



*The Edison Foundation*

INSTITUTE for  
ELECTRIC INNOVATION

## Report

# Electric Company Smart Meter Deployments: Foundation for a Smart Grid

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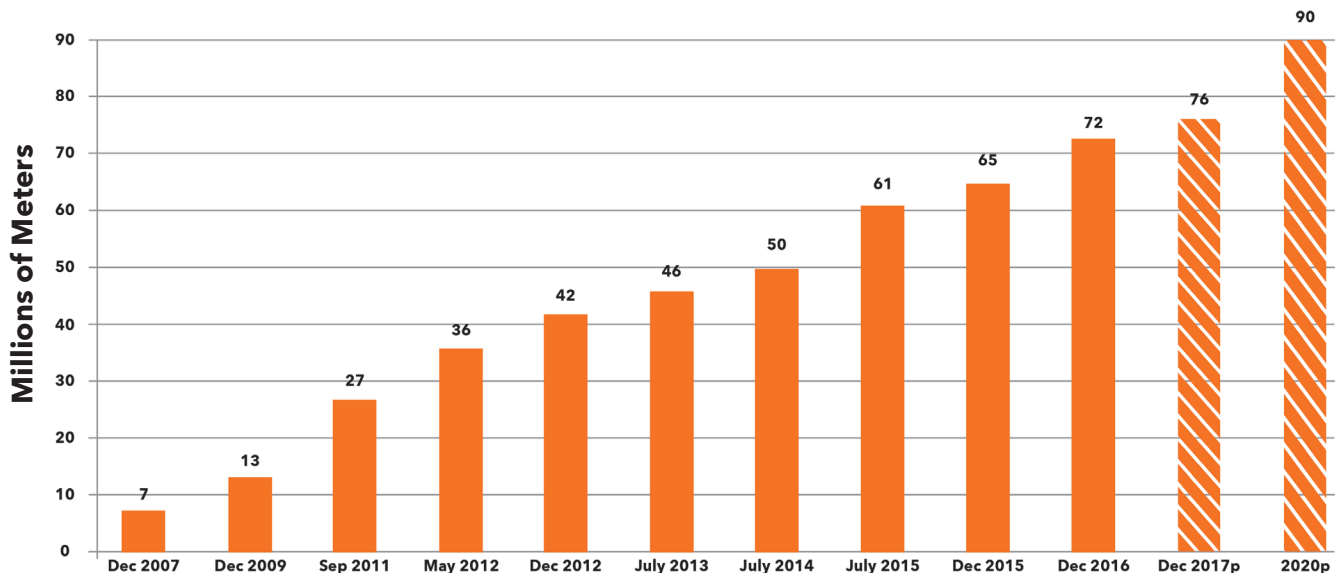
## EXECUTIVE SUMMARY

The transition of the electric power system is underway, and a key technology creating big changes for customers and electric companies continues to be smart meters.<sup>1</sup> While deployment of smart meters began a decade ago, electric companies continue to find ways to create value from the data and capabilities smart meters enable. Investing in the distribution grid, particularly in smart meters, is the foundation for a customer-facing, modern energy grid.

In this report, we discuss some of the innovations, benefits, and capabilities enabled by smart meters; summarize the results of the Institute for Electric Innovation's (IEI's) 2017 Smart Meter Survey; 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 2007. As of year-end 2016, electric companies had installed 72 million smart meters, covering more than 55 percent of U.S. households. Based on survey results and approved plans, estimated deployments are expected to reach 76 million smart meters by the end of 2017 (covering 60 percent of U.S. households) and 90 million by 2020.

