I&M Exhibit: _____

Cause No. 45576

INDIANA MICHIGAN POWER COMPANY

PRE-FILED VERIFIED DIRECT TESTIMONY

OF

TOBY L. THOMAS

Content

DIRECT TESTIMONY OF TOBY L. THOMAS
ON BEHALF OF
INDIANA MICHIGAN POWER COMPANY

I. Introduction of Witness

Q1. Please state your name and business address.

My name is Toby L. Thomas and my business address is Indiana Michigan Power Center, P.O. Box 60, Fort Wayne, IN 46801.

Q2. By whom are you employed and in what capacity?

I am employed by Indiana Michigan Power Company (I&M or Company) as its President and Chief Operating Officer.

Q3. Briefly describe your educational background and professional experience.

I hold a Bachelor of Science Degree in Mechanical Engineering from the Rose Hulman Institute of Technology. I joined American Electric Power Company, Inc. (AEP) in 2001 as a project engineer involved in the development and optimization of competitive power generation and industrial steam generation projects across the United States. I have performed various roles of increasing responsibility including serving as the Managing Director for Kentucky Power, Gas Turbine and Wind Generation.

In 2013, I was named Vice-President Competitive Generation for AEP Generation Resources, where I was responsible for the safe, efficient, and environmentally compliant operation of AEP's competitive generating assets – *i.e.*, the AEP plants that are not part of a vertically integrated AEP operating company. I became President and Chief Operating Officer of I&M on January 1, 2017.

Q4. What are your responsibilities as Chief Operating Officer?

I am responsible for the safe, reliable, and efficient day-to-day operation of I&M, which is an operating company subsidiary of AEP. I am accountable and responsible for I&M's financial performance and the quality of the services we provide to our customers.

My responsibilities include I&M's community involvement and economic development, and ensuring compliance with federal regulatory and statutory rules, as well as laws of Indiana and Michigan, the states comprising the Company's electric service territory. Essentially, I am accountable for the Company's distribution, customer service, transmission, and generation functions to provide safe, adequate and reliable service to I&M's customers.

Q5. Have you previously testified before any regulatory commissions?

Yes. I have provided testimony in several cases before the Indiana Utility Regulatory Commission (IURC or Commission) including I&M's two most recent rate cases docketed as Cause Nos. 45235 and 44967. I also provided testimony in Michigan Public Service Commission (MPSC) Case Nos. U-20359, U-18370 and U-18092. I also testified before the Public Utilities Commission of Ohio in Case Nos. 14-1693-EL-RDR *et seq.* on behalf of Ohio Power Company.

II. Purpose of Testimony

Q6. What is the purpose of your testimony?

My testimony provides an overview of I&M's overall request. I discuss ongoing operating challenges and the need to replace aging infrastructure and strengthen the grid. I generally describe the Company's integrated investment plans to continue to modernize our systems, including information technology and the distribution systems, to enhance reliability, to deploy grid technologies

such as Advanced Metering Infrastructure (AMI), to maintain safe and reliable generation resources, and to take advantage of new technologies to efficiently manage our business and improve our customer's experience. My testimony also discusses I&M's efforts to control costs for the benefit of our customers. Together with Company witness Bulkley, I support the Company's requested return on equity (ROE) of 10.00 percent. Finally, to provide context, I provide an overview of I&M's service area and organizational structure and the Company's relationship with AEP.

Q7. Are you sponsoring any attachments?

Yes. I am sponsoring the following Attachments:

- Attachment TLT-1, which is a copy of the Petition in this Cause and attached filing index and summary. As the Petition has been filed separately it is not reproduced with my testimony but will be offered into evidence with my testimony at the hearing in this Cause.
- Attachment TLT-2, which is a copy of the 2019 IEI report identified below.

Q8. Were the attachments that you sponsor prepared or assembled by you or under your direction?

Yes.

Q9. Please summarize your testimony.

As a regulated company, the price we charge for retail electric service is necessarily underpinned by the cost the Company incurs to provide service. The Test Year results demonstrate that the Company's rates will not be sufficient to cover the Company's Test Year cost of providing service. I&M requests that the Commission approve a total annual increase in revenues of approximately $104 million, or 6.5%. Commission approval of the proposed

package of base rates and rate adjustment mechanisms is reasonable and necessary to allow the Company to continue to meet our customers' needs for service.

The Rockport Unit 2 Lease ends in December 2022, the last month of the Test Year. The Company proposes to recognize the annual Lease payment savings as a reduction to cost of service in I&M's Resource Adequacy Rider (RAR) filings. Reflecting these cost savings in the RAR will largely offset the impact of the proposed rate increase on customers.

Similarly, the Cook Life Cycle Management (LCM) Project is nearly complete. The Company proposes to wind down the LCM Rider in an efficient manner. The PJM Rider, on the other hand, remains important due to the grid investment needs and associated cost of transmission service within PJM.

The rate adjustment mechanisms included in the Company's filing are an important tool in our effort to timely reflect variable costs and savings in I&M's rates for electric service while providing reliable service to our customers.

