204QFY19(1).pdf.

NV Energy. 2019. *Application of Nevada Power Company d/b/a NV Energy and Sierra Pacific Power Company d/b/a NV Energy for Approval of Their 2019 Combined Annual Electric Demand Side Management Update Report as It Relates to the Action Plan of Their 2019–2038 Triennial Joint Integrated Resource Plan*. Docket No. 19-07004, June 1. Nevada PUC (Public Utilities Commission). pucweb1.state.nv.us/PUC2/DktDetail.aspx.

Ohio Edison. 2019. *Energy Efficiency and Peak Demand Reduction Program Portfolio Status Report to the Public Utilities Commission of Ohio.* Docket Nos. 19-1020-EL-EEC, 19-1021-EL-

EEC, 19-1022-EL-EEC, May 15. dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=19-1020-EL-EEC.

Oklahoma Gas and Electric. 2019. *2018 Oklahoma Demand Programs Annual Report*. Oklahoma City: Oklahoma Corporation Commission. www.occeweb.com/pu/EnergyEfficiency/2018OGEOKAnnualReportOGEADMReport.pdf.

Oncor Electric Delivery Company LLC. *2019 Energy Efficiency Plan and Report.* Project No. 49297, April 1. Austin: Texas PUC (Public Utility Commission). interchange.puc.texas.gov/Documents/49297_6_1013066.PDF.

PECO Energy. 2019. *Energy Efficiency and Conservation Program Semiannual Report.* Docket No. M-2015-2515691, July 15. Prepared by Navigant Consulting. Harrisburg: Pennsylvania PUC (Public Utility Commission). peco.com/SiteCollectionDocuments/PHaseIIIEECPSemiannualReportJune2018May2019.pdf.

PG&E (Pacific Gas and Electric Company). 2019. *2018 Energy Efficiency Annual Report.* May 1. San Francisco: CPUC (California Public Utilities Commission). eestats.cpuc.ca.gov/EEGA2010Files/PGE/AnnualReport/PGE.AnnualNarrative.2018.1.pdf.

PPL (PPL Electric Utilities Corporation). 2015. *Energy Efficiency and Conservation Program Phase III Implementation Order*. Docket No. M-2014-2424864, June 11. Harrisburg: Pennsylvania PUC. puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx.

PSE (Puget Sound Energy). 2019. *Annual Report of Energy Conservation Accomplishments.* April 1. Olympia: Washington UTC (Utilities and Transportation Commission). pse.com/-/media/Project/PSE/Portal/Rate-documents/EES/ees_2018_annual_rpt_energy_conservation_accomplishments.pdf.

PSEG Long Island. 2016. *Energy Efficiency and Renewable Energy Portfolios: 2018 Annual Evaluation Report.* Prepared by Opinion Dynamics. Uniondale: Long Island Power Authority. lipower.org/wp-content/uploads/2019/07/2018-PSEGLI-Annual-Report-Volume-I_2019_06_03.pdf.

Public Service Company of Colorado. 2018. *Demand-Side Management Annual Status Report.* Proceeding No. 16A-0512EG, April 1. Denver: Colorado PUC (Public Utilities Commission). xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Public%20Service%20Company%202018%20DSM%20Annual%20Status%20Report_FINAL.pdf.

Rocky Mountain Power. 2019. *Utah Energy Efficiency and Peak Reduction Annual Report.* June 18. Salt Lake City: Utah PSC (Public Service Commission). pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/ut

ah/Energy%20Efficiency%20and%20Peak%20Reduction%20Report%202018%20(Utah).pdf.

SDGE (San Diego Gas and Electric). 2019. *San Diego Gas and Electric Company (U 902 M) Energy Efficiency Programs Annual Report 2018 Results*. Rulemaking 13-11-005, May 1. San Francisco: CPUC. eestats.cpuc.ca.gov/EEGA2010Files/SDGE/AnnualReport/SDGE.AnnualNarrative.2018.1.pdf/.

South Carolina Electric & Gas Company. 2019. *Annual Update on Demand Side Management Programs and Petition to Update Rate Rider.* Docket No. 2019-57-E, Order No. 2019-292, May 1. Columbia: South Carolina PSC (Public Service Commission). dms.psc.sc.gov/Attachments/Order/43565944-5a65-4702-8178-2f8f897694e3.

Southern California Edison. 2019. *Southern California Edison Company's (U 388-E) Amended 2019 Annual Report for Energy Efficiency Programs.* R.13-11-005, June 7. San Francisco: CPUC. eestats.cpuc.ca.gov/Views/Documents.aspx/.

SRP (Salt River Project). 2018. *FY18 Energy Efficiency Report.* Tempe: SRP. srpnet.com/environment/sustainability/pdfx/2018EEReport.pdf.

Tampa Electric Company. 2019. *Demand Side Management Program Accomplishments*. March 1. Tallahassee: Florida PSC (Public Service Commission). www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/ARDemandSide/2018/Tampa%20Electric%20Company.pdf.

West Penn Power. 2018. *Final Annual Report to the Pennsylvania Public Utility Commission*. Docket No. M-2015-2514772, July 15. Harrisburg: Pennsylvania PUC. www.firstenergycorp.com/content/dam/customer/Customer%20Choice/Files/PA/ACT129/PY10-Report.pdf.

Xcel Minnesota. 2019. *Status Report & Associated Compliance Filings: Minnesota Electric and Natural Gas Conservation Improvement Program*. Docket No. E,G002/CIP-16-115, April 1. Minnesota Department of Commerce. edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId=%7BA066D969-0000-C119-9E6C-26A4634F87C5%7D&documentTitle=20194-151545-01

WEBSITES AND OTHER DOCUMENTS

Benefits.gov. 2017. "Arkansas Weatherization Assistance Program." benefits.gov/benefits/benefit-details/1843.

Duke Energy. 2017. "Neighborhood Energy Saver Program." Accessed February. duke-energy.com/home/products/income-qualified/neighborhood-energy-saver.

Energize CT. 2017. "Home Energy Solutions—Income Eligible." Accessed February. energizect.com/your-home/solutions-list/save-energy-and-money-all-year-long.

Focus on Energy. 2017a. "Commercial Kitchen Equipment." focusonenergy.com/business/efficient-equipment/food-service.

——. 2017b. "ENERGY STAR Certified Appliances." Accessed April. focusonenergy.com/residential/energy-star-appliances.

——. 2017c. "Find Energy Savings Products Online." Accessed April. focusonsaving.com/products/list.

——. 2017d. "Income Eligible Residents." Accessed February. focusonenergy.com/residential/income-eligible-residents.

——. 2017e. "Simple Energy Efficiency." Accessed April. focusonenergy.com/residential/simple-energy-efficiency.

Marshall, J. 2014. "How PG&E Is Using Demand Management to Make Smarter Use of the Grid." *PG&E Currents*, October 30. pgecurrents.com/2014/10/30/how-pge-is-using-demand-management-to-make-smarter-use-of-the-grid/.

