The Edison Foundation
INSTITUTE for ELECTRIC INNOVATION

Report

Electric Company Smart Meter Deployments: Foundation for a Smart Grid (2019 Update)

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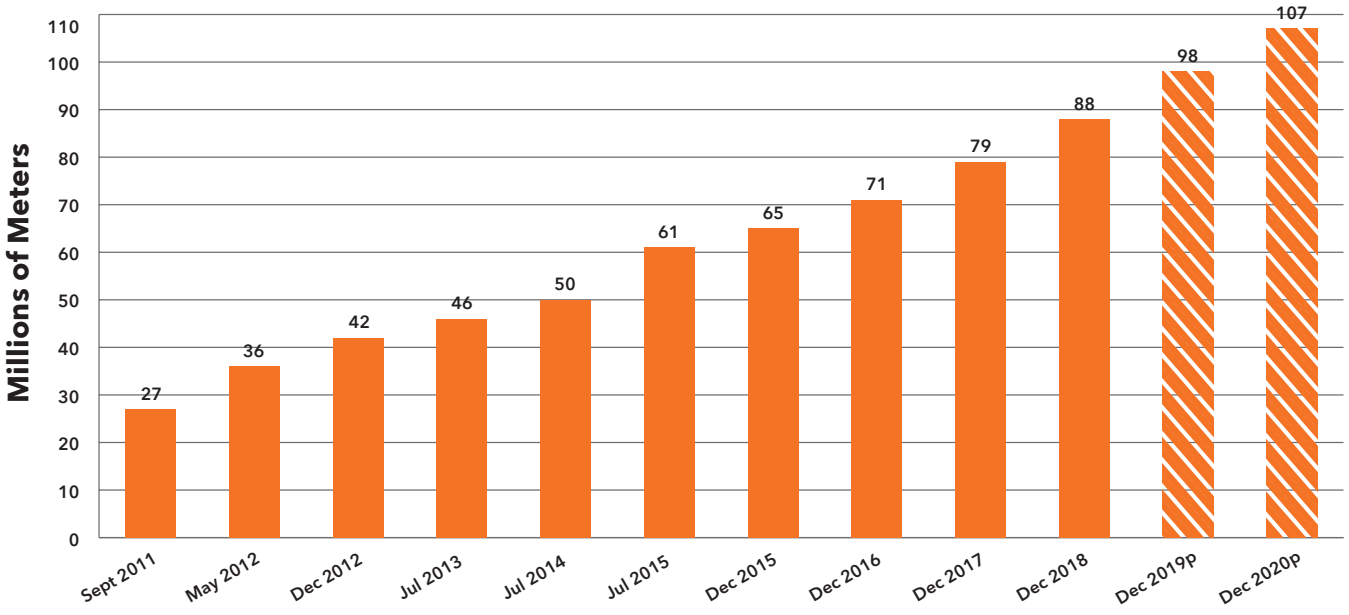
EXECUTIVE SUMMARY

The transition of the electric power system is underway, and smart meters continue to be a key technology that enables customer services and communications and enhanced energy grid operations.[1] Investing in the distribution grid, particularly in smart meters, is the foundation for a customer-facing, modern energy grid. While deployment of smart meters began more than a decade ago, electric companies continue to find ways to create value from the data and capabilities smart meters enable.[2]

In this report, we discuss some of the innovations, benefits, and capabilities enabled by smart meters; summarize the current status and projected number of smart meters installed nationwide; and, provide our perspective on the growing importance of investing in the distribution grid.

As shown in Figure 1, smart meter installations have grown dramatically since 2011. As of year-end 2018, electric companies had installed more than 88 million smart meters, covering nearly 70 percent of U.S. households. Based on survey results and approved plans, estimated deployments are expected to reach 98 million smart meters by the end of 2019 and 107 million by year-end 2020.

Figure 1: U.S. Smart Meter Installations Approach 98 Million; Projected to Reach 107 Million by December 2020