The Company's filing includes an average annual capital expenditure of $539.9 million during the Capital Forecast Period (January 2021 – December 2022). The capital investments reflected in the Company's filing focus on infrastructure improvements and complying with environmental and regulatory requirements. The Company is continuing to execute its integrated grid modernization package, which incorporates technologies such as AMI, Enhanced Conservation Voltage Reduction (Enhanced CVR), distribution automation circuit reconfiguration (DACR), supervisory control and data acquisition (SCADA), distribution line sensors, smart reclosers and smart circuit ties. Embracing new technology and automated controls, including AMI, will improve and modernize our energy delivery infrastructure and service and improve the customer experience. Customers will benefit from this investment through improved system reliability and improved tools to manage energy usage and cost. The

Company also continues to invest in technologies that improve internal business processes and customer interactions, which are essential to I&M's strategy to control costs and improve the customer experience.

The Company requests an authorized ROE of 10.00 percent in conjunction with Commission approval of the rate relief package proposed by the Company in this Cause. The Company's requested ROE and associated rate relief supports the Company's ongoing ability to secure access to comparatively low cost capital to fund its operations, which is heavily dependent on regulatory support that authorizes rate increases in a timely manner, manages known risks, provides predictability and fairly compensates equity investors.

The AMI Project that is part of I&M's integrated distribution strategy is scheduled to occur over four years (2021 through 2024) and is estimated to have a cumulative capital cost of approximately $121 million. The age of our existing meters, our experience and knowledge of AMI, and a cost-benefit analysis prepared by Accenture (Accenture CBA) give us confidence that investing in AMI technology can provide many benefits to the distribution system and our customers. The Company proposes to include the capital cost contained in the 2021–2022 Capital Forecast Period in base rates and address the ongoing investment, as well as operational cost savings identified in the Accenture CBA through the proposed AMI Rider so that this benefit also flows through to customers as AMI is deployed.

In sum, rate relief is necessary and appropriate to support our ongoing effort to address aging infrastructure, secure long-term reliability and resiliency, enhance the service we provide through new technology and automation, and otherwise meet the ongoing energy and capacity needs of our customers.

III. Overview of I&M's Request

Q10. What is the annual revenue increase sought by I&M in this proceeding?

I&M is requesting that the Commission approve a total annual increase in revenues of approximately $104 million, or 6.5%, based on a forward looking calendar Test Year ending December 31, 2022. The Company proposes to phase-in the increase over two steps. The initial step will reflect an increase of $73 million, or 4.55%; the second step will reflect an increase of $31 million, or approximately 2% as adjusted for actual Test Year investments. As discussed by Company witness Williamson, I&M proposes to use the Resource Adequacy Rider (RAR) to reflect the net reduction in expense associated with the Rockport Unit 2 Lease expiration in December 2022. The use of the RAR will allow customers to realize approximately $82 million of annual Lease savings in a timely fashion which will significantly offset the proposed rate increase.

Q11. Why is the requested rate increase necessary?

The Company's ongoing investment in infrastructure remains important to our efforts to maintain and improve our service and our customers' experience. As shown by the Company's case-in-chief, the Test Year results demonstrate that the Company's rates will not be sufficient to cover the Company's Test Year cost of providing service. As a regulated company, the price we charge for retail electric service is necessarily underpinned by the cost the Company incurs to provide service. Commission approval of the Company's proposed package of base rates and rate adjustment mechanisms is necessary for the Company to continue to meet our customers' needs for service.

Q12. Please provide an overview of the infrastructure investment underlying the need for a rate adjustment.

The Company's filing includes average annual capital expenditures of $539.9 million during the Capital Forecast Period (January 2021 – December 2022).[1] The investments reflected in the Company's filing focus on infrastructure improvements, investments in cybersecurity and information technology, and complying with environmental and regulatory requirements. Embracing new technology and automated controls will improve and modernize our energy delivery infrastructure and service and improve the customer experience. Customers will benefit from this investment through improved system reliability and improved tools to manage energy usage and cost.

As explained below, AMI is an essential and integral element of the Company's grid modernization strategy, as it provides wide ranging operational and customer benefits, allows the Company to meet the ongoing need for service and facilities, and builds the foundation for ongoing technological advancement, personalized customer experience and evolving customer service needs.

Q13. How does the Company make investment decisions regarding its electricity generation and energy delivery system?

To make investment decisions in our electricity system, our management team considers numerous factors, including environmental and regulatory compliance, integrated resource planning, the service reliability metrics reported to the Commission, age and condition of the Company's facilities, the consequence of failure, customer and employee safety, avoidance of outages, preservation and improvement of operational integrity, equipment protection, evolving customer demands, and taking advantage of new technology options.

[1] Company witness Lucas Direct Testimony, Q35 (average annual capital expenditures in 2021 – 2022 is forecast to be $539.9 million compared to $566.3 million in 2016 – 2020).

Once we determine and prioritize the investments or maintenance needs required to serve our customers, we then employ industry proven design, engineering, and project execution methods to ensure the desired results are achieved in a timely and efficient manner. Our approach is a thoughtful, reasoned, flexible process that ensures we are doing the right projects or activities at the right time, at a reasonable cost to ensure we have reliable and efficient generation resources and a safe and resilient electricity system capable of meeting customers' needs 24/7.