Maryland Department of Housing and Community Development. 2017. "EmPOWER Maryland Low Income Energy Efficiency Program." Accessed February. dhcd.maryland.gov/Residents/Pages/lieep/default.aspx.

New Jersey BPU (Board of Public Utilities). 2017. "Comfort Partners." Accessed February. njcleanenergy.com/residential/programs/comfort-partners/comfort-partners.

NV Energy. 2017. "Smart Thermostat Home Energy Management." Accessed February. nvenergy.com/home/saveenergy/rebates/smart-thermostat/index.cfm.

Oregon.gov. 2017. "Energy and Weatherization Programs." Accessed March. oregon.gov/ohcs/Pages/energy-weatherization-programs-oregon.aspx.

PG&E (Pacific Gas and Electric). 2017a. "Energy Savings Assistance Program." Accessed February. pge.com/en_US/residential/save-energy-money/help-paying-your-bill/energy-reduction-and-weatherization/energy-savings-assistance-program/energy-savings-assistance-program.page.

——. 2017b. "Share My Data." Accessed April. pge.com/en_US/residential/save-energy-money/analyze-your-usage/your-usage/view-and-share-your-data-with-smartmeter/reading-the-smartmeter/share-your-data/third-party-companies/data-access.page.

PSEG (Public Service Enterprise Group Long Island). 2016. "Residential Energy Affordability Partnership." psegliny.com/page.cfm/Home/CustomerService/FinancialAssistancePrograms/REAP.

Rocky Mountain Power. 2017a. "Smart Thermostat, Smarter Savings." Accessed April. rockymountainpower.net/res/sem/smart-thermostat.html.

——. 2017b. "Water Heating." Accessed April. rockymountainpower.net/res/sem/het/wh.html.

SCE (Southern California Edison). 2016. *2015 SCE's Preferred Resources Pilot (PRP) Annual*. Rosemead: SCE. www.sce.com/sites/default/files/inline-files/PRP_YE_2015_Annual_Report.pdf.

——. 2017. "Energy Savings Assistance Program." Accessed February. www.sce.com/wps/portal/home/residential/assistance/energy-saving-program.

SDGE (San Diego Gas and Electric). 2016. "Energy Savings Assistance Program." sdge.com/energy-savings-assistance-program.

SRP (Salt River Project). 2016. "Low Income Weatherization Assistance Program." savewithsrp.com/RD/weatherization.aspx.

Texas PUC (Public Utility Commission). 2016. *Annual Statewide Portfolio Report for Program Year 2015.* Project Number 45019, August 15. Prepared by Tetra Tech and The Cadmus Group. Austin: Texas PUC. interchange.puc.texas.gov/Search/Documents?controlNumber=45019&itemNumber=9.

We Energies. 2017. "Energy Management Services." Accessed April. we-energies.com/business/bus_emgt_tools.htm.

Appendix B. Savings and Spending Data

Table B1. Energy efficiency (EE) savings data

Utility	Net incremental electric savings at meter (MWh)	Net incremental electric savings at generator (MWh)	Gross incremental electric savings at generator (MWh)	2018 system peak demand (MW)	Net peak demand savings at generator (MW)	Net lifetime electric savings at generator (MWh)	Weighted average useful life (years)
AEP OH	445,129	467,385	563,115	8,515	73.82	5,616,992	12.02
AEP TC	50,756	53,294	64,158	3,998	17.35	599,553	11.25
AL Power [b]	9,645	10,127	12,192	11,989	5.23	101,237	10.00
Ameren IL	364,289	404,725	532,533	8,658	56.84	4,775,756	11.80
Ameren MO	345,876	364,080	438,303	7,118	101.81	4,095,900	11.25
APS	198,923	212,752	256,125	7,253	67.86	2,487,590	11.69
BGE	591,310	616,559	765,912	6,626	95.75	4,957,190	10.10
CenterPoint	134,283	140,997	169,741	15,354	40.34	1,586,216	11.25
ComEd	1,859,773	2,064,720	2,268,923	21,349	216.25	19,423,111	9.90
ConEd [a d]	404,245	425,521	512,270	13,455	80.21	5,792,420	11.25
Consumers	586,784	641,648	712,943	7,568	77.20	7,338,711	11.72
CPS	120,636	126,985	152,873	5,081	58.38	1,591,122	12.53
Dominion	66,759	70,097	84,387	17,792	12.57	722,338	10.57
DTE	727,907	777,405	845,005	11,418	122.97	9,795,299	12.60
Duke FL	64,070	68,377	82,382	10,323	28.64	637,453	8.50
Duke IN	183,609	199,640	229,471	5,776	38.28	1,989,399	7.70
Duke NC	585,489	624,322	800,413	13,942	125.00	6,811,465	8.20
Duke OH	271,076	292,107	347,747	4,023	50.62	2,719,521	9.31

Utility	Net incremental electric savings at meter (MWh)	Net incremental electric savings at generator (MWh)	Gross incremental electric savings at generator (MWh)	2018 system peak demand (MW)	Net peak demand savings at generator (MW)	Net lifetime electric savings at generator (MWh)	Weighted average useful life (years)
Duke SC	219,233	233,774	299,710	4,844	46.80	2,519,309	8.20
Entergy AR	243,133	255,930	308,105	4,604	48.45	3,772,019	14.74
Entergy LA	5,665	5,963	7,178	9,703	1.01	103,360	17.33
Eversource CT	329,714	346,200	405,433	5,057	49.65	3,664,877	10.59
Eversource MA	704,398	760,750	915,841	4,644	109.79	7,602,310	10.79
FP&L	69,019	72,652	87,463	23,217	72.65	817,335	11.25
GA Power	394,209	413,919	456,865	15,748	149.40	4,967,033	12.00
JCP&L [a]	61,132	64,189	77,275	5,977	14.39	970,594	15.12
LADWP	356,048	395,609	476,260	6,201	43.78	6,354,354	16.06
LIPA	274,399	293,161	352,926	5,440	51.80	2,129,502	9.89
MidAm. IA	300,242	322,760	388,560	5,051	65.19	4,388,094	13.60
NG MA	745,560	782,838	942,432	4,670	117.42	6,861,313	8.76
NG NY [a d]	378,926	397,304	441,449	6,610	44.50	3,528,457	7.00
Nevada Power	129,656	134,609	165,286	5,956	25.02	1,289,552	9.58
OG&E	173,918	187,414	217,923	6,094	45.26	2,029,193	10.83
OH Edison	272,478	286,819	345,291	5,604	41.48	3,226,709	11.25
Oncor	171,225	182,620	219,850	22,550	58.83	2,865,784	16.00
PacifiCorp UT	211,726	230,839	268,417	10,551	47.09	3,209,666	11.00
PECO	324,001	349,889	479,300	8,608	50.60	2,565,442	7.29
PG&E	1,287,988	1,352,387	1,628,093	17,263	359.84	16,031,614	11.85