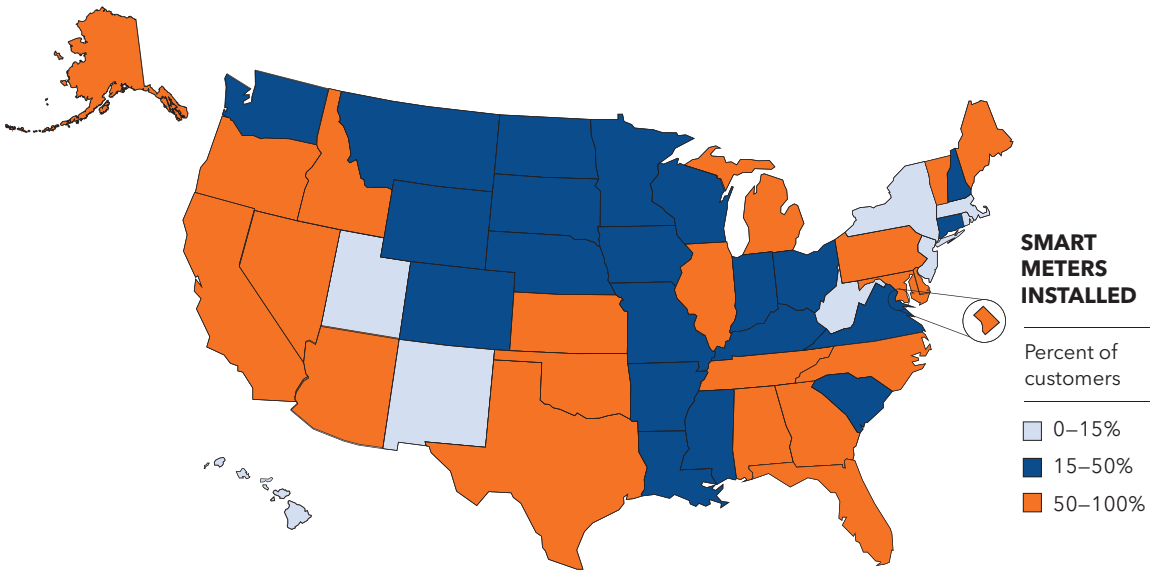
1. Smart meters, or advanced metering infrastructure (AMI), are digital meters that measure and record electricity usage data hourly, or more frequently, and allow for two-way communication between electric companies and their customers.
2. For the purposes of this report, the electric power industry includes investor-owned electric companies, public power utilities, electric cooperatives, and federal utilities. We use the term 'electric companies' in this report to encompass all of these industry segments.

HIGHLIGHTS

Electric companies across the United States are leveraging smart meter data to better monitor the health of the energy grid, more quickly restore electric service when outages occur, integrate distributed energy resources (DERs), and deliver energy solutions to customers. Figure 2 shows smart meter deployments by state through 2018.

- Electric companies have installed more than 88 million smart meters, covering nearly 70 percent of U.S. households, as of year-end 2018.
- Deployments are estimated to reach 98 million smart meters by the end of 2019 and 107 million by year-end 2020.
- More than 50 investor-owned electric companies in the United States have fully deployed smart meters.[3]
- Electric companies are using smart meter data to provide customer solutions, to enhance grid resiliency and operations, and to support electric company planning, rate design, and DER integration.
- Smart meters provide a digital link between electric companies and their customers by opening the door to new and expanded services, such as smart home energy management, load control, budget billing, usage alerts, outage notifications, and time-varying pricing.
- Smart meters enable two-way power and information flows that improve visibility into the energy grid.
- Electric companies are focused on modernizing the energy grid and are projected to invest more than $39 billion in the distribution system alone in 2019 (out of a projected $135.6 billion total investments).[4]

Figure 2. Smart Meter Deployments by State, 2018 (% of Customers)



3. Table 2 provides an in-depth list of smart meter deployments by electric company. Table 3 provides smart meter counts by state. Table 4 provides a listing of the companies that have fully deployed meters.
4. EEI Industry Capital Expenditures with Functional Detail (October 2019).

INTRODUCTION

Smart meters are the building blocks of a digital energy grid and are the foundation for a smart grid. Electric companies have installed more than 88 million smart meters as of year-end 2018, covering nearly 70 percent of U.S. households. Based on approved plans, completed and ongoing deployments, and proposals before state regulatory commissions, 98 million smart meter are estimated to be in place at the end of 2019 and 107 million by year-end 2020.

- Table 1 provides a summary of smart meter installations and projected deployments.
- Table 2 provides an in-depth list of smart meter deployments by electric company.
- Table 3 provides smart meter counts by state.
- Table 4 provides a listing of the more than 50 companies that have fully deployed meters.

This report highlights how electric companies are using smart meter data and underlying communications systems to provide customer solutions, enhance grid resiliency and operations, and support other efforts such as rate design and distributed energy resource (DER) adoption.

ENHANCING CUSTOMER SOLUTIONS IN MOMENTS THAT MATTER

Smart meters provide a digital link between electric companies and their customers that opens the door to new or expanded customer solutions. This section provide examples and describes how smart meter data and analytics are helping electric companies to communicate and engage with customers during moments that matter and to provide personalized services and insights.

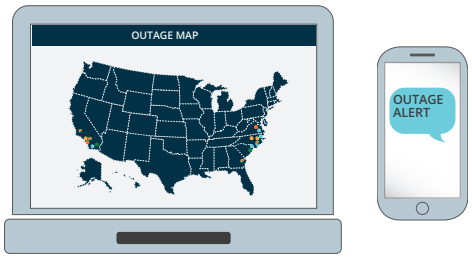
Proactive Outage Communications

Smart meters help to notify customers if their power is out, provide an estimated time to restore service, and deliver a final notice when the power is back on.