Q14. Are the costs reflected in I&M's filing and the proposed rates reasonable and necessary to allow I&M to provide service to its customers?

Yes. Recognizing the cost of providing service in the ratemaking process in a timely manner better positions the Company to provide service and the customer to utilize service in an informed manner. I&M has worked hard to responsibly grow our business by attracting and retaining customers and we remain committed to supporting economic development of the communities in which we serve. The costs reflected in the proposed rates are reasonably representative of the Test Year cost of service and are reasonable and necessary for the Company to provide safe, adequate and reliable service during the time the rates are expected to be in effect.

Q15. Do other Company witnesses support the Company's request?

Yes. Company witness Seger-Lawson summarizes I&M's requested rate relief, and together with the Company's other witnesses supports the accounting and ratemaking reflected in the Company's filing. Company witness Fischer supports our proposed rate design, including the proposed changes in the residential rate design. The Company's request is further supported by the witnesses identified on the Index of the Company's filing included with the Petition. This support includes testimony and evidence from subject matter experts, including subject

matter experts responsible for providing generation and energy delivery services. This support also includes testimony of financial experts to discuss the financial needs of the Company and technical witnesses to describe the level of costs that will be incurred going forward.

While I further discuss certain aspects of the Company's filing below, to provide context the next section of my testimony turns to an overview of I&M.

IV. I&M Overview

Q16. Please describe I&M and its organizational structure.

I&M supplies electric service to approximately 470,000 retail customers in northern and east-central Indiana and 130,000 retail customers in southwestern Michigan. I&M operates plant and equipment in Indiana and Michigan that are in service and used and useful in the generation, transmission, and distribution of electric service to the public. I&M's Indiana service territory consists of over 3,200 square miles and includes the Cities of Fort Wayne, South Bend, Elkhart, Muncie, Marion, Kendallville and Decatur.

The Company's principal offices are located in Fort Wayne, Indiana. I&M's four distribution and customer service districts (Benton Harbor (MI), Fort Wayne, South Bend/Elkhart, and Muncie/Marion) are each responsible for a specific geographic portion of I&M's service territory.

I&M is subject to the regulatory authority of the Commission, the Michigan Public Service Commission (MPSC), and the Federal Energy Regulatory Commission (FERC). I&M is a member of PJM Interconnection, LLC (PJM),

which is a regional transmission organization (RTO) serving the eastern portion of the country.

Q17. Please describe the relationship between AEP and I&M.

AEP owns electric operating companies located in the Midwestern and central parts of the country, including I&M. In key respects, the operating companies function as an integrated utility system that provides electric service to approximately 5.4 million customers located in eleven states. To effectively manage the costs of joint activities, American Electric Power Service Corporation (AEPSC) provides corporate support services to the operating companies, including generation-related services, human resources, information technology, accounting, finance and legal.

I&M is located in the AEP System – East Zone (AEP East), which is an integrated generation and transmission network located in Indiana, Kentucky, Michigan, Ohio, Tennessee, Virginia, and West Virginia. AEP's operating companies, including I&M, are responsible for day-to-day operations and management of local business affairs, including responsibility and accountability for the operation of each operating company's generating plants.

I&M participates in a FERC-approved Power Coordination Agreement (PCA) with the three other regulated, vertically-integrated AEP East Operating Companies (Appalachian Power Company, Wheeling Power Company and Kentucky Power Company). The PCA is the successor agreement to the AEP Interconnection Agreement that terminated in January 2014. Through the PCA, I&M is responsible for planning for and serving our customers' capacity and energy resource needs. The PCA also provides for the direct assignment of

traditional Off System Sales (OSS) and for the allocation of asset hedges and trading.

V. Ongoing Challenges and Service to Customers

Q18. Please describe the ongoing challenges faced by the Company with respect to the ongoing provision of adequate and reliable retail electric service and facilities.

Key challenges facing I&M include how to continue to provide reliable electric service at a comparatively low price when costs are rising, environmental regulation is changing and, customer needs and technology are evolving. Because many electronic devices and equipment used by our customers today are less tolerant of even minor service interruptions, continued diligence with respect to service reliability remains important. I&M also continues to recognize developing environmental concerns, including those addressed to the issues surrounding climate change and customer interest in renewable energy resources.

It is important to improve the alignment between our rate structures and the fixed and variable cost of the service we provide so that customers are sent appropriate price signals. As the Commission has previously recognized:

> *Cost recovery design alignment with cost causation principles sends efficient price signals to customers, allowing customers to make informed decisions regarding their consumption of the service being provided.*[2]

[2] *Indianapolis Power & Light Company*, Cause No. 44576 (IURC 3/16/2016), p. 72.

Q19. Is it important to continue the use of general rate cases in combination with ongoing rate adjustment mechanisms?