Utility	Net incremental electric savings at meter (MWh)	Net incremental electric savings at generator (MWh)	Gross incremental electric savings at generator (MWh)	2018 system peak demand (MW)	Net peak demand savings at generator (MW)	Net lifetime electric savings at generator (MWh)	Weighted average useful life (years)
PGE [a]	276,109	303,416	322,783	3,816	41.74	4,325,857	14.26
PPL	306,306	326,966	408,707	7,468	50.20	3,371,036	10.30
Duke Progress	289,508	305,066	324,539	15,322	56.70	2,416,463	6.60
PSE	249,129	261,586	314,914	4,206	—	3,443,001	13.16
PSE&G [a]	166,849	175,192	210,907	9,978	28.83	2,415,551	13.79
SCE	1,348,000	1,415,400	1,703,951	23,460	300.62	17,556,000	12.40
SCE&G	55,843	58,635	70,589	4,768	12.32	631,260	10.77
SDG&E	441,200	463,260	1,029,467	4,377	137.55	5,720,400	13.21
SRP [c]	593,425	624,658	752,004	7,305	122.86	4,145,748	11.25
TECO	38,758	40,696	48,992	4,044	9.13	372,641	20.00
We Energies [a]	187,488	202,487	324,498	5,615	25.61	2,975,628	15.00
West Penn	154,307	162,428	195,542	3,879	19.36	1,553,927	9.57
Xcel CO	422,719	453,854	492,784	6,649	75.29	5,925,098	12.90
Xcel MN	525,163	565,220	680,448	7,609	89.68	6,401,343	12.80

[a] Includes savings separately allocated from a third-party program administrator. [b] Data from EIA 2019d. [c] SRP achieves almost half of its savings from prepay electricity programs. For those savings, we apply a WAML of 1. For more information on prepay programs, see Sussman et al. 2018. [d] The WAML shown is specific to the utility itself. The third-party administrators (NYPA and NYSERDA) had WAMLs of around 15, which were accounted for in calculating lifetime savings for both NG NY and ConEd

Table B2. Energy efficiency (EE) spending data

Utility	Total EE program costs (without performance incentives)	Performance incentive costs	Total costs with performance incentives
AEP OH	$62,864,638		$62,864,638
AEP TC	$9,471,414	$3,459,596	$12,931,010
AL Power	$3,444,670		$3,444,670
Ameren IL [b]	$99,696,676		$99,696,676
Ameren MO	$66,483,135		$66,483,135
APS	$28,245,298		$28,245,298
BGE	$114,626,581		$114,626,581
CenterPoint	$17,566,004	$8,393,259	$25,959,263
ComEd	$352,988,361		$352,988,361
ConEd [a]	$187,493,628	$82,179	$187,575,807
Consumers	$117,838,710		$117,838,710
CPS	$44,471,193		$44,471,193
Dominion [b]	$52,662,000		$52,662,000
DTE	$106,629,458	$21,325,892	$127,955,350
Duke FL	$20,796,850		$20,796,850
Duke IN	$28,277,308		$28,277,308
Duke NC	$70,152,893	$23,353,377	$93,506,270
Duke OH	$32,134,301		$32,134,301
Duke SC	$23,441,393	$11,474,912	$34,916,305
Entergy AR	$45,905,331	$5,024,969	$50,930,300
Entergy LA	$1,637,661		$1,637,661
Eversource CT	$104,171,027		$104,171,027
Eversource MA	$266,403,945		$266,403,945
FP&L	$84,457,000		$84,457,000
GA Power	$45,757,118	$10,941,597	$56,698,715
JCP&L [a]	$25,327,197		$25,327,197
LADWP	$135,201,757		$135,201,757
LIPA	$71,724,487		$71,724,487
MidAm. IA	$63,804,277		$63,804,277
NG MA	$266,403,945		$266,403,945
NG NY [a]	$105,971,504		$105,971,504

Utility	Total EE program costs (without performance incentives)	Performance incentive costs	Total costs with performance incentives
Nevada Power	$19,204,887		$19,204,887
OG&E	$30,895,657	$5,413,590	$36,309,247
OH Edison	$30,597,049		$30,597,049
Oncor	$30,702,119	$7,774,182	$38,476,301
PacifiCorp UT	$42,028,572		$42,028,572
PECO	$61,127,000		$61,127,000
PG&E	$294,599,628		$294,599,628
PGE [a]	$85,681,659		$85,681,659
PPL	$53,162,395		$53,162,395
Duke Progress	$5,778,056	$52,592,900	$58,370,956
PSE	$91,086,596		$91,086,596
PSE&G [a]	$62,144,124		$62,144,124
SCE	$102,028,360	$95,378,644	$197,407,004
SCE&G	$13,585,912		$13,585,912
SDG&E	$82,155,060		$82,155,060
SRP	$37,168,928		$37,168,928
TECO	$14,925,900		$14,925,900
We Energies [a]	$55,824,164		$55,824,164
West Penn	$10,008,550		$10,008,550
Xcel CO	$70,439,157	$9,074,239	$79,513,396
Xcel MN	$77,210,688	$30,241,197	$107,451,885

[a] Includes spending separately allocated from a third-party program administrator.
[b] Data from EIA 2019b.

Table B3 shows whether each utility's data were originally reported as net or gross, at the meter or generator level, and what we assumed if this information was not available. The table also shows the NTGR and line loss factor used to adjust each utility's data as necessary. For utilities where an NTGR was not available, we utilized an NTGR of 83.1% to adjust figures as necessary. This is the average of NTGRs that were reported by utilities for the *2020 Utility Energy Efficiency Scorecard*. Where a line loss factor was not available, we used 5%, based on EIA data.

Table B3. Utility NTGR and line loss factor data

Utility	Data originally reported as net/gross	Data originally reported at meter/ generator	NTG ratio	Line loss factor
AEP OH	Gross	Meter	0.830	0.050
AEP TC	Gross	Meter	0.831	0.050
AL Power	Gross	Meter	0.831	0.050
Ameren IL	Net	Meter	0.760	0.111
Ameren MO	Net	Generator	0.831	0.050
APS	Gross	Generator	0.831	0.065
BGE	Gross	Meter	0.805	0.043
CenterPoint	Gross	Meter	0.831	0.050
ComEd	Net	Meter	0.910	0.110
ConEd	Gross	Generator	0.831	0.050
Consumers	Net	Meter	0.900	0.094
CPS	Net	Generator	0.831	0.050
Dominion	Gross	Meter	0.831	0.050
DTE	Net	Meter	0.920	0.068
Duke FL	Gross	Generator	0.830	0.063
Duke IN	Gross	Generator	0.870	0.080
Duke NC	Net	Generator	0.780	0.062
Duke OH	Gross	Generator	0.840	0.072
Duke SC	Net	Generator	0.780	0.062
Entergy AR	Net	Generator	0.831	0.050
Entergy LA	Gross	Generator	0.831	0.050
Eversource CT	Net	Meter	0.854	0.050
Eversource MA	Net	Meter	0.831	0.080
FP&L	Gross	Generator	0.831	0.050
GA Power	Net	Meter	0.906	0.050
JCP&L	Gross	Meter	0.831	0.050
LADWP	Gross	Generator	0.831	0.100
LIPA	Net	Generator	0.831	0.064
MidAm. IA	Gross	Meter	0.831	0.075
NG MA	Net	Meter	0.831	0.050
NG NY	Net	Meter	0.900	0.049
Nevada Power	Net	Meter	0.814	0.038