- As of 2018, more than 1.4 million customers in the Houston area were enrolled in **CenterPoint Energy's** Power Alert Service (PAS). Using data collected through smart meters to pinpoint addresses affected by power outages, PAS notifies customers within minutes of confirmed outages. The PAS notifications include the estimated time of restoration, status of repair crews, number of affected customers, and outage cause, helping to keep customers informed throughout the outage restoration process. Surveys of PAS enrollees in 2018 consistently showed customer satisfaction around 92 percent with only 5 percent of PAS enrollees calling in to report an outage compared to 25 percent of those not enrolled.
- **San Diego Gas & Electric (SDG&E)** proactively sends out outage notifications to about 1 million customers, including information on why an outage occurred and an estimated restoration time for when power will be restored. Overall, customers are satisfied with the outage notifications; 6 of 10 survey respondents were satisfied with the timeliness of notifications, and nearly 7 of 10 customers said they received the right number of notifications. As a result of proactive notifications, SDG&E has realized a 36-percent reduction in agent-handled outage calls.

Going forward, electric companies are investing in technology and process enhancements to improve the accuracy, convenience, and timeliness of outage notifications. This includes expanding the types of outage cause descriptions; developing status trackers for restoration work; enabling two-way text messaging; and improving accuracy of estimated restoration times by shifting away from system-wide averages to more precise estimates based on substation and circuit-level data.

Smart meters help keep customers informed



about outages and restoration times.

Proactive Customer Notification and Engagement

Smart meters support budget-setting tools and alerts that notify customers if their bill is projected to be higher than normal.

- More than 500,000 **Southern California Edison (SCE)** customers have signed up for Budget Assistant, a proactive performance notification tool that provides residential customers with information on how their projected costs compare to their preselected monthly spending targets for each billing period. Customers can select to receive periodic (e.g., weekly, mid-month) updates or a conditional notification if their projected bill is trending higher than budget. On average, customers enrolled in Budget Assistant save 0.5 percent on their energy usage compared to non-enrolled customers.
- **Georgia Power's** Online Customer Care platform is a self-service tool that gives more than 1.5 million customers more flexibility to manage home electricity usage. With this tool, customers are able to pay their bills, view their energy usage, set alerts, report outages, and make service requests. Through My Power Usage Alerts, more than 100,000 customers monitor their electricity usage with daily and/or monthly email notifications. This personalized tool provides customers with tailored information about their energy usage and daily costs, eliminating surprises at the end of the month.

Residential Bill Payment Options

Smart meters support pre-payment and/or pay-as-you-go options.

- **Baltimore Gas and Electric (BG&E)** launched a one-year pre-pay energy pilot in 2019 for up to 1,000 residential customers with smart meters to study the costs, benefits, and experiences that customers encounter while on the pre-pay pilot. Since payments are made prior to actual

energy consumption, BG&E partnered with PayGo Utilities to analyze customers' smart meter data, develop daily account calculations for each household, and send account balance information to customers. Other electric companies offering pre-pay services have reported customers use from 5 percent to 15 percent less energy, largely because of this real-time feedback.

Home Energy Insights

Smart meter data is used in decision support tools that assist customers in the evaluation of energy management options, solar or battery energy storage installations, and electric vehicle purchases.

- In December 2018, **Commonwealth Edison (ComEd)** launched the Green Power Connection Toolkit, which helps customers evaluate private (rooftop) solar options. In the toolkit, customers can access a solar calculator that leverages their smart meter recorded energy usage history, rate, and solar exposure to help customers understand what solar could mean for them. As of May 2019, 6,000 customers have used the toolkit to create a solar calculator report.

Smart meters support household load disaggregation and visualization.

- **DTE Energy's** Insight App helps customers make informed home energy management decisions by applying analytics to smart meter data to deliver device-level energy usage data to customers with 99.8 percent accuracy. Examples of real-time insights include visualization of a customer's HVAC system energy usage, on/off control of thermostats, and alerts for appliances left on.

Time-Varying Rates

Smart meters enable electric companies to offer new pricing options to customers to incent load shifting, reduce energy consumption, and align consumption with clean energy production.

Today, millions of customers with smart meters are enrolled in time-varying pricing programs that incent customers to reduce energy consumption during peak times when demand for electricity is expected to be especially high.

- In 2019, **Arizona Public Service (APS)** migrated approximately 1 million residential customers to five new rate plans that encourage more efficient electric consumption, support alignment of energy demand with clean energy production, and provide cost savings opportunities for shifting energy usage. Having fully deployed smart meters throughout their service territory helped APS design and communicate to customers how the new rate plans (in particular the rates with demand charges) can help to ensure clean energy plays a larger role in meeting customer energy needs. With this information, about 20 percent of APS customers selected plans that include a basic service charge, a time-of-use (TOU) energy rate, and peak usage (demand) charges.
- **Southern California Edison (SCE)** offers EV-specific TOU rates either for whole house or for separately-metered EV charging. Smart meter data supports analysis of the TOU rates to shift EV charging to off-peak periods, maximize distribution system upgrades, and increase the

efficient use of the energy grid. Results of the program show that SCE customers using whole house EV TOU rates with smart meters consume 10 percent more of their energy during off-peak hours than customers under normal residential rates.