Yes. I&M seeks to continue the timely recovery of costs because rate adjustment mechanisms are an important tool in our effort to meet ongoing challenges while providing reliable service to our customers. We appreciate the ability to better match the time costs are incurred with their inclusion in rates through the use of a forward-looking Test Year and the Commission's approval of timely cost recovery mechanisms.

As stated below, and further discussed by Company witness Williamson, the Rockport Unit 2 Lease ends in December 2022, the last month of the Test Year, and the Company proposes to timely recognize the elimination of the annual Lease payment as a reduction to cost of service in I&M's RAR filings. Similarly, the Cook LCM Project is nearly complete. Company Witness Auer explains the Company's proposal to wind down the LCM Rider in an efficient manner.

As shown by Company witness Koehler, the PJM Rider remains important due to the grid investment needs and associated cost of transmission service within PJM. The transfer of functional control of the Company's transmission facilities to PJM was authorized by the Commission's September 10, 2003 Order in Cause Nos. 42350/52. The Company's membership in PJM has allowed I&M's customers to benefit from the independent regionally operated, and jointly planned and coordinated, PJM transmission grid necessary to enhance competitive wholesale markets, resource diversity and system reliability and

security. The PJM rate adjustment mechanism remains reasonable and necessary.[3]

Q20. Has the Company considered these challenges in developing its proposals in this case?

Yes. The package of rate relief including the adjustment to base rates and ongoing use of rate adjustment mechanisms is reasonably designed to meet these objectives while also remaining mindful of rate impacts, as well as the Company's need for a reasonable opportunity to earn a fair return.

Q21. Has the Company considered these objectives in developing its return on equity recommendation?

Yes. Company witness Bulkley presents her analysis and conclusion that the Company's return on equity is within a range between 9.75 percent and 10.45 percent. Within this range, the Company requests an authorized ROE of 10.00 percent. Company witness Bulkley testifies that while this request falls below the midpoint of her range, the requested ROE is reasonable in conjunction with Commission approval of the rate relief package proposed by the Company in this Cause.

Q22. Do I&M's customers benefit from I&M being able to secure capital at a competitive cost?

Yes. Maintaining access to the capital markets for competitive low cost debt and equity financing continues to be paramount for I&M and its customers. I&M's ability to access capital to fund its operations is heavily dependent on regulatory support that authorizes rate increases in a timely manner, manages known

[3] The history, rationale and benefits the FERC's efforts to transition to a competitive market are summarized in the FERC's Order No. 2000 (In Re Regional Transmission Organizations, dated December 20, 1999, 89 FERC ¶ 61,285).

risks, provides predictability and fairly compensates equity investors. Being in good financial health and having predictable revenues benefit customers by allowing I&M to compete both internally and externally for access to capital at reasonable terms relative to others in the utility industry.

Q23. How does the Company's proposal to update its residential rate design further those objectives?

Company witness Fischer presents the Company's proposed rate design for residential service, including the proposal to increase the residential monthly service charge from $15.00 to $20.00. Importantly, it should be recognized that the percentage increase in the service charge relates only to one component of the customer's entire bill and should not be confused as equating to an overall increase in the entire bill. As previously recognized by the Commission, "gradualism is best considered in the context of the entire customer bill and not discrete charges within the bill."[4]

While proposals to change the residential rate design have been controversial in past cases, as noted above, it is important that we continue to make progress on properly designing our rates to align cost recovery with cost causation principles. Doing so sends efficient price signals to customers so as to allow them to make informed decisions regarding their consumption of the service being provided.

If I&M's rates are not properly designed, some customers will be incented to avoid fixed costs buried in the variable charge, leaving those fixed costs to be spread among the other customers. Under I&M's proposed rate design, the total bill for all customers will better reflect the underlying cost of service.

[4] Cause No. 45235 Order dated March 11, 2020, p. 96 (quoting March 16, 2016 order in *Indianapolis Power & Light Company,* Cause No. 44576, p. 72).

Additionally, the proposed rate design provides benefits for those low income, high usage customers, while remaining fair to low income, low usage customers.

VI. Grid Modernization Strategy (including AMI)

Q24. Please summarize the Company's integrated distribution service strategy.

The goal of I&M's distribution service strategy is to provide customers with a reliable, high quality experience that allows them to optimize the use of our energy delivery platform. We began executing our strategy several years ago as we renewed our focus on energy delivery service. I am pleased to report that the strategy is showing results that demonstrate we are headed in the right direction.

At its core, I&M's distribution strategy is based on three guiding principles:

- Improve the reliability of the system today and in the future.
- Utilize technology to increase operational efficiency and create a more optimized system.
- Position I&M to meet changing regulatory requirements and customer expectations.

These principles guide our identification of needs and opportunities for enhancing our distribution service and our thoughtful and deliberate plans to implement projects and process improvements.

To improve the reliability of the system, I&M is continuing its strategic approach to asset renewal, which is necessary to maintain a safe and reliable system. We are also continuing the vegetation management program that protects our facilities and promotes reliable service, while being considerate of the interests of property owners. The efforts I&M has made over the past five years have

produced improvements in our reliability metrics that show customers are benefiting from our strategic initiatives.