Utility	Data originally reported as net/gross	Data originally reported at meter/ generator	NTG ratio	Line loss factor
OG&E	Net	Meter	0.860	0.078
OH Edison	Gross	Generator	0.831	0.050
Oncor	Gross	Meter	0.831	0.067
PacifiCorp UT	Net	Generator	0.860	0.083
PECO	Gross	Meter	0.730	0.080
PG&E	Net	Meter	0.831	0.050
PGE	Gross	Generator	0.940	0.090
PPL	Gross	Meter	0.800	0.067
Duke Progress	Net	Generator	0.940	0.051
PSE	Gross	Meter	0.831	0.050
PSE&G	Gross	Meter	0.831	0.050
SCE	Net	Meter	0.831	0.050
SCE&G	Net	Meter	0.831	0.050
SDG&E	Net	Meter	0.450	0.050
SRP	Net	Generator	0.831	0.050
TECO	Gross	Meter	0.831	0.050
We Energies	Gross	Meter	0.624	0.080
West Penn	Gross	Generator	0.831	0.050
Xcel CO	Net	Generator	0.921	0.069
Xcel MN	Gross	Generator	0.831	0.071

Appendix C. Portfolio Comprehensiveness Data

Table C1. Portfolio comprehensiveness program definitions

Program name	Definition
Residential programs	
Appliance recycling	Removing less efficient appliances (typically refrigerators and freezers) from households.
Behavior-based/feedback	Reducing energy consumption through social science theories of behavior change by providing information to customers, by leveraging interpersonal interactions, or by providing consumer education. Excludes programs that rely on traditional program strategies such as incentives, rebates, or regulations.
Education	Providing education about energy efficiency to students, not including marketing programs.
Heat pump water heaters	Incentivizing the purchase of heat pump water heaters (and/or condensing gas heaters), either stand-alone or included as part of another program.
Home appliances	Incentivizing the sale, purchase, and installation of appliances (e.g., refrigerators, dishwashers, clothes washers, and dryers) that are more efficient than current standards.
Home retrofit	Combining a comprehensive energy assessment or audit that identifies energy savings opportunities with house-wide improvements in air sealing, insulation, and often, HVAC systems and other end uses.
HVAC equipment	Encouraging the sale/purchase and installation of heating, cooling, and/or ventilation systems at higher efficiency than current energy performance standards, across a broad range of unit sizes and configurations.
Learning thermostats	Increasing energy-efficient behaviors through smart thermostats. Includes learning thermostats, Wi-Fi enabled thermostats, grid-connected thermostats, and other smart thermostat programs.
Lighting	Encouraging the sale/purchase and installation of more efficient lighting in the home. These programs range from point-of-sale rebates to mailings or giveaways. Measures tend to be LED lamps, fixtures, and holiday lights and lighting controls, including occupancy monitors/switches and daylighting controls.
Multifamily	Encouraging the installation of energy efficiency measures in common areas, units, or both for residential structures of more than four units.
New construction	Providing incentives and possibly technical services to ensure new homes are built or manufactured to energy performance standards higher than applicable code.
Commercial and industrial programs	
Agriculture	Offering incentives for energy-efficient farm- and orchard-based equipment such as irrigation pumping.
CHP	Acquiring cost-effective combined heat and power in a way similar to the acquisition of other energy efficiency resources, such as through incentives for feasibility studies, installed capacity, or energy output.
Custom	Delivering site-specific industrial and commercial projects typically characterized by an extensive onsite energy assessment and identification and installation of multiple measures unique to that facility.
Efficient motor systems	Incentivizing improvements to motor systems, including installation of adjustable-speed drives, optimization of pump and fan systems, and compressed air system controls.

Program name	Definition
HVAC	Encouraging the sale/purchase and installation of heating, cooling, and/or ventilation systems at higher efficiency than current energy performance standards, across a broad range of unit sizes and configurations.
Kitchen and restaurants	Offering energy-efficient measures for commercial food service equipment.
Lighting	Incentivizing the installation of efficient lighting including high-efficiency lamps and fixtures.
Lighting system and control	Incentivizing lighting occupancy monitors/switches and daylighting controls.
Retrocommissioning	Diagnosing energy consumption in a commercial facility and optimizing its operations to minimize energy waste. Program activities tend to be characterized by tuning or retuning, and coordinating and testing the operation of existing end uses, systems, and equipment for energy-efficient operation.
Small business	Offering energy-efficient measures to retail, grocery, small offices, convenience stores, and other nonresidential customers with electric demand below 100 kW. Can include direct install or other delivery models.
Strategic energy management	Managing energy through continual improvement and a systematic approach to energy performance, including a commitment through policies, goals, and allocation of resources; energy management planning and implementation; and a system for measuring and reporting performance.
Upstream programs	Programs that transform the market for energy efficiency products by targeting upstream manufacturers and partners to improve choices and reduce costs for consumers.
Whole building retrofit	Combining a comprehensive energy assessment or audit that identifies energy savings opportunities with building-wide improvements in air sealing, insulation, and often, HVAC systems and other end uses.

Table C2. Residential program types by utility

Utility	Appliance recycling	Behavior -based	Education	Home appliances	Home retrofit	Heat pump water heaters	HVAC equipment	Lighting	Learning thermostats	Multifamily	New construction	Total
AEP OH	•	•	•	•	•	•	•	•	•	•	•	11
AEP TC					•	•	•				•	4
AL Power	•		•	•		•		•	•			6
Ameren IL	•	•	•		•		•	•	•	•		8
Ameren MO	•	•		•		•	•	•	•	•	•	9
APS		•			•	•	•		•	•	•	7
BGE	•	•		•	•	•	•	•	•	•	•	10
CenterPoint					•		•	•		•	•	5
ComEd	•	•	•	•	•	•	•	•		•	•	10
ConEd	•	•	•	•		•	•	•	•	•	•	10
Consumers	•	•	•	•	•		•	•	•	•	•	10
CPS		•	•		•		•	•	•	•	•	8
Dominion												—
DTE	•	•	•	•	•		•	•	•	•	•	10
Duke FL		•			•		•			•	•	5
Duke IN		•	•		•	•	•	•		•		7
Duke NC		•	•		•	•	•	•	•	•	•	9
Duke OH		•	•		•	•	•	•	•	•		8
Duke SC		•	•		•	•	•	•	•	•	•	9