Demand response and energy efficiency programs also are benefitting from the deployment of smart meters by enabling electric companies to send price signals to customers and to get an accurate estimate of demand and usage reductions. Smart meter data also is used to determine bill credits based on actual reductions during demand response events.

Distributed Energy Resources Integration

Smart meters help electric companies identify and understand the impact of customer-sited DERs on system operations and planning.

As DERs—such as private or rooftop solar PV, energy storage systems, electric vehicles (EVs), and connected home devices like smart thermostats and grid interactive heat pump water heaters—continue to grow, having greater visibility into the performance of these systems allows electric companies to better utilize these resources for efficient distribution grid operations.

- In 2018, **Arizona Public Service (APS)** launched three new programs that incent residential customers to adopt smart thermostats, battery energy storage, or grid-interactive heat pump water heaters. Since APS has deployed smart meters fully throughout its service territory, the company can evaluate how demand-based rate structures, technologies, and/or customer behaviors influence system load shape and deliver customer savings.
- Smart meters also enable smart charging for EVs so that customers can manage their EV charging in response to price signals. And, in the future, customers may make their EVs available as a grid resource.

Other Services

Electric companies are supporting a range of other customer services using smart meter data, including:

- Offering online access to view and download energy use information from company websites and increasingly through mobile apps.
- Providing fewer estimated bills for a better customer experience.
- Providing remote connect and disconnect services to customers who are moving.
- Training customer service representatives using smart meter data to resolve billing questions.

Customers are benefitting from smart meters in many ways today. And, as electric companies increasingly engage with customers via online platforms, apps, and other channels, more customer services and solutions will be powered by smart meter data.

Smart meters provide customers control &

flexibility over their energy use.

ENHANCING GRID RELIABILITY, OPERATIONS, AND RESILIENCE

Having a reliable supply of electricity is more than just a convenience; it's a necessity. Our economy—and our way of life—depend on it. Customers expect continual improvements to resilience and reliability, and smart meters, coupled with other advanced technologies and continued investment in people and processes, are changing the way electric companies identify, respond to, and recover from problems on the energy grid. For example:

- Smart meter data and analytics provide situational awareness so that crews can be sent to the highest priority outage locations.
- On circuits that have switching devices or automation, faults are isolated and a large percentage of customers can be restored within minutes.

Electric company investments in the distribution grid are projected to be more than $39 billion in 2019.[5] Through targeted investments, electric companies are developing a digital distribution grid that can serve as a platform to enhance energy grid resiliency and reliability, integrate a growing number of DERs, and provide more customer solutions.

In recent years, extreme weather has impacted the electric power system in different parts of the United States. This section outlines how electric companies use smart meter data, analytics, and communication networks to predict, mitigate, and enhance energy grid reliability and operations.

Hurricanes

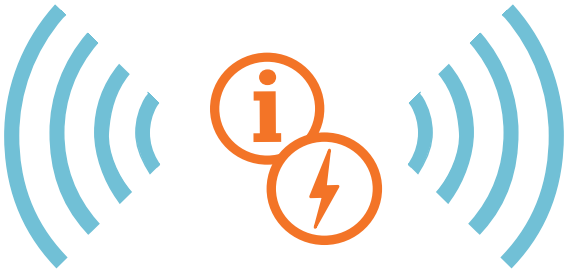
Smart meters were instrumental in the speedy recovery efforts following Hurricanes Harvey and Irma in 2017, Hurricane Michael in 2018, and Hurricane Dorian in 2019. The data from smart meters, when integrated with other systems, gave electric companies visibility into the distribution grid and the ability to better coordinate storm response efforts and communicate outage information to customers.

5. EEI Industry Capital Expenditures with Functional Detail (October 2019).

- During Hurricane Harvey, **CenterPoint Energy** operated more than 250 intelligent grid switching devices covering more than 140,000 customers. The company also flew 15 drones over more than 500 locations to assess damage, efficiently direct crews to accessible locations, and identify equipment needing further inspection. Real-time analytics were used to correlate weather and flood information with outage information and to provide operations crews with critical situational awareness and decision-making tools. These capabilities helped CenterPoint avoid almost 41 million outage minutes during Hurricane Harvey, a huge benefit to customers.
- In 2017, Hurricane Irma impacted about 4.4 million of **Florida Power & Light's** (FPL's) more than 5 million customers. Irma caused the largest outage in FPL's history and impacted all 27,000 square miles of FPL's service territory. FPL's grid hardening investments helped to make the system more resilient, and investments in digital grid technologies—5 million smart meters and more than 110,000 intelligent grid devices and smart switches—and data analytics greatly improved FPL's visibility into the nature, extent, and locations of outages, allowing the company to restore hundreds of thousands of customers during the storm without the need to roll trucks. As a result of FPL's visibility into its energy grid and the enhanced operational capabilities of the distribution network, approximately 1 million customers were restored before Irma exited FPL's service territory. And, for 2 million customers, power was restored by the end of the first full day of restoration work.