**Figure 1: U.S. Smart Meter Installations Approach 76 Million; Projected to Reach 90 Million by 2020**



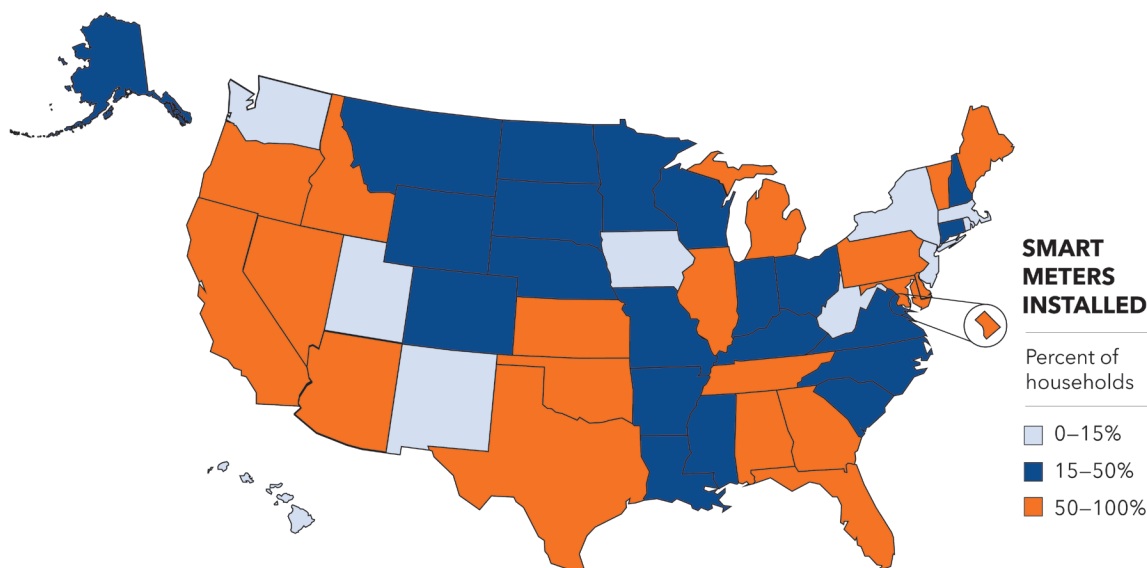
1. Smart Meters, or Advanced Metering Infrastructure (AMI), are digital meters that measure and record electricity usage data hourly, or more frequently, and allow for two-way communication between electric companies and their customers.

## HIGHLIGHTS

- Electric companies had installed 72 million smart meters, covering more than 55 percent of U.S. households, as of year-end 2016.
- Deployments are estimated to reach 76 million smart meters by the end of 2017 and 90 million by 2020.
- More than 40 electric companies in the United States have fully deployed smart meters.<sup>2</sup>
- Electric companies are using smart meter data today to enhance grid resiliency and operations, integrate distributed energy resources (DERs), and provide customer solutions.
- Smart meters provide a digital link between electric companies and their customers and open the door to new and expanded services, such as time-based pricing, load control, budget billing, high-usage alerts, push notifications, and web services for energy management.
- Smart meters enable two-way power and information flows to improve visibility into the energy grid.
- Electric companies are focused on modernizing the energy grid and are projected to invest more than \$35 billion in the distribution system in 2017.
- A digital energy grid is essential to integrate DERs seamlessly, enhance reliability, reinforce resiliency, and provide more solutions to customers.

Electric companies across the U.S. are leveraging smart meter data to better monitor the health of the energy grid, more quickly restore electric service when outages occur, integrate DERs, and deliver energy solutions to customers. Figure 2 shows smart meter deployments by state.

**Figure 2. Smart Meter Deployments by State, 2016 (% of households)**



2. An in-depth list of smart meter deployments by electric company is at the end of this report.

## INTRODUCTION

This report describes how electric companies are using smart meter data today to enhance grid resiliency and operations, integrate DERs, and provide customer solutions, and discusses the growing importance of the energy distribution grid.

Given the impact of the 2017 hurricane season on the electric power system in some areas of the country, this report provides recent examples of how electric companies used smart meters to enhance grid reliability and operations.

## ENHANCING GRID RELIABILITY AND OPERATIONS

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. Smart meters are changing the ways electric companies respond to problems on the energy grid, and the results speak for themselves.

During the historic 2017 hurricane season, smart meters were instrumental in the speedy recovery efforts following Hurricanes Harvey and Irma in August and September. 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 communication with customers.