The utilization of technology allows us to increase operational efficiency, which benefits our customers' experiences with our service. For example, grid modernization technologies, including AMI, allow the Company to have a more predictive and data-driven approach to managing the system. Through technology, we can safeguard against potential outages, take advantage of self-healing opportunities, and reduce outage restoration times. Combining AMI with the use of Enhanced CVR can reduce system losses and provide more insight into customer end use points.

Last, but not least, our distribution system strategy prepares us to provide a system on which customers can optimize their use of our service in a changing energy world. The energy industry is starting to move away from a linear paradigm where electrons flowed in one direction from large central power stations to end users and moving towards a more complex matrix of customer options, including distributed energy resources (DER) that provide a two-way power flow. Customer and regulatory expectations are evolving in parallel with the changing industry. The Company's proposals provide customers with more control, optionality and new program offerings. Regulators expect us to integrate our generation and energy delivery planning and to accommodate the increasing penetration of DERs. For example, we must be ready to proactively and collaboratively address the implications of FERC's recent Order 2222. Our strategy is intended to allow us to meet the changes in customer expectations and regulatory requirements.

Company witnesses Isaacson, Lucas and Walter provide details of the specific elements of our plans in their respective testimonies.

Q25. Please provide an overview of the AMI Project that is an integral part of I&M's distribution service strategy.

As discussed by Company witness Isaacson, I&M plans to deploy AMI across its Indiana service territory over the four-year period of 2021 through 2024. The Company's AMI program provides for the efficient deployment of this technology and will enable the Company and our customers to realize the value of this technology in a timely manner.

I&M has been assessing the deployment of AMI for years as part of its grid modernization efforts intended to improve customer experience and provide other operational benefits. In fact, we proposed a deployment plan in the 2019 base rate case (Cause No. 45235). The Commission's March 11, 2020 Order in Cause No. 45235 (45235 Order) (p. 12) recognized that:

> *Given the industry advancements in AMI technology, we find the key question is not 'whether' AMI technology should be deployed, but rather, 'when' it is reasonable to do so and recover these costs from I&M's ratepayers.*

Following issuance of the 45235 Order, the Company engaged Accenture to assess the costs and benefits associated with an AMI deployment and usefulness of this technology in the provision of retail electric service. The Accenture CBA, which is described in detail by Company witness Bech, furthered the Company's understanding of the value streams from this technology, as well as the integrated nature of the wide-ranging benefits across the Company's operations. This in turn facilitated the development of the deployment plan and customer programming presented in this case.

Q26. Why is it appropriate to proceed with AMI deployment at this time?

As also discussed by Company witness Isaacson, the Company's current metering infrastructure is predominantly an AMR Standard Consumption Meter

(SCM) metering system. The one vendor (Itron) that remains in the AMR meter business no longer supports this platform. Consequently, the Company has two choices: 1) make a substantial investment in a declining technology; or 2) move to AMI technology.

Given the age of the existing meters, it is reasonable to move to AMI. In making our decision, we recognized that AMI technology has matured, its pricing has stabilized and its importance to system and customer operations has increased.

Our experience and knowledge of AMI technology and the Accenture CBA tell us that investing in AMI technology can provide many benefits to the distribution system and our customers.

From an operational perspective, as discussed by Company witnesses Isaacson and Walter, AMI integrates with other grid modernization technologies to provide insight into optimizing the reliability of the grid. For customers, AMI provides more insight and control into how and when they use the electric service, which enhance the customer's experience by enabling customer programs and services (e.g. the proposed voluntary Flex Pay service), as discussed by Company witnesses Lucas and Walter.

Finally, I&M can take advantage of the lessons learned from AMI deployment by our AEP affiliated operating companies in other states.

Taken together and as further discussed by the other Company witnesses identified above, these factors support the systematic move to AMI at this time.

Q27. Why is it appropriate to pace the deployment of AMI over a 45-month period?

As shown by Company witness Bech, once the investment decision is made, it is cost effective to roll out the new technology in a timely manner via a systematic replacement plan. The Accenture CBA found that a 27-month deployment scenario had the best score (net present value). However, this

deployment scenario introduced additional execution and cost overrun risks, which can be mitigated if the deployment period is lengthened. While the net present value of a 45-month deployment plan was lower, it is still reasonably close to the 27-month deployment scenario and an appropriate way to mitigate risks.

The Accenture CBA also found that an end of life (EOL) scenario where meters are randomly replaced when they fail and reach EOL (full deployment reached at 2035) had a much lower net present value and would not permit the Company to achieve efficiencies associated with a systematic replacement plan. This kind of reactive approach would also delay the opportunity for our customers to benefit from AMI technology.

Therefore, the 45-month deployment scenario is reasonable and financially justified.

Q28. What is the timeline for achieving customer benefits from the AMI deployment plan?

As discussed by Company witness Lucas, the Company proposes to roll-out the customer engagement platform and AMI enabled customer programs contemporaneous with the deployment of AMI meters to allow customers to take advantage of the AMI technology as it is installed. As explained by Company witness Seger-Lawson, the Company proposes to reflect the ongoing post Test Year capital investment, as well as operational cost savings identified in the Accenture CBA, through the proposed AMI Rider so that this benefit also flows through to customers as AMI is deployed.