Smart meters played a key role in CenterPoint's and FPL's ability to respond rapidly and accurately to outages resulting from the hurricanes. By investing in smarter energy infrastructure, physical grid hardening, digital grid technologies, and data analytics to enhance grid resiliency and to improve visibility into outages, electric companies are able to restore power faster when outages do occur, resulting in millions of avoided outage minutes.

Smart meters enable two-way power and information flows to



improve visibility into the health of the energy grid.

Technologically Advanced Grid Operations & Analytics

The sensing capabilities in smart meters continue to advance, and electric companies now are collecting more complete power characteristics (e.g., voltages and reactive power) in addition to consumption and power on/off status from the meters.

By integrating voltage and reactive power data collected by smart meters with distribution management systems (DMS), electric companies are implementing distribution automation and circuit reconfiguration, volt/VAR management, device monitoring, and predictive asset maintenance capabilities. For example:

- American Electric Power, Baltimore Gas & Electric, Dominion Energy, DTE Energy, Evergy, FPL, Pepco, and several other electric companies are using voltage and power quality data collected and transmitted by smart meters for voltage optimization that provides energy efficiency benefits and proactively identifies distribution transformers that are at risk to fail.

As the energy grid integrates more DERs and as switching and dynamic automation capabilities proliferate, having an accurate representation and mapping of transformers to customer meters is critical for public safety, faster outage restoration, and the integration of DERs. These capabilities depend, in part, on data collected by smart meters.

CONCLUSION

The role of the distribution grid continues to evolve, but smart meters remain the fundamental building block. Increasingly, electric company distribution resource plans identify and prioritize grid modernization investments—both software and hardware—that must be made to improve visibility into the distribution system, enhance resiliency, integrate growing numbers of DERs, and provide a platform for new customer solutions.

As electric companies continue to manage, operate, and invest in an increasingly digital energy grid, the next steps are to continue to utilize the data being generated as a strategic asset to improve grid operations, use customer resources more efficiently, and offer new services to customers.

Table 1. Summary of Smart Meter Installations and Projected Deployments

Electric Company Type	Total Installed Smart Meters		
	2018	2019p	2020p
Investor-Owned	64,344,000	72,161,000	78,531,000
Public Power Utilities & Electric Cooperatives	23,721,000	26,234,000	28,496,000
U.S. Total	**88,065,000**	**98,395,000**	**107,027,000**

Note: Totals are rounded to nearest thousand and are projected for 2019 and beyond.

Table 2. Smart Meter Installations and Projected Deployments by Investor-Owned Electric Company