CenterPoint Energy has been investing in smarter energy infrastructure since 2009. The company has deployed smart meters to virtually all 2.4 million customers in the Houston area; automated 31 substations, installed 872 Intelligent Grid Switching Devices on more than 200 circuits; and built a private wireless radio telecommunications network across a 5,000-square mile footprint. In 2012, CenterPoint created an asset management analysis and strategy unit, which coordinates business intelligence and data analytics activities across the entire company, enabling the information generated by these technologies to be used more efficiently.

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

During Hurricane Harvey, CenterPoint 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 outages and to provide operations crews with critical situational awareness and decision-making tools. These steps helped CenterPoint avoid almost 41 million outage minutes during Hurricane Harvey.

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**Smart meters enable two-way power and information flows to**



**improve visibility into the health of the energy grid**

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Florida Power & Light Company (FPL) has invested heavily in energy grid modernization—physical grid hardening, digital grid technologies, and data analytics—to enhance grid resiliency and to improve its understanding of the nature and extent of outages, improving its ability to restore power when outages do occur.

To date, FPL has installed 4.9 million smart meters that let the company know when individual customers are out of power and has deployed more than 83,000 intelligent grid devices and smart switches. As a result, the electric company has deep visibility into its distribution grid. This greatly improves FPL’s understanding of the nature and extent of outages when they do occur, improves communications with customers, and improves outage restoration times.

In 2017, Hurricane Irma impacted more than 4.4 million of FPL’s nearly 5 million customers. It was the largest outage in FPL’s history, and was the first time that a storm impacted all 27,000 square miles of its service territory. System hardening helped to make the system more resilient, and investments in digital grid technologies and data analytics greatly improved FPL’s understanding of 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. In fact, even before Irma exited FPL’s service territory, approximately 1 million customers had been restored. 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 to outages resulting from the two hurricanes.

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, DTE Energy, and several other electric companies are using voltage and power quality data collected and transmitted by smart meters for voltage optimization and proactive identification of distribution transformers that are at risk to fail.

And, as the energy grid integrates more distributed energy resources (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.

The more basic functions of smart meters—such as cross-referencing smart meter data with billing systems to reduce uncollectable expenses, reduce consumption from inactive meters, and better detect energy theft, and reducing the need to “roll trucks” to a customer site to read a meter or troubleshoot—still continue to provide major benefits on a daily basis.

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*“The data generated by smart meters provides the basic information for integrating distributed energy resources and modeling their behavior.”*

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## BEYOND INTEGRATING DISTRIBUTED ENERGY RESOURCES

As DERs, such as private or rooftop solar PV, energy storage systems, electric vehicles, and connected home devices like smart thermostats and smart appliances, continue to grow, electric companies need greater visibility into the performance of these systems to better utilize these resources for efficient distribution grid operations. The data generated by smart meters provides the basic information for integrating these DERs and modeling their behavior.

Going forward, the computing power in each smart meter opens the door to applications beyond traditional metering services.

- For example, applications are under development to predict the behavior of customer-sited energy resources so that these resources can be utilized more efficiently.
- Another example is using smart meters as platforms for distributed analytics, decision making, and communication across devices on the grid edge.

## PROVIDING CUSTOMER SOLUTIONS

Smart meters provide a digital link between electric companies and their customers and open the door to new or expanded customer solutions.

### Smart Pricing Options

Residential customers have proven time and again that they are engaged, willing to participate in pricing programs, and satisfied when they do participate.

- Smart pricing programs are growing across the United States. Today, millions of customers with smart meters are enrolled in time-based pricing programs that reward participants for reducing energy consumption voluntarily during designated peak times when demand for electricity is expected to be especially high.
- While the majority of customers enrolled in smart pricing programs are responding to time-of-day, or peak pricing signals today, smart meters also support residential rates with demand charges. Demand information can be utilized by customers to better inform their usage decisions.
- Demand response programs are benefitting from the deployment of smart meters and two-way communication, enabling electric companies to communicate with customers to get accurate feedback on demand reductions.
- Smart meters also help customers to leverage smart charging for plug-in electric vehicles to better manage vehicle charging in response to price signals.

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**Smart meters provide customers control**



**& flexibility over their energy use**

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### Other Services

Electric companies are providing a range of other services to customers with smart meters, including:

- Power alerts that 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.
- Remote connect and disconnect services that help customers who are moving receive faster and more convenient electric service.