Utility	Appliance recycling	Behavior -based	Education	Home appliances	Home retrofit	Heat pump water heaters	HVAC equipment	Lighting	Learning thermostats	Multifamily	New construction	Total
Entergy AR		•		•	•	•	•	•	•	•		8
Entergy LA			•	•	•	•	•	•	•	•		8
Eversource CT		•	•	•	•	•	•	•	•	•	•	10
Eversource MA	•	•	•	•	•	•	•	•	•	•	•	11
FP&L					•		•				•	3
GA Power	•	•	•		•	•	•	•	•	•	•	10
JCP&L	•			•	•	•	•	•	•	•		8
LADWP	•		•	•	•		•	•	•	•	•	9
LIPA	•	•		•	•	•	•	•	•			8
MidAm. IA	•	•	•	•	•	•	•	•		•	•	10
NG MA	•	•		•	•	•	•	•	•	•	•	10
NG NY	•	•	•	•		•	•	•	•	•	•	10
Nevada Power		•	•		•		•		•	•	•	7
OG&E			•		•		•	•		•	•	6
OH Edison	•	•	•	•	•	•	•	•	•	•		10
Oncor				•	•		•	•		•		5
PacifiCorp UT				•			•	•				3
PECO	•	•	•	•	•	•	•	•	•	•	•	11

Utility	Appliance recycling	Behavior -based	Education	Home appliances	Home retrofit	Heat pump water heaters	HVAC equipment	Lighting	Learning thermostats	Multifamily	New construction	Total
PG&E		•	•	•	•	•	•	•	•	•	•	10
PGE		•	•		•	•	•	•	•	•	•	9
PPL	•	•	•	•	•	•	•	•	•	•	•	11
Duke Progress		•	•		•	•	•	•	•	•	•	9
PSE	•			•	•	•	•	•	•	•	•	9
PSE&G	•	•		•	•	•	•	•	•	•		9
SCE		•		•	•		•	•		•	•	7
SCE&G	•	•					•	•				4
SDG&E		•	•	•	•	•	•	•	•	•	•	10
SRP		•			•		•	•	•	•	•	7
TECO		•	•		•		•			•	•	6
WE Energies	•	•	•	•	•	•	•	•	•	•	•	11
West Penn	•			•	•	•	•	•			•	7
Xcel CO	•	•	•	•	•	•	•	•	•	•	•	11
Xcel MN	•	•	•	•	•		•	•	•	•	•	10
Total	27	39	32	32	45	34	50	45	37	44	38	

In states with statewide program administrators, we counted program types offered by administrators for the utilities in that state.

Table C3. Commercial and industrial program types by utility

Utility	Agriculture	CHP	Custom	Efficient motor systems	HVAC	Kitchens and restaurants	Lighting	Lighting system and control	Retrocommis-sioning	Small business	Strategic energy manage-ment	Upstream programs	Whole building retrofit	Total
AEP OH		•	•	•	•	•	•	•	•	•	•	•	•	12
AEP TC			•							•			•	3
AL Power	•		•		•	•	•	•	•				•	8
Ameren IL	•	•	•	•	•	•	•	•	•	•	•			11
Ameren MO			•	•	•	•	•	•	•	•				8
APS	•	•	•	•	•		•	•	•	•		•	•	11
BGE	•	•	•	•	•	•	•	•	•	•	•		•	12
CenterPoint			•	•	•		•	•	•			•		7
ComEd		•	•	•	•	•	•	•	•	•	•	•		11
ConEd			•		•	•	•			•			•	6
Consumers	•		•	•		•	•	•	•	•	•		•	10
CPS			•	•	•	•	•		•	•	•		•	9
Dominion					•			•		•				3
DTE	•		•	•	•	•	•	•	•	•	•	•		11
Duke FL			•	•	•	•				•		•	•	7
Duke IN	•		•	•	•	•	•	•	•	•	•	•	•	12
Duke NC		•	•	•	•	•	•	•	•	•	•	•		11
Duke OH	•	•		•	•	•	•	•	•	•		•	•	11
Duke SC		•	•	•	•	•	•	•	•	•	•	•		11
Entergy AR	•		•		•		•	•		•				6

Utility	Agriculture	CHP	Custom	Efficient motor systems	HVAC	Kitchens and restaurants	Lighting	Lighting system and control	Retrocommis-sioning	Small business	Strategic energy manage-ment	Upstream programs	Whole building retrofit	Total
Entergy LA			•	•	•	•	•	•	•	•	•		•	10
Eversource CT	•	•	•	•	•	•	•	•	•	•	•	•	•	13
Eversource MA	•	•	•	•	•	•	•	•	•	•	•	•	•	13
FP&L		•	•		•		•							4
GA Power	•		•	•	•	•	•	•		•		•	•	10
JCP&L		•	•	•	•	•	•	•		•			•	9
LADWP	•		•	•	•	•	•	•	•	•	•	•	•	12
LIPA		•	•	•	•		•	•		•		•	•	9
MidAm. IA	•	•	•	•	•	•	•	•	•	•	•	•	•	13
NG MA		•	•	•	•	•	•	•	•	•	•		•	11
NG NY	•		•	•	•	•	•	•	•	•		•	•	11
Nevada Power	•		•	•	•	•	•	•	•	•	•		•	11
OG&E			•	•	•	•	•	•	•	•	•	•	•	11
OH Edison		•	•		•	•	•		•	•			•	8
Oncor			•	•	•		•	•		•				6
PacifiCorp UT	•		•	•	•	•	•			•	•	•		9
PECO		•	•	•	•	•	•	•	•	•	•	•	•	12
PG&E	•		•	•	•	•	•		•	•	•	•	•	11
PGE	•	•	•	•	•	•	•	•	•	•	•	•	•	13

Utility	Agriculture	CHP	Custom	Efficient motor systems	HVAC	Kitchens and restaurants	Lighting	Lighting system and control	Retrocommis-sioning	Small business	Strategic energy manage-ment	Upstream programs	Whole building retrofit	Total
PPL	•	•	•	•	•	•	•	•	•	•	•	•		12
Duke Progress		•	•	•	•	•	•	•	•	•	•			10
PSE			•	•	•	•	•			•	•	•	•	9
PSE&G	•	•	•	•	•		•	•		•	•		•	10
SCE	•				•	•			•		•			5
SCE&G			•	•	•	•	•	•	•	•			•	9
SDG&E	•		•	•	•	•	•	•	•	•	•	•	•	12
SRP			•		•		•			•				4
TECO		•	•	•	•		•	•					•	7
WE Energies	•	•	•	•	•	•	•	•	•	•	•	•	•	13
West Penn	•		•		•	•	•						•	6
Xcel CO	•		•	•	•	•	•	•	•	•	•			10
Xcel MN			•	•	•	•	•	•	•	•	•	•	•	11
Total	26	23	49	42	50	41	48	40	36	46	31	27	35	

In states with statewide program administrators, we counted program types offered by administrators for the utilities in that state.