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Alliant	IA WI	670,000	972,000	972,000	Alliant Energy Corporation is comprised of two subsidiaries, Wisconsin Power and Light (WPL) and Interstate Power and Light (IPL). The WPL smart meter implementation was completed in December of 2011, now totaling 476,000 meters. In Fall of 2017, IPL began deploying smart meters in Iowa, with anticipated full deployment of 497,000 meters by the end of 2019.
Ameren Illinois	IL	1,070,000	1,246,000	1,246,000	Ameren Illinois is expected to fully deploy 1,246,000 smart meters by the end of 2019.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
American Electric Power	IN MI OH OK TX VA WV	2,543,000	3,138,000	3,334,000	AEP Indiana Michigan Power has deployed 15,000 meters; AEP Ohio has deployed 675,000 and will complete its Phase 2 deployment of 1,046,000 smart meters by Q1 2020, with approval for phase 3 (approximately 500,000 meters) pending; AEP Texas reached full deployment of 1,082,000 meters; AEP Public Service Company of Oklahoma reached full deployment of 578,000 meters; and AEP Appalachian Power deployed 190,000 smart meters in Virginia through 2018 and expects to deploy roughly 400,000 more throughout Virginia and West Virginia by the end of 2020.
Arizona Public Service	AZ	1,251,000	1,251,000	1,251,000	APS achieved full deployment of smart meters in March 2016.
Avista Corporation	WA	17,000	120,000	256,000	Avista installed 17,000 smart meters as part of a Smart Grid Demonstration Grant project and Phase 1 of AMI deployment. Avista anticipates a full rollout of 256,000 smart meters in Washington by the end of 2020.
Baltimore Gas & Electric	MD	1,290,000	1,309,000	1,328,000	BG&E, a subsidiary of Exelon Corporation, has fully deployed 1,290,000 smart meters, with anticipated growth through new customer enrollments.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Black Hills Corporation	CO MT SD WY	212,000	212,000	212,000	Black Hills Energy has fully installed 212,000 smart meters in its service territory across four states.
CenterPoint Energy	IN TX	2,493,000	2,646,000	2,646,000	CenterPoint Energy received approval in 2008 to install an advanced metering system across its Texas service territory. It completed deployment in July 2012 and currently has 2,493,000 smart meters installed in the greater Houston area. Vectren, recently acquired by CenterPoint, expects to fully deploy 153,000 smart meters by the end of 2019 in Indiana.
Central Maine Power	ME	632,000	632,000	632,000	Central Maine Power, a subsidiary of AVANGRID, completed its smart meter deployment in 2012 and currently has 632,000 smart meters installed.
Cleco	LA	287,000	287,000	287,000	Cleco fully deployed 287,000 smart meters across the company's entire service territory after receiving approval from the Louisiana Public Service Commission in 2011.
Commonwealth Edison	IL	4,131,000	4,131,000	4,131,000	In June 2013, ComEd, a subsidiary of Exelon Corporation, received regulatory approval for full deployment of 4,131,000 smart meters, which was completed in 2018.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
ConEdison	NY	796,000	2,276,000	4,113,000	ConEdison deployed 796,000 smart meters through 2018 and is projected to deploy 4,113,000 by year-end 2020. As of December 2019, ConEdison has deployed 2,276,000 smart meters.
Consumers Energy	MI	1,831,000	1,831,000	1,831,000	Consumers Energy, a subsidiary of CMS Energy, achieved full deployment in 2017. Through 2019, new customer enrollments have led to a total of 1,831,000 smart meters deployed.
Dominion Energy	NC SC VA	453,000	526,000	996,000	Dominion Virginia has completed installation of 475,000 smart meters through 2019 and plans to have more than 1 million deployed by the end of 2021. Dominion South Carolina expects 27,000 smart meters deployed by the end of 2019 and 465,000 by the end of 2021. Dominion North Carolina is currently in early stage AMI deployment.
DTE Energy	MI	2,533,000	2,533,000	2,533,000	DTE Energy achieved full deployment in 2016 and currently has 2,533,000 smart meters.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Duke Energy	FL IN KY NC OH SC	3,865,000	6,207,000	7,521,000	Through the end of 2019, Duke has deployed 705,000 smart meters in Florida; 147,000 in Kentucky; 2,974,000 in North Carolina; 741,000 in Ohio; 783,000 in South Carolina; and 857,000 in Indiana. As of end of 2019, deployments are complete in Kentucky, Indiana, Ohio, and South Carolina. More than 7.5 million smart meters are projected to be deployed by 2020; Duke is projected to reach full deployment by 2021 with nearly 8 million customers.
Duquesne Light Company	PA	600,000	600,000	600,000	Duquesne Light has fully deployed 600,000 smart meters.
Emera Maine	ME	122,000	122,000	122,000	Emera Maine has fully deployed 122,000 smart meters in its service territory.
Entergy Corporation	AR LA MS TX	21,000	1,065,000	2,244,000	In 2019, Entergy deployed 1,065,000 smart meters of an enterprise-wide deployment for 2,943,000 smart meters by December 2021. Entergy has deployed 247,000 in Arkansas; 328,000 in Louisiana; 183,000 in Mississippi; 108,000 smart meters in New Orleans; and 199,000 in Texas.
Evergy	KS MO	1,526,000	1,559,000	1,568,000	Evergy expects 1,559,000 smart meters (610,000 in Kansas and 948,000 in Missouri) deployed by the end of 2019.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
FirstEnergy Corporation	NY OH PA	1,973,000	2,100,000	2,100,000	Through end of 2019, FirstEnergy subsidiary Penn Power has fully deployed 169,000 smart meters; West Penn Power has deployed 729,000; MetEd has deployed 575,000; and Penelec has deployed 593,000. FirstEnergy operating company The Illuminating Company in Cleveland installed 34,000 meters as part of a pilot.