- Budget setting options that allow customers to set spending goals and that provide weekly updates to show how they are performing against their goals.
- High usage alerts that notify customers if their bill is projected to be higher than normal.
- Fewer estimated bills for a better customer experience.
- Pre-payment and/or pay-as-you-go options.
- Online access to view and download energy use information.
- Decision support tools to assist customers in the evaluation of energy management options, solar or battery energy storage installations, and electric vehicle purchases.

Customers are benefiting from smart meters in many different ways. And, as electric companies continue to engage with customers via online platforms and apps, more customer services and solutions will be powered by smart meter data.

## **GROWING IMPORTANCE OF DISTRIBUTION GRID**

Electric company investments in the distribution grid are projected to be more than \$35 billion in 2017. Through targeted investments, electric companies are developing a digital distribution grid that can serve as a platform to enhance grid resiliency and reliability, integrate a growing number of DERs, and provide more customer solutions.

Investing in smart meters is one of the first steps in moving toward a digital distribution grid and recent approvals of smart meter deployments in Indiana, Louisiana, New York, North Carolina, and Ohio demonstrate their continued importance as a critical technology to support the energy grid of the future.

Distribution grid digitization is not a one-off technology project, it is an iterative process. A distribution grid platform requires advanced grid operating systems, robust communications network, and intelligent grid devices. 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, integrate growing numbers of DERs, and provide a platform for new customer solutions. The role of the distribution grid continues to evolve, but smart meters remain the fundamental building block.

## **CONCLUSION**

Building a solid, smart foundation for a more distributed, increasingly clean, and increasingly digital energy grid allows electric companies to deliver new services to customers. Investing in smart meters is one of the first steps in building a smarter energy infrastructure

As electric companies continue to manage, operate, and invest in an increasingly digital energy grid, the next step is 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	Meters Installed (2016)	Estimated Meters Installed (2017)	Projected Meters Installed (2020)
<b>Investor-Owned</b>	53,350,000	57,000,000	70,000,000
<b>Public Power Utilities and Electric Cooperatives</b>	18,650,000	19,000,000	20,000,000
<b>U.S. Total</b>	<b>72,000,000</b>	<b>76,000,000</b>	<b>90,000,000</b>

Note: Totals are rounded.

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

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>Alliant Energy</b>	IA WI	476,000	961,000	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, totaling 476,000 meters. In Fall of 2017, IPL began deployment of 485,000 smart meters in Iowa. Installations are taking place over a three-year period with anticipated commissioning/provisioning of the smart meters by end of 2019.	IEI Smart Meter Survey 2017
<b>Ameren Illinois</b>	IL	425,000	1,249,000	Ameren Illinois installed 425,000 smart meters through end of 2016 and anticipates 700,000 meters installed by end of 2017, and full deployment of 1,249,000 meters by December 2019.	IEI Smart Meter Survey 2017

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>American Electric Power</b>	IN OH OK TX VA	1,910,000	2,965,000	AEP's Indiana Michigan Power subsidiary has deployed 10,600 meters to customers in South Bend, IN; AEP Ohio has deployed 136,000 in the Columbus area and will reach full deployment of over 1 million meters by 2020; AEP Texas reached full deployment of 1,200,000 meters; and AEP's Public Service Company of Oklahoma reached full deployment of 564,000 meters in 2016. Appalachian Power started a smart meter pilot in 2017.	IEI Smart Meter Survey 2017
<b>Arizona Public Service</b>	AZ	1,329,000	1,500,000	APS achieved full deployment of smart meters in May 2014. 2020 projection accounts for new customers in service territory.	IEI Smart Meter Survey 2017
<b>Avista Utilities</b>	WA	13,000	263,000	Avista has installed 13,000 smart meters in Pullman, WA, as part of a Smart Grid Demonstration Grant project. Avista is in the early planning stages of a full rollout of 263,000 meters in Washington.	IEI Smart Meter Survey 2017
<b>Baltimore Gas &amp; Electric</b>	MD	1,244,000	1,270,000	BG&E installed 1,244,000 smart meters through December 2016 and is 98 percent deployed.	IEI Smart Meter Survey 2017
<b>Black Hills Energy</b>	CO MT SD WY	209,000	209,000	Black Hills Energy has fully installed 209,000 smart meters in its service territory across four states.	IEI Smart Meter Survey 2017
<b>CenterPoint Energy</b>	TX	2,388,000	2,388,000	CenterPoint Energy received approval in 2008 to install an advanced metering system across its service territory. It completed deployment in July 2012 and currently has 2,388,000 smart meters installed in the greater Houston area.	IEI Smart Meter Survey 2017; EIA Form 861