Q29. Has the Company considered the impact to customer bills of the proposed AMI deployment plan?

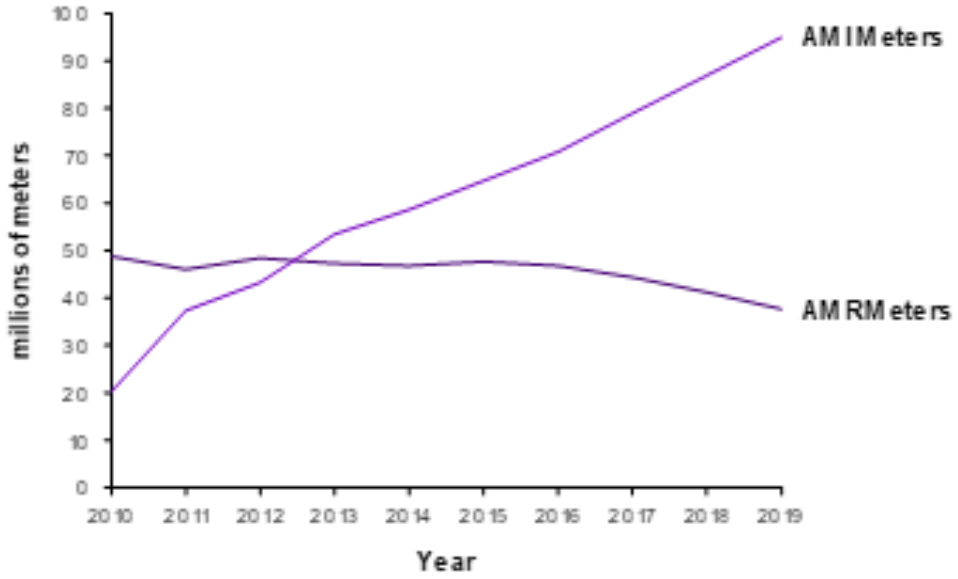
Yes. Like all major investment decisions, I&M considered the impact on customers and the bills they pay for service when deciding the merits of

installing AMI. To mitigate the bill impact, we developed a thoughtful, cost effective plan to install AMI efficiently and effectively. The 45-month deployment period mitigates the bill impact by more gradually reflecting the costs in rates and the proposed AMI Rider will flow through cost savings to customers' bills. We have also included depreciation of the remaining AMR meters over the life of the AMI meters to reduce the impact of depreciation expense reflected in rates, as discussed by Company witness Cash. We are confident that the cost of the AMI deployment plan is worthwhile to provide our customers with a quality of service that meets their needs for transparency into and control over their consumption of electricity.

Q30. Is the transition to AMI meters reasonable and necessary to maintain the Company's utility property in an operating state of efficiency corresponding to the progress of the industry?

Yes. Most of the investor-owned utilities in Indiana and Michigan have begun or completed smart meter deployments.[5] I&M's sister companies have moved to this technology and utilities across the U.S. have reported strong acceptance of Smart Grid technology. The state of AMI meter deployment is illustrated by Figure 2 in the Accenture CBA reproduced below:

[5] The IEI report (pp. 12, 14) indicates that Vectren expects to fully deploy 153,000 smart meters by the end of 2019 in Indiana; and Duke Energy Indiana completed its deployment in 2019. The Commission has also approved IPL's transition from AMR to AMI meters. IPL, Cause No. 45264 (IURC 3/4/2020).



A recent report published by The Edison Foundation Institute for Electric Innovation (IEI) corroborates the view that the transition to AMI remains an industry priority. The IEI report projects that U.S. electric companies have installed 98 million smart meters as of year-end 2019, covering more than 70

percent of all U.S. households.[6] The report also projects the total number of installed smart meters will rise to 107 million by the end of 2020.[7]

While the timing and nature of the Company's decisions regarding infrastructure are necessarily Company specific, these materials illuminate and validate the Company's plan to deploy AMI.

VII. Efforts to Mitigate Increasing Costs

Q31. Please discuss the ongoing efforts taken by I&M to manage costs.

The Company is keenly focused on maximizing the value of the service we provide to our customers. One way we seek to achieve this is by mitigating cost increases where possible without negatively impacting service quality or accepting unreasonable risk to infrastructure or safety.

We manage our operations based on continuous improvement principles. Our Company currently has programs underway to utilize new technologies, to automate manual and repetitive tasks, and use advanced data analytics to drive efficiencies.

Once the annual budget is approved by management, the individual managers in charge of each department, operating district, power plant, or other functional area, are responsible and accountable for operating within the approved amounts.

[6] Electric Company Smart Meter Deployments: Foundation for a Smart Grid (2019 Update), at 3; IEI_Smart-Meter-Report_2019_FINAL.ashx (edisonfoundation.net). The IEI reports are publicly available on the Internet and I have included a copy of the 2019 Report with my testimony as Attachment TLT-2.