Appendix D. Emerging Areas Data

Table D1. Emerging areas by utility

Utility	Advanced space-heating heat pumps	Commercial and industrial geo-targeting	Conservation voltage reduction (CVR) or volt/var optimization (VVO)	Data centers	Energy-efficient fuel switching	Energy use feedback to consumers in real time	Grid-interactive efficient buildings	High-efficiency ceiling fans	High-efficiency consumer electronics (residential)	High-efficiency residential clothes dryers	Midstream programs	Programs using data disaggregation	Quality HVAC installation	Reduction of plug and other miscellaneous load in commercial buildings	Residential geo-targeting	Zero energy buildings	Pilot programs	Total
AEP OH			•	•		•		•				•					•	6
AEP TC														•			•	2
AL Power									•				•				•	3
Ameren IL			•	•							•							3
Ameren MO	•			•														2
APS			•	•		•						•	•				•	6
BGE	•		•	•		•		•			•	•	•	•			•	10
Center Point				•	•						•						•	4
ComEd	•		•	•		•			•	•	•	•		•			•	10
ConEd		•		•					•		•				•	•	•	7
Consu-mers		•		•		•	•	•			•			•	•	•	•	10
CPS			•			•	•				•						•	5
Dominion	•																	1
DTE		•		•		•			•	•	•	•		•	•		•	10

Utility	Advanced space-heating heat pumps	Commercial and industrial geo-targeting	Conservation voltage reduction (CVR) or volt/var optimization (VVO)	Data centers	Energy-efficient fuel switching	Energy use feedback to consumers in real time	Grid-interactive efficient buildings	High-efficiency ceiling fans	High-efficiency consumer electronics (residential)	High-efficiency residential clothes dryers	Midstream programs	Programs using data disaggregation	Quality HVAC installation	Reduction of plug and other miscellaneous load in commercial buildings	Residential geo-targeting	Zero energy buildings	Pilot programs	Total
Duke FL			•	•														2
Duke IN											•							1
Duke NC			•	•							•		•					4
Duke OH													•					1
Duke SC			•	•							•		•					4
Entergy AR											•		•	•			•	4
Entergy LA									•								•	2
Eversource CT	•	•		•	•		•		•	•	•		•	•	•	•	•	13
Eversource MA		•	•	•	•	•	•		•	•	•	•	•	•		•	•	14
FP&L																		—
GA Power				•		•			•		•			•			•	6
JCP&L										•				•			•	3
LADWP	•		•	•		•		•	•	•	•	•	•	•		•	•	13
LIPA											•		•					2
MidAm. IA	•	•		•		•		•	•				•	•			•	9
NG MA	•	•	•				•	•	•	•	•		•	•	•	•	•	13

Utility	Advanced space-heating heat pumps	Commercial and industrial geo-targeting	Conservation voltage reduction (CVR) or volt/var optimization (VVO)	Data centers	Energy-efficient fuel switching	Energy use feedback to consumers in real time	Grid-interactive efficient buildings	High-efficiency ceiling fans	High-efficiency consumer electronics (residential)	High-efficiency residential clothes dryers	Midstream programs	Programs using data disaggregation	Quality HVAC installation	Reduction of plug and other miscellaneous load in commercial buildings	Residential geo-targeting	Zero energy buildings	Pilot programs	Total
NG NY	•			•	•	•		•	•		•	•	•	•	•	•	•	13
Nevada Power	•		•	•			•				•	•	•	•			•	9
OG&E	•	•	•						•		•		•		•		•	8
OH Edison				•					•	•	•							4
Oncor				•							•							2
PacifiCorp UT									•									1
PECO	•	•		•	•	•			•	•	•	•		•	•			11
PG&E									•	•	•		•	•	•	•	•	8
PGE		•	•	•		•	•	•	•	•	•	•		•	•	•	•	14
PPL					•			•	•		•						•	5
Duke Progress			•	•							•		•					4
PSE	•				•						•			•			•	5
PSE&G										•				•			•	3
SCE			•	•		•	•					•						5
SCE&G									•						•			2
SDG&E	•			•		•							•	•		•	•	7

Utility	Advanced space-heating heat pumps	Commercial and industrial geo-targeting	Conservation voltage reduction (CVR) or volt/var optimization (VVO)	Data centers	Energy-efficient fuel switching	Energy use feedback to consumers in real time	Grid-interactive efficient buildings	High-efficiency ceiling fans	High-efficiency consumer electronics (residential)	High-efficiency residential clothes dryers	Midstream programs	Programs using data disaggregation	Quality HVAC installation	Reduction of plug and other miscellaneous load in commercial buildings	Residential geo-targeting	Zero energy buildings	Pilot programs	Total
SRP				•		•												2
TECO		•		•							•		•	•				5
WE Energies		•		•		•			•		•						•	6
West Penn										•			•					2
Xcel CO				•					•	•	•		•				•	6
Xcel MN				•					•	•	•		•				•	6
Total	14	12	17	32	7	18	8	9	23	15	33	12	23	22	11	10	32	

In states with statewide program administrators, we counted program types offered by administrators for the utilities in that state.

Appendix E. Pilot Programs

Table E1. Pilot programs data

Utility	Pilot program names
AEP OH	Marketplace, EV DR, Automated Benchmarking, High-Performance HW Circulation Pumps, Business Behavior, Domestic Hot Water DR
AEP TC	Residential Pool Pump Pilot Market Transformation Program (MTP)
AL Power	
Ameren IL	
Ameren MO	
APS	Energy and Demand Education, Storage Rewards Battery Storage, Reserve Rewards Connected Heat Pump Water Heater, Cool Rewards Smart Thermostat DR
BGE	Smart Home, Small Business Energy Advance
CenterPoint	Smart Thermostat
ComEd	Business: Variable Speed Drive Energy Savings in Refrigeration Condensers, Smart Building Operations Residential: Ductless Heat Pump and Building Envelope, HVAC SAVE, Nest Seasonal Savings (Cooling Season), Nest Seasonal Savings (Heating Season), Total Connected Savings Wi-Fi Thermostat Optimization (Cooling Season), I Total Connected Savings Wi-Fi Thermostat Optimization (Heating Season)
ConEd	New Movers, Sealed Residential Financing, Building Energy Performance Program, Instant Lighting, BYOD for Wi-Fi enabled Air Conditioners, Energy Star Retail Products Platform, Propel Fresh EBT
Consumers	Residential: Energy Savers Club (nonwires alternative), Pay My Way, HVAC System Monitoring Business: Advanced Lighting Controls, Condensing Rooftop Units, Commercial Real Estate, Energy Smart Grocery, Energy Efficiency Training Center, Green Revolving Fund, Market Place, Smart Vent Zoning, and Zero Net Energy
CPS	Volt/Var Optimization
Dominion	
DTE	HVAC Tune-Up, Heat Pump Dryers, Energy Star Retail Products Platform, Manufactured Homes, Multifamily Low-Income, Non-Wire Alternative, New Home Construction, Home Energy Management with DTE Insight, DTE Insight, Strategic Energy Management, E-Challenge 3, Rooftop Unit Market Assessment, Mid-Stream HVAC, Retro-Commissioning, New Commercial Energy Codes
Duke FL	
Duke IN	
Duke NC	
Duke OH	
Duke SC	
Entergy AR	Make Your Thermostat Pay
Entergy LA	Manufactured Homes
Eversource CT	Residential Demand Response (Wi-Fi Thermostats, Smart Plugs, Pool Pumps) and Commercial Demand Response (HVAC Controls); Residential Heat-Pump