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>Central Maine Power</b>	ME	630,600	630,600	Central Maine Power Company completed its smart meter deployment in 2012 and currently has 630,600 smart meters installed.	EIA Form 861
<b>Cleco Power</b>	LA	287,000	287,000	Cleco Power fully deployed smart meters across the company's entire service territory, after receiving approval from the Louisiana Public Service Commission in 2011.	IEI Smart Meter Survey 2017
<b>Commonwealth Edison</b>	IL	3,035,000	4,192,000	In June 2013, ComEd received regulatory approval for full deployment of smart meters. As of December 2016, approximately 3,035,000 smart meters were deployed. ComEd anticipates installations reaching 3,770,000 customers by end of 2017, with full installation complete to 4,192,000 customers in 2019, several years in advance of the originally scheduled 2021 completion date.	IEI Smart Meter Survey 2017
<b>Consolidated Edison</b>	NY	4,100	2,000,000	ConEdison received approval to deploy 3,600,000 smart meters between 2017 and 2022. Installations began on Staten Island in summer 2017, and 2 million meters are projected to be installed by 2020.	Case 15-E-0050, Company Website
<b>Consumers Energy</b>	MI	1,355,000	1,824,000	Consumers Energy deployed 1,355,000 smart meters deployed through end of 2016, with full deployment of 1,824,000 meters anticipated by end of 2017.	IEI Smart Meter Survey 2017
<b>Dominion</b>	VA	367,000	400,000	Dominion has completed installation of 367,000 smart meters in Virginia through 2106. The AMI business case and full deployment plans for 2.7 meters are still under development.	IEI Smart Meter Survey 2017

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>DTE Energy</b>	MI	2,600,000	2,600,000	DTE Energy achieved full deployment of 2,600,000 smart meters in 2016.	IEI Smart Meter Survey 2017
<b>Duke Energy</b>	FL IN KY NC OH SC	1,769,000	7,900,000	Duke has fully deployed 729,000 smart meters in Ohio. In other jurisdictions, through the end of 2016, Duke deployed 79,000 meters in Florida; 69,000 in Kentucky; 624,000 in North Carolina; 232,000 in South Carolina; and 36,000 meters in Indiana. Full deployments are underway in Indiana, North Carolina, and South Carolina. Close to 3 million meters will be installed at the end of 2017, and 7.9 million are projected to be installed by the end of 2020.	IEI Smart Meter Survey 2017; EIA Form 861
<b>Emera Maine</b>	ME	120,600	120,600	Emera Maine has fully deployed 120,600 smart meters in its service territory.	EIA Form 861
<b>Entergy Corporation</b>	AR LA MS TX	20,000	1,918,000	Entergy has deployed 20,000 smart meters in New Orleans and is at the beginning of an enterprise wide deployment of 2,920,000 electric meters by December 2021. The company has regulatory approval in Louisiana; pending regulatory approval in 4 other jurisdictions. Deployment will be spread over 3 years, beginning January 2019 and ending December 2021. A two-year IT systems build out has begun.	IEI Smart Meter Survey 2017