[7] *Id.*

Our commitment to and success with operating cost control is demonstrated by the year-over-year operating cost comparisons in Company witness Lucas' testimony.[8]

VIII. Impact on Customers

Q32. Is the Company mindful of the impact of rate increases on customers?

Yes. We consider our ongoing investments through a lens of providing safe and reliable electric service while being mindful of the cost impacts. I&M undertakes asset management and replacement consistent with Ind. Code § 8-1-2-0.5. This statute provides that the State policy is intended to "create and maintain conditions under which utilities plan for and invest in infrastructure necessary for operation and maintenance while protecting the affordability of utility services for present and future generations of Indiana citizens." The reference to conditions "under which utilities plan for and invest in infrastructure" suggests to me that the General Assembly acknowledges and supports the good utility planning and prioritization of resources as a means for promoting affordability. In my view, the policy recognizes that addressing infrastructure issues on an emergent basis is more costly than taking a planned approach to investment. This is precisely what I&M is seeking to do through capital expenditures, including the AMI and other technology deployment.

Finally, I&M ratemaking and rate design proposals seek to reflect the way a customer uses the system accurately and fairly in the customer's rates. This enables customers to reasonably evaluate options and make rational decisions.

[8] See Lucas Direct Testimony, Section IV.

Company witnesses Duncan, Fischer, and Williamson further address the customer impact through the Company's two-step phase-in rate adjustment mechanism and RAR.

Q33. Does the Company offer assistance to customers who may need help paying their bill?

Yes. We recognize that it is difficult for some customers to pay their electric bills, and we continue to offer payment assistance programs ranging from agreements to extend a bill payment a few days to longer monthly payment programs. In addition, I&M continues to offer a portfolio of cost effective energy efficiency programs to help customers reduce their energy usage.

The deployment of AMI will give our customers better insight into their energy usage. This in turn will allow informed decisions and opportunities for customers to reduce their electric bill by changing their use of electricity. Company witness Lucas discusses the proposed I&M Flex Pay Program and the diversified suite of optional rates and load management programs included in the Company's filing to allow customers to utilize AMI technology and benefit through reduced energy and load requirements.[9]

IX. Conclusion

Q34. What is your recommendation?

As mentioned above, the electric business continues to change as a result of environmental regulation, economic conditions, evolving technology and changes in the way our customers use electricity and want to be served. Our

[9] Lucas Direct Testimony, Section VII.

goal is to invest wisely, operate our business efficiently, and provide a customer experience that serves customers the way they want to be served.

Rate relief is necessary and appropriate to support our ongoing effort to address aging infrastructure, secure long-term reliability and resiliency, enhance the service we provide through new technology and automation, and otherwise meet the ongoing energy and capacity needs of our customers. The proposals we make in this case allow us to continue to embrace technology advancements and use them for the benefit of customers.

We ask the Commission to find that I&M's proposal is a balanced and rational solution to the Company's need for both cost recovery and a reasonable opportunity to earn a reasonable return, while we continue to fulfill I&M's duty to provide reliable electric service and facilities to our customers.

Finally, we at I&M have a responsibility to our customers to manage our business properly so I ask the Commission to timely approve the proposed rate relief to allow I&M to continue to provide customers adequate and reliable electric service and facilities.

Q35. Does this conclude your pre-filed verified direct testimony?

Yes, it does.

VERIFICATION

I, Toby L. Thomas, President and Chief Operating Officer for Indiana Michigan Power Company, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information, and belief.

Date: June 30, 2021

Toby L. Thomas

Attachment TLT-1: Verified Petition

The Verified Petition in this case is filed separately.