Utility	Pilot program names
Eversource MA	On-site Facility Training, High Performance Labs, Equipment & Systems Performance Optimization (ESPO)
FP&L	
GA Power	Water Heater Demand Response, Bring Your Own Thermostat, Small Commercial Behavioral, Smart Home, Whole Building Data Aggregation, Low-Income Multifamily, Indoor Agriculture
JCP&L	
LADWP	Whole Building Multifamily Program, AC Recycling Program, Energy Efficiency Kits
LIPA	
MidAm. IA	Air Sealing and Infiltration for Multifamily Buildings, Small Business Lighting
NG MA	Called Demonstration Projects in MA: Residential & C&I Demand Response
NG NY	
Nevada Power	Residential: Ultra-High SEER Air Conditioners, Strategic Installation of Advanced Windows Films, Energy Saving R-22 Refrigerant Replacements and Alternate Solutions, Improved Mechanical Ventilation Retrofits, Low-Cost Home Energy Monitoring Sensors, Low-Income Multi-Family Building Packaged Retrofits Commercial: Air Side Economizer Control Retrofits for HVAC Rooftop Units, LED Lighting for Indoor Agriculture, Thermal Energy Storage Solutions Assessment, (continued from prior years) Enbala Demand Management Trial, which focused on achieving fast-acting demand response resources from industrial and large commercial customers
OG&E	Residential and Commercial Geo Targeting
OH Edison	
Oncor	
PacifiCorp UT	
PECO	
PG&E	Numerous pilots in 2018
PGE	Numerous pilots in 2018
PPL	Student Energy Efficient Education Program: Take Action Pilot (augmented reality app); Innovation Pilot (Tier 2 smart strips)
Duke Progress	
PSE	Business: Pay for Performance
PSE&G	
SCE	
SCE&G	
SDG&E	
SRP	
TECO	
We Energies	Seasonal Savings Pilot and Midstream Commercial Equipment Pilot
West Penn	

Utility	Pilot program names
Xcel CO	Thermostat Optimization, Energy Star Retail Products Platform
Xcel MN	Energy Star Retail Products Platform Pilot (ESRPP) and Energy Information Systems Pilot

Blanks indicate that the utility ran no pilots in 2018 or we could not find pilot names. See Appendix D for detailed information on which utilities ran pilots in 2018.

Appendix F. Electric Vehicle Data

Table F1. Electric vehicle data

Utility	Promotion of charging rate, not EV-specific (1=yes; 0=no)	Rate type	EV-specific rate (1=yes; 0=no)
AEP OH	0		0
AEP TC	0		0
AL Power	1	TOU PEV rider	1
Ameren IL	0		0
Ameren MO	0		0
APS	1	Time-of-use plan	0
BGE	1	EV TOU	1
CenterPoint	0		0
ComEd	0		0
ConEd	0	EV TOU	1
Consumers	1	EV TOU	1
CPS	0		0
Dominion	1		1
DTE	0	Plug-in EV TOU	1
Duke FL	0		0
Duke IN	0		0
Duke NC	0		0
Duke OH	0		0
Duke SC	0		0
Entergy AR	0		0
Entergy GS	0		0
Entergy LA	0		0
Eversource CT	0	EV rate rider	1
Eversource MA	1		0
FP&L	1	TOU	0
GA Power	1	Plug-in EV TOU	1
JCP&L	0		0
LADWP	1	Off-peak discount	1
LIPA	0		0
MidAm IA	1	TOU	0
NG MA	0		0

Utility	Promotion of charging rate, not EV-specific (1=yes; 0=no)	Rate type	EV-specific rate (1=yes; 0=no)
NG NY	1	EV recharge rider	1
Nevada Power	1	EV recharge rider	1
OG&E	1	Smart hours TOU	0
OH Edison	0		0
Oncor	0		0
PacifiCorp UT	1	Plug-in TOU	1
PECO	1		0
PG&E	1	Time-of-use service plug-in electric vehicle	1
PGE	1	EV TOU	1
PPL	0		0
Duke Progress	0		0
PSE	0		0
PSE&G	0		0
SCE	1	EV TOU	1
SCE&G	0		0
SDG&E	1	EV TOU	1
SRP	0	EV TOU	1
TECO	0		0
We Energies	1	TOU	0
West Penn	0		0
Xcel CO	1	TOU	0
Xcel MN	1	EV rate plan	1

Appendix G. Evaluation, Measurement, and Verification Data

Table G1. EM&V data

Utility	Oversight organization	Independent	Net savings	Net savings factors
AEP OH	Third-party evaluation team retained by PUCO (no recent evaluations)	0	0	
AEP TC	Third-party evaluation team retained by PUCT	1	0	
AL Power		0	0	
Ameren IL	Working group	1	1	Free riders, spillover
Ameren MO	Third-party evaluation team retained by PUCT	1	1	Free riders, spillover
APS	Commission oversight	1	0	Free riders, spillover
BGE	PUC oversight	1	1	Free riders, spillover
CenterPoint	Third-party evaluation team retained by PUCT	1	1	
ComEd	Working group	1	1	Free riders, spillover
ConEd	Advisory group	1	1	Free riders, spillover
Consumers	Advisory group	1	1	Free riders, spillover
CPS		0	1	Free riders, spillover
Dominion		0	1	Free drivers, free riders, standards
DTE	Advisory group	1	1	Free riders, spillovers
Duke FL		0	0	
Duke IN	PUC oversight	1	1	Free riders
Duke NC	Oversight committee	1	1	Free riders, spillover
Duke OH	Third-party evaluation team retained by PUCT	1	1	Free riders, spillover
Duke SC	Oversight committee	1	1	Free riders, spillover
Entergy AR	Third-party evaluation team retained by PUCT	1	1	Free riders, spillover
Entergy LA		0	1	
Eversource CT	Energy efficiency evaluation committee	1	1	
Eversource MA	Massachusetts Energy Efficiency Advisory Council	1	1	Free riders, spillover, market effects
FP&L		0	0	
GA Power	Working group	1	1	
JCP&L	PUC and state agency oversight	1	0	