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>FirstEnergy Corporation</b>	OH PA	670,000	2,050,000	Pennsylvania Act 129 (2008) requires electric distribution companies with more than 100,000 customers to install smart meter technology to all customers by 2022. FirstEnergy subsidiary Penn Power is fully deployed with 170,000 meters. At year end 2016, West Penn Power had 98,000 smart meters deployed; MetEd had 138,000; Penelec had 264,000 deployed. Per approved deployment plans, 2,016,000 smart meters will be deployed by 2020. FirstEnergy operating company The Illuminating Company in Cleveland installed 34,300 meters as part of a pilot.	IEI Smart Meter Survey 2017
<b>Florida Power &amp; Light Company</b>	FL	4,942,000	4,942,000	FPL has fully deployed 4,942,000 smart meters to residential, commercial, and industrial customers.	IEI Smart Meter Survey 2017; EIA Form 861
<b>Green Mountain Power</b>	VT	260,600	260,600	Green Mountain Power has deployed 260,600 smart meters to customers across Vermont.	EIA Form 826
<b>Hawaiian Electric Company</b>	HI	5,200	50,000	Hawaiian Electric Installed 5,200 smart meters during the first phase of its smart grid program. In August 2017, the company filed a grid modernization strategy with its state regulatory commission proposing targeted smart meter investments rather than system wide.	Docket No. 2016-0087
<b>Idaho Power</b>	ID OR	525,000	525,000	Idaho Power has fully deployed 525,000 smart meters across its service territory in Idaho and Oregon.	EIA Form 861

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>Indianapolis Power &amp; Light</b>	IN	53,000	80,000	IPL has installed 53,000 smart meters, and will strategically deploy smart meters where needed.	IEI Smart Meter Survey 2017; EIA Form 861
<b>Kansas City Power &amp; Light</b>	KS MO	703,000	703,000	KCP&L completed the installation of 703,000 smart meters; 234,000 in Kansas and 469,000 in Missouri.	EIA Form 861
<b>Madison Gas &amp; Electric</b>	WI	7,300	7,300	MGE installed a small-scale smart grid network, including 7,300 meters, EV charging stations, and in-home energy management systems.	EIA Form 861
<b>Minnesota Power</b>	MN	52,800	83,000	Minnesota Power deployed 52,800 smart meters in northeast Minnesota.	EIA Form 861
<b>National Grid</b>	MA NY	15,000	50,000	15,000 smart meters have been installed in Worcester, MA, for a pilot demonstration. Approximately 13,000 smart meters will be installed to support National Grid's Demand Reduction REV Demonstration in Clifton Park, NY.	IEI Smart Meter Survey 2017; EIA Form 826
<b>NV Energy</b>	NV	1,260,000	1,260,000	NV Energy has fully deployed 1,260,000 smart meters.	EIA Form 861
<b>Oklahoma Gas &amp; Electric</b>	AR OK	873,000	873,000	OG&E has fully installed 873,000 meters: 804,000 in Oklahoma and 69,000 in Arkansas.	EIA Form 861
<b>Oncor</b>	TX	3,424,000	3,424,000	Oncor has fully deployed 3,424,000 smart meters across its service territory.	EIA Form 861
<b>Orange &amp; Rockland</b>	NY	2,500	230,000	Orange & Rockland received approval to install 230,000 smart meters in its New York Service territory. Expected completion date is 2020.	Company Website

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>Pacific Gas &amp; Electric</b>	CA	5,333,000	5,333,000	PG&E has deployed 5,333,000 meters through end of 2016, and completed its SmartMeter Project in 2013. Customers with smart meters can participate in PG&E's SmartRate plan, a voluntary critical peak pricing rate plan that will help manage system load during hot summer days, and receive EnergyAlerts that notify customers when they are moving into higher-priced electricity tiers.	IEI Smart Meter Survey 2017
<b>Pacific Power</b>	OR	0	590,000	Pacific Power plans to install 590,000 smart meters for Oregon customers in 2018-2019.	Press Release
<b>PECO</b>	PA	1,649,000	1,649,000	PECO fully deployed 1,649,000 smart meters.	EIA Form 861
<b>Pepco Holdings</b>	DC DE MD	1,419,000	1,419,000	Pepco has reached full deployment in the District of Columbia with 303,000 smart meters installed; in Maryland, Pepco and Delmarva Power have reached full deployment of 578,000 and 213,000 smart meters, respectively. In Delaware, Delamarva Power has reached full deployment with 325,000 meters installed.	IEI Smart Meter Survey 2017
<b>Portland General Electric</b>	OR	863,000	863,000	PGE's smart meter program was approved by the state regulatory commission in 2008; full deployment was completed by the fall of 2010.	EIA Form 861
<b>PPL</b>	PA	1,426,000	1,426,000	PPL is in compliance with PA Act 129 and has fully deployed 1,426,000 smart meters in its service territory.	EIA Form 861; PA Docket No. M-2009-2092655



Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>San Diego Gas &amp; Electric</b>	CA	1,428,000	1,428,000	SDG&E has fully deployed 1,428,000 meters across its service territory.	IEI Smart Meter Survey 2017
<b>Southern California Edison</b>	CA	5,069,000	5,069,000	SCE has fully deployed more than 5 million smart meters and will continue to accommodate population growth. SCE's SmartConnect program uses the meters to offer Critical Peak Pricing and Peak Time Rebate rates to customers with enabling technology.	IEI Smart Meter Survey 2017; EIA Form 861
<b>Southern Company</b>	AL FL GA MS	4,390,000	4,570,000	Southern Company's Georgia Power, Alabama Power, and Gulf Power are fully deployed. Georgia Power reached full deployment in 2012 and has 2,428,000 meters. Alabama Power reached full deployment in 2010 and has 1,503,000 meters. Gulf Power reached full deployment in 2012 and has 453,000 meters. Mississippi Power has installed 6,000 meters and is awaiting approval from the Public Service Commission for full deployment of 187,000.	IEI Smart Meter Survey 2017
<b>Texas New Mexico Power</b>	TX	240,000	240,000	TNMP achieved full deployment of 240,000 meters in Texas in 2016. It is using smart meters to facilitate outage detection/restoration and remote connect/disconnect.	EIA Form 861
<b>United Illuminating</b>	CT	213,000	350,000	United Illuminating has installed 213,000 of its projected 350,000 smart meters.	EIA Form 861

Electric Company	State	Meters Installed (2016)	Projected Meters Installed (2020)	Notes	Resources
<b>Unitil</b>	MA NH	103,000	103,000	Unitil has fully deployed 103,000 smart meters across its service territory around Concord, NH and Fitchburg, MA. It has used this technology to, among other things, implement a time-of-use pricing pilot.	EIA Form 861
<b>Vectren</b>	IN	0	153,000	Vectren is finalizing its AMI network design and systems integration work and starting on its field network equipment deployment. Full deployment of 153,000 smart meters is expected to be complete by summer 2019.	Docket No. 44910
<b>Westar Energy</b>	KS	432,000	705,000	Westar deployed 432,000 smart meters thru end of 2016 with a goal of fully deploying 708,000 smart meters by the end of 2018. As of November 2017, approximately 575,000 meters were deployed.	IEI Smart Meter Survey 2017
<b>WE Energies</b>	WI	187,000	187,000	WE Energies has deployed 187,000 smart meters to customers in Wisconsin.	EIA Form 861
<b>Xcel Energy</b>	CO	23,700	40,000	Xcel Energy has deployed 23,700 smart meters. As part of a May 2017 settlement agreement, Xcel Energy will deploy 13,000 additional meters to support integrated volt-var optimization. Pursuant to the settlement, full deployment of smart meters will not begin until 2020.	EIA Form 826; Proceeding No. 16A-0588E
<b>Other</b>		199,350	857,000	Limited deployments by multiple operating companies accounts for close to 200,000 smart meters deployed through 2016.	IEI Smart Meter Survey 2017; EIA Form 861
<b>U.S. Total</b>		53,350,000	70,000,000		

Note: Totals are rounded.