Green Mountain Power	VT	268,000	268,000	270,000	Green Mountain Power has deployed 268,000 smart meters to customers across Vermont.
Hawaiian Electric Industries	HI	5,000	28,000	50,000	Hawaiian Electric installed 5,000 smart meters during the first phase of its smart grid program. The company filed a grid modernization plan with its state regulatory commission and will make targeted smart meter investments through 2020.
Idaho Power	ID OR	546,000	546,000	546,000	Idaho Power has fully deployed 546,000 smart meters across its service territories in Idaho and Oregon.
Indianapolis Power & Light	IN	147,000	185,000	295,000	IPL, a subsidiary of AES Corporation, has installed 147,000 smart meters and is strategically deploying smart meters where needed. IPL has a pending application for full deployment of smart meters by 2022.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
MGE Energy	WI	9,000	9,000	9,000	MGE Energy has deployed 9,000 smart meters.
Minnesota Power	MN	79,000	93,000	109,000	Minnesota Power, a subsidiary of ALLETE, deployed 93,000 smart meters by year-end 2019 in north-east Minnesota and expects to complete full deployment by the end of 2020.
National Grid	MA NY RI	19,000	30,000	30,000	National Grid is piloting 30,000 smart meters in Massachusetts and New York, and actively work-ing on rate cases to fully install smart meters in New York and Rhode Island.
NextEra Energy	FL	5,517,000	5,517,000	5,536,000	FPL has fully deployed 5,054,000 smart meters to residential, com-mercial, and industrial customers. Gulf Power reached full deploy-ment in 2012 and has 463,000 meters.
NV Energy	NV	1,310,000	1,310,000	1,310,000	NV Energy, a subsidiary of Berkshire Hathaway Energy, has fully deployed 1,310,000 smart meters.
OGE Energy Corporation	AR OK	879,000	879,000	879,000	OG&E has fully installed 879,000 meters: 809,000 in Oklahoma and 70,000 in Arkansas.
Oncor	TX	3,611,000	3,611,000	3,611,000	Oncor has fully deployed 3,611,000 smart meters across its service territory.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Orange and Rockland Utilities	NJ NY	217,000	382,000	446,000	Orange and Rockland Utilities, a subsidiary of ConEdison, has installed 217,000 smart meters through end of 2018 and plans to achieve full deployment of 446,000 by 2020.
Pacific Power	CA OR	517,000	655,000	655,000	Pacific Power, a subsidiary of Berkshire Hathaway Energy, expects full deployment of smart meters across service territories by year-end 2019 in California (47,000) and Oregon (608,000).
PECO	PA	1,675,000	1,675,000	1,675,000	PECO, a subsidiary of Exelon Corporation, has fully deployed 1,675,000 smart meters.
Pepco Holdings	DC DE MD	1,340,000	1,340,000	1,340,000	Pepco, a subsidiary of Exelon Corporation, has reached full deployment in the District of Columbia with 278,000 smart meters installed. Pepco and Delmarva Power in Maryland have reached full deployment, with 555,000 and 213,000 smart meters, installed respectively. In Delaware, Delamarva Power has reached full deployment with 293,000 meters installed.
PG&E Corporation	CA	5,323,000	5,323,000	5,323,000	PG&E has fully deployed 5,323,000 smart meters across its service territory.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Portland General Electric	OR	888,000	888,000	888,000	PGE's smart meter program was approved by the state regulatory commission in 2008; full deployment was completed by the fall of 2010.
PPL Corporation	KY PA	1,450,000	1,450,000	1,450,000	PPL is in compliance with PA Act 129 and has fully deployed 1,441,000 smart meters in its Pennsylvania service territory. Pilot programs in Kentucky have deployed 9,000 smart meters.
Public Service Enterprise Group	NJ NY	144,000	513,000	882,000	In 2018, PSE&G filed a proposal with the New Jersey Board of Public Utilities to deploy 2.2 million smart meters by 2024. PGE&G's NY service territory has a pilot program with 129,000 smart meters deployed.
Puget Sound Energy	WA	190,000	374,000	564,000	Puget Sound Energy plans to deploy smart meters to all electric customers by the end of 2023.
San Diego Gas & Electric Company	CA	1,449,000	1,449,000	1,449,000	SDG&E has fully deployed 1,449,000 meters across its service territory.
Southern California Edison	CA	5,139,000	5,139,000	5,139,000	SCE has fully deployed more than 5 million smart meters and will continue to accommodate population growth.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Southern Company	AL GA MS	3,951,000	3,951,000	3,951,000	Southern Company's Georgia Power and Alabama Power are fully deployed. Georgia Power reached full deployment in 2012 and has 2,498,000 meters. Alabama Power reached full deployment in 2010 and has 1,453,000 meters. Mississippi Power received approval to deploy 200,000 smart meters in late 2018.
Tampa Electric	FL	75,000	145,000	300,000	TECO (an Emera company) has installed 75,000 smart meters through 2018 with plans to complete deployment of 750,000 meters in early 2022.
Texas-New Mexico Power	TX	247,000	247,000	247,000	TNMP, a subsidiary of PNM Resources, has fully deployed 247,000 smart meters.
United Illuminating	CT	237,000	294,000	350,000	United Illuminating, a subsidiary of AVANGRID, has installed 237,000 of its projected 350,000 smart meters by the end of 2020.
Unitil Corporation	MA NH	108,000	108,000	108,000	Unitil has fully deployed 108,000 smart meters across its service territory around Concord, NH, and Fitchburg, MA.
WEC Energy Group	WI	662,000	946,000	1,145,000	WE Energies has deployed 662,000 smart meters to customers in Wisconsin.