Utility	Oversight organization	Independent	Net savings	Net savings factors
LADWP	California Energy Commission	1	1	
LIPA		0	1	Free riders, spillover
MidAm. IA		0	0	
NG MA	Massachusetts Energy Efficiency Advisory Council	1	1	Free riders, spillover, market effects
NG NY	Advisory group	1	1	Free riders, spillover
Nevada Power	PUCN	1	1	Free riders, spillover
OG&E	Third-party evaluation team retained by PUCT	1	1	Free riders, spillover
OH Edison	Third-party evaluation team retained by PUCT	1	0	
Oncor	Third-party evaluation team retained by PUCT	1	0	
PacifiCorp UT	Advisory group	1	1	Free riders, spillover
PECO	Statewide evaluator	1	1	Free riders, spillover, market effects, codes and standards
PG&E	CPUC	1	1	Free riders, spillover, market effects
PGE	Energy Trust of Oregon	1	1	Common practice baseline
PPL	Statewide evaluator	1	1	Free riders, spillover, market effects, codes and standards
Duke Progress	Oversight committee	1	1	Free riders, spillover
PSE	Northwest Power and Conservation Council	1	0	
PSE&G	PUC and state agency oversight	1	0	
SCE	CPUC	1	1	Free riders, spillover, market effects
SCE&G	Oversight committee	1	1	
SDG&E	CPUC	1	1	Free riders, spillover, market effects
SRP		0	0	
TECO		0	0	
WE Energies	Focus on Energy and PSC oversight	1	1	Free riders, spillover
West Penn	Statewide evaluator	1	1	Free riders, spillover, market effects

Utility	Oversight organization	Independent	Net savings	Net savings factors
Xcel CO		0	1	Free riders, spillover
Xcel MN		0	1	Free riders, spillover

Appendix H. Respondents to Utility and Administrator Data Requests and External Review Request

Table H1. Respondents to utility data requests and external review request

Utility	Primary data request respondent
AEP OH	Andy McCabe, Manager of Business Programs Brian Billing, Compliance Manager
AEP TC	Robert Cavazos, Manager, Energy Efficiency/Consumer Programs
AL Power	Brandi Hurst, Programs Manager Stevie Searcy, Marketing Product Manager
Ameren IL	Ken Woolcutt, Managing Supervisor, Energy Efficiency
Ameren MO	Gary Krautwurst, Program Scheduler and Cost Controller Greg Lovett, Manager Energy Services
APS	Roger Krouse, DSM Program Manager
BGE	Douglas Gargano, Senior Business Analyst, BGE Measurement and Verification, and Analytics
CenterPoint	Shea Richardson, Compliance Manager, Energy Efficiency
ComEd	David Pautlitz, Manager, Billing Jordan Russe Thomas, Business Analyst, Energy Efficiency
ConEd	Alexander Buell, Department Manager, Energy Efficiency Strategy & Planning Christopher Puckart, Section Manager, Financial Planning & Analysis and Financial Controls David Donovan, Senior Analyst Don Johnson, Senior Specialist, Strategy and Planning Energy Efficiency and Demand Management
Consumers	Theodore Ykimoff, Director of Energy Efficiency
CPS	Julie Cain, Program Manager, Residential Demand Response and Energy Efficiency Justin Chamberlain, Manager, Demand Response and Energy Efficiency
Dominion	Michael Hubbard, Manager, Energy Conservation Selma Cosic, New Technology and Energy Conservation
DTE	Jason Kupser, Manager, EWR Strategy, EM&V and Demand Response Kevin Bilyeu, Principal Supervisor, Energy Efficiency Strategy Christopher Payne, CPA, Energy Efficiency
Duke Energy	Melissa Adams, Manager, Regulator Filings and Analysis

Utility	Primary data request respondent
Entergy AR	Gabe Munoz, Manager, Energy Efficiency Tondra Jeter, Project Manager, Distribution
Entergy LA	Andrew Owens, Director of Regulatory Policy
Eversource CT	Karlyn Lempa, Senior Analyst, Energy Efficiency Stephen Bruno, Manager, Energy Efficiency
Eversource MA	Brandy Chambers, Senior Analyst, Energy Efficiency Brian Greenfield, Policy Analyst, Energy Efficiency Michael Goldman, Manager, Energy Efficiency Planning and Evaluation
GA Power	Andrea Sieber, Regulatory Manager, Energy Efficiency Jeff Smith, Manager, Energy Efficiency Lea Clanton, Renewable Energy Planning Shani Marrow, Marketing Representative Sammie McDearis, Reporting Analyst, Energy Efficiency Jody Morris
LADWP	Craig Tranby, Environmental Supervisor
LIPA	Ashley Kaleita, Business Management Associate, Energy Efficiency Jossi Fritz-Mauer, Lead Program Support Analyst, Energy Efficiency and Renewable Energy
MidAm. IA	David McCammant, Energy Efficiency Product Manager
NG MA	Marie Abdou, Lead Analyst, Policy and Evaluation Steven Menges, Senior Strategy and Policy Analyst, Customer Energy Management
NG NY	Ken Chan, Energy Reporting Lead Analyst Matt Manzo, Product Reporting
NJ BPU	Jessica Brand, Program Administrator, Energy Efficiency
NPC	Alebachew Yimer, DSM Planning Specialist Kimberly Lukasiak, DSM Policy and Compliance Manager Patricia Rodriguez, DSM Director Sarah Chatterjee, Renewable Energy Program Director
NYSERDA	Robert Bergen, Project Manager
NYPA	Shunaid Memon, Manager, Business Systems
OG&E	Donney Dorton, EM&V Specialist Randy Warren, Manager
Ohio Edison	Rachel Oliver, Associate Business Analyst, Energy Efficiency Compliance and Reporting
Oncor	Bruce Blackburn, Program Manager

Utility	Primary data request respondent
Oregon Housing and Community Services	Dan Elliot, Senior Policy Analyst
PacifiCorp UT	Michael Snow, Manager, DSM Regulatory Affairs
PECO	Maria Mancuso, Senior Business Analyst Marina Geneles, EM&V Lead
PG&E	Jose Leal-Alcantar Ryan Chan, Energy Efficiency Policy Manager
PGE	Brendan McCarthy, Government Affairs Analyst Jason Salmi Klotz, Manager, Emerging Technology
PPL	Dirk Chiles, Supervisor Customer Programs Measurement and Verification Mike Stanz, Senior Energy Efficiency Consultant
PSE	Jim Perich-Anderson, Senior Market Analyst
PSE&G	Tim Fagan, Manager
SCE	Jose Monterroso, Regulatory Affairs and Compliance, Senior Specialist
SCE&G	John Raftery, Director, Rates and Regulatory Sheryl Shelton, Manager, DSM Administrative Therese Griffin, Manager, Energy Efficiency and Demand Management
SDG&E	Brittney Lee, Regulatory Case Administrator Kristina Miller, Senior Business Analyst