**Table 3. Smart Meter Installations by Electric Company Type and State (2016)**

State	Investor-Owned Electric Company Smart Meters Installed	Public Power Utilities and Electric Cooperative Smart Meters Installed	Total
<b>AK</b>	0	95,900	95,900
<b>AL</b>	1,503,000	435,000	1,938,000
<b>AR</b>	69,600	407,800	477,400
<b>AZ</b>	1,329,100	1,171,900	2,501,000
<b>CA</b>	11,830,000	964,000	12,794,000
<b>CO</b>	120,600	402,500	523,100
<b>CT</b>	213,000	25,800	238,800
<b>DC</b>	303,000	0	303,000
<b>DE</b>	325,000	17,000	342,000
<b>FL</b>	5,474,000	786,000	6,260,000
<b>GA</b>	2,428,000	1,807,000	4,235,000
<b>HI</b>	5,200	31,100	36,300
<b>IA</b>	1,000	172,700	173,700
<b>ID</b>	507,600	94,600	602,200
<b>IL</b>	3,460,000	220,800	3,680,800
<b>IN</b>	92,500	547,900	640,400
<b>KS</b>	666,000	294,800	960,800
<b>KY</b>	44,700	676,800	721,500
<b>LA</b>	307,000	158,000	465,000
<b>MA</b>	44,000	64,400	108,400
<b>MD</b>	2,035,000	71,000	2,106,000
<b>ME</b>	751,200	0	751,200
<b>MI</b>	3,955,000	270,200	4,225,200
<b>MN</b>	52,800	397,800	450,600
<b>MO</b>	469,000	483,700	952,700
<b>MS</b>	6,700	536,400	543,100
<b>MT</b>	200	122,700	122,900

State	Investor-Owned Electric Company Smart Meters Installed	Public Power Utilities and Electric Cooperative Smart Meters Installed	Total
NC	552,000	1,083,500	1,635,500
ND	0	117,000	117,000
NE	0	188,300	188,300
NH	74,600	84,700	159,300
NJ	13,500	24,500	38,000
NM	0	102,900	102,900
NV	1,260,000	2,000	1,262,000
NY	12,500	27,800	40,300
OH	885,000	201,000	1,086,000
OK	1,347,000	364,800	1,711,800
OR	880,300	231,900	1,112,200
PA	3,631,000	212,000	3,843,000
RI	250	0	250
SC	214,000	467,900	681,900
SD	68,600	112,100	180,700
TN	0	1,889,500	1,889,500
TX	7,074,000	2,297,600	9,371,600
UT	0	75,200	75,200
VA	367,000	384,000	751,000
VT	262,600	35,000	297,600
WA	18,000	258,000	276,000
WI	653,000	196,400	849,400
WV	1,600	6,400	8,000
WY	42,400	45,100	87,500
<b>U.S. Total</b>	<b>53,350,000</b>	<b>18,650,000</b>	<b>72,000,000</b>

Note: Totals are rounded.

## **APPENDIX**

### **IEI 2017 Smart Meter Survey: Limits and Interpretation**

Thirty electric companies (representing 54 operating companies) provided responses to IEI's 2017 Smart Meter survey. These electric companies account for roughly 41 million of the 72 million smart meters captured in this report. The remaining information on smart meter deployments was obtained from the U.S. Energy Information Administration (Forms 826 & 861), regulatory filings, and company press releases.

This report identifies general trends and examples of how electric companies are using smart meters. The report does not attempt to cover all of the ways in which electric companies are leveraging investments in their smart meters.

### **Smart Meter Opt-Out Policies**

Several states have implemented policies that allow customers to opt out of smart meters. These customers typically pay an initial fee and a monthly opt-out fee. The number of customers who have requested to opt-out of a smart meter installation is extremely low (far less than 1 percent).

For inquiries, please contact Adam Cooper at [acooper@edisonfoundation.net](mailto:acooper@edisonfoundation.net)

## **ABOUT THE INSTITUTE FOR ELECTRIC INNOVATION**

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.

IEI promotes the sharing of information, ideas, and experiences among regulators, policy makers, technology companies, thought leaders, and the electric power industry. IEI also identifies policies that support the business case for the adoption of cost-effective technologies.

IEI is governed by a Management Committee of electric industry Chief Executive Officers. In addition, IEI has a Strategy Committee made up of senior electric industry executives and a select group of technology companies on its Technology Partner Roundtable.

## **ABOUT THE EDISON FOUNDATION**

The Edison Foundation is a 501(c)(3) charitable organization dedicated to bringing the benefits of electricity to families, businesses, and industries worldwide. Furthering Thomas Alva Edison's spirit of invention, the Foundation works to encourage a greater understanding of the production, delivery, and use of electric power to foster economic progress; to ensure a safe and clean environment; and to improve the quality of life for all people. The Edison Foundation provides knowledge, insight, and leadership to achieve its goals through research, conferences, grants, and other outreach activities.



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