The Edison Foundation
INSTITUTE for ELECTRIC INNOVATION

Report

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

December 2019

Prepared by:
Adam Cooper
Mike Shuster

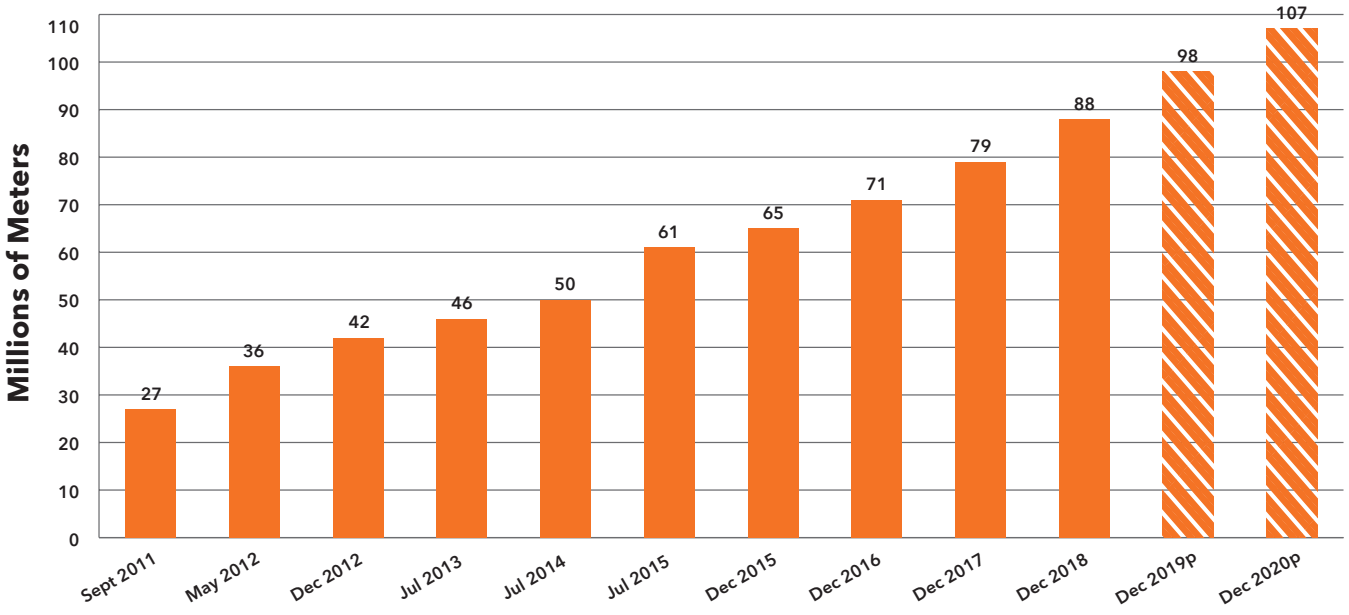
EXECUTIVE SUMMARY

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



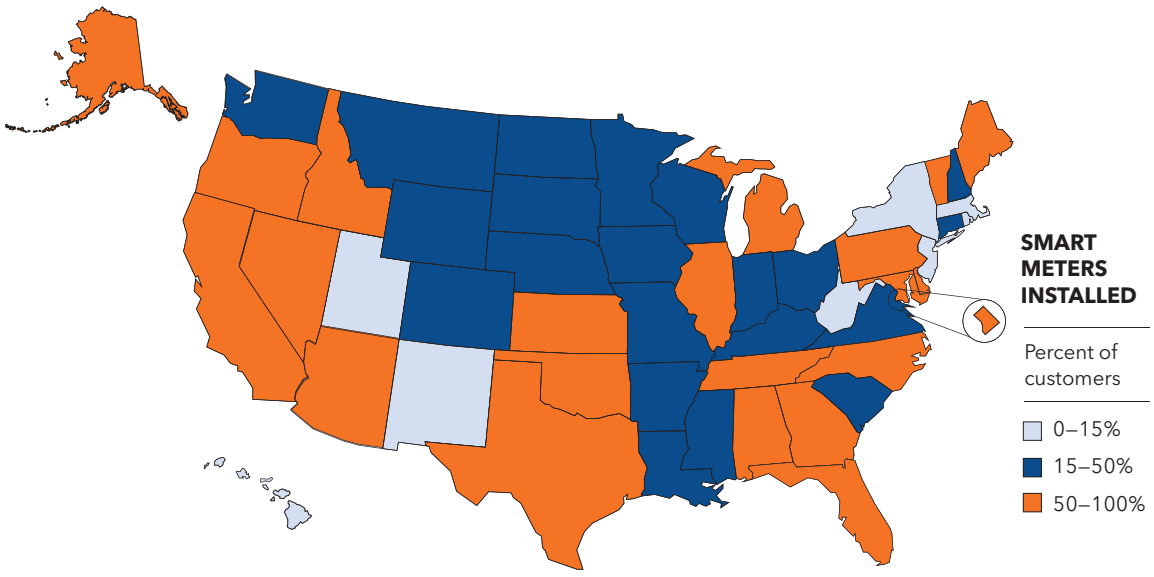
1. Smart meters, or advanced metering infrastructure (AMI), are digital meters that measure and record electricity usage data hourly, or more frequently, and allow for two-way communication between electric companies and their customers.
2. For the purposes of this report, the electric power industry 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.

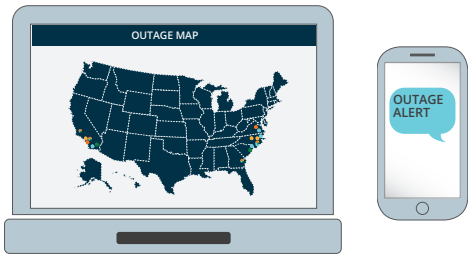
Proactive Outage Communications

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

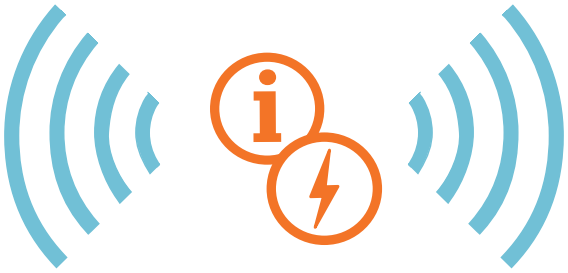
Smart meters were instrumental in the speedy recovery efforts following Hurricanes Harvey and Irma in 2017, Hurricane Michael in 2018, and Hurricane Dorian in 2019. The data from smart meters, when integrated with other systems, gave electric companies visibility into the distribution grid and the ability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