Electric Company	State	Meters Installed (2018)	Projected Meters Installed (2019)	Projected Meters Installed (2020)	Notes
Xcel Energy	CO MN	13,000	32,000	40,000	Full deployment of smart meters in Colorado for 1.5 million customers will not begin until 2020 and will conclude in 2024. Xcel has publicly filed for full deployment of smart meters in Minnesota by 2024.
Other		13,000	11,000	11,000	Limited deployments by multiple operating companies account for roughly 13,000 smart meters deployed through 2018.
U.S. Total		**64,344,000**	**72,161,000**	**78,531,000**	

Note: Totals are rounded to nearest thousand.

Table 3. Smart Meter Installations by Electric Company Type and State (2018)

State	Investor-Owned Electric Company	Public Power Utilities & Electric Cooperatives	Total
AK	0	219,000	219,000
AL	1,453,000	483,000	1,936,000
AR	70,000	476,000	546,000
AZ	1,259,000	1,285,000	2,544,000
CA	11,956,000	1,102,000	13,058,000
CO	109,000	519,000	628,000
CT	237,000	41,000	278,000
DC	278,000	0	278,000
DE	294,000	45,000	339,000
FL	5,683,000	1,217,000	6,900,000
GA	2,498,000	1,918,000	4,416,000
HI	5,000	32,000	37,000
IA	196,000	239,000	435,000
ID	528,000	99,000	627,000
IL	5,203,000	238,000	5,441,000
IN	728,000	563,000	1,291,000
KS	944,000	327,000	1,271,000
KY	152,000	770,000	922,000
LA	307,000	171,000	478,000
MA	44,000	111,000	155,000
MD	2,059,000	219,000	2,278,000
ME	754,000	6,000	760,000
MI	4,365,000	306,000	4,671,000
MN	80,000	733,000	813,000
MO	582,000	647,000	1,229,000
MS	<1,000	562,000	562,000
MT	<1,000	145,000	145,000
NC	1,796,000	1,159,000	2,955,000

State	Investor-Owned Electric Company	Public Power Utilities & Electric Cooperatives	Total
ND	<1,000	118,000	118,000
NE	0	291,000	291,000
NH	78,000	85,000	163,000
NJ	84,000	23,000	107,000
NM	<1,000	123,000	123,000
NV	1,310,000	12,000	1,322,000
NY	1,077,000	19,000	1,096,000
OH	1,426,000	279,000	1,705,000
OK	1,387,000	434,000	1,821,000
OR	1,378,000	285,000	1,663,000
PA	5,655,000	234,000	5,889,000
RI	<1,000	2,000	2,000
SC	581,000	569,000	1,150,000
SD	70,000	147,000	217,000
TN	0	2,639,000	2,639,000
TX	7,434,000	3,171,000	10,605,000
UT	0	105,000	105,000
VA	614,000	424,000	1,038,000
VT	268,000	36,000	304,000
WA	207,000	737,000	944,000
WI	1,145,000	296,000	1,441,000
WV	1,000	7,000	8,000
WY	45,000	53,000	98,000
U.S. Total	**64,344,000**	**23,721,000**	**88,065,000**

Note: Totals are rounded to nearest thousand.

Table 4. Electric Companies with Full Smart Meter Deployment (2018)

AMI Full Deployment by Operating Company	
AEP Texas	Georgia Power
Alabama Power	Green Mountain Power
Arizona Public Service	Gulf Power
Baltimore Gas & Electric	Idaho Power
Black Hills Colorado Electric	Idaho Power (OR)
Black Hills Power (MT)	NV Energy
Black Hills Power (SD)	Oklahoma Gas & Electric (AR)
Black Hills Power (WY)	Oklahoma Gas & Electric (OK)
CenterPoint Energy (TX)	Oncor Electric Delivery
Central Maine Power	Pacific Gas & Electric
Cheyenne Light Fuel & Power (WY)	PacifiCorp (CA)
Cleco	PECO Energy
Commonwealth Edison	Pennsylvania Electric
Consumers Energy	Pennsylvania Power
Delmarva Power (DE)	Portland General Electric
Delmarva Power (MD)	Potomac Electric Power (DC)
DTE Energy	Potomac Electric Power (MD)
Duke Energy (KY)	PPL Electric Utilities
Duke Energy (NC)	Public Service Company of Oklahoma
Duke Energy (OH)	San Diego Gas & Electric
Duke Energy (SC)	Southern California Edison
Duquesne Light	Texas-New Mexico Power
Evergy (KS)	Unitil Energy Systems (NH)
Evergy (MO)	West Penn Power
Fitchburg Gas & Electric Light	Wisconsin Power & Light
Florida Power & Light	

Note: Full deployment may exclude customer with opt-out clauses or hard-to-access meters.

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The Institute for Electric Innovation focuses on advancing the adoption and application of new technologies that will strengthen and transform the energy grid. IEI's members are the investor-owned electric companies that represent about 70 percent of the U.S. electric power industry. The membership is committed to an affordable, reliable, secure, and clean energy future.

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