DIRECT TESTIMONY OF DONALD L. SCHNEIDER, JR.
DIRECTOR, ADVANCED METERING
DUKE ENERGY BUSINESS SERVICES LLC
ON BEHALF OF DUKE ENERGY INDIANA, INC.
CAUSE NO. 44526 BEFORE THE
INDIANA UTILITY REGULATORY COMMISSION

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Donald L. Schneider, Jr., and my business address is 400 South Tryon Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Director, Advanced Metering by Duke Energy Business Services LLC, a service company subsidiary of Duke Energy Corporation ("Duke Energy"), and a non-utility affiliate of Duke Energy Indiana, Inc. ("Duke Energy Indiana" or "Company").

Q. WHAT IS YOUR PRIMARY RESPONSIBILITY AS DIRECTOR, ADVANCED METERING?

A. As Director, Advanced Metering, I am responsible for managing the project execution of all Advanced Metering Infrastructure ("AMI") related projects for all Duke Energy jurisdictions.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a Bachelor of Science Degree in Electrical Engineering from the University of Evansville in 1986. Upon graduation, I was employed by Duke Energy Indiana (then known as Public Service Indiana) as an electrical engineer.

Throughout my career with Duke Energy, I have held various positions of increasing responsibility in the areas of engineering and operations, including distribution planning, distribution design, field operations, and capital budgets. Prior to my current position with the Company, I was General Manager, Midwest Premise Services, responsible for managing all of Duke Energy's Midwest premise service and meter reading departments. In 2008, prior to the Duke Energy/Progress Energy merger, I was promoted to a position responsible for managing the project execution for all Grid Modernization projects in the field, including both AMI and Distribution Automation ("DA") devices, for all legacy Duke Energy jurisdictions.

Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF INDIANA?

A. Yes. I have been registered as a professional engineer with the State Board of Registration for Professional Engineers in the state of Indiana since 1995.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to discuss the Company's plans to implement AMI technology in Indiana, including deployment timelines, as well as provide background on Duke Energy's experiences deploying AMI in other jurisdictions. Through this testimony I am also sponsoring exhibits to demonstrate the positive business case for deploying AMI technology in Duke Energy Indiana's service territory.

II. AMI TECHNOLOGY

Q. PLEASE DESCRIBE THE PROPOSED METERING PLAN.

A. Duke Energy Indiana is proposing implementation of an advanced metering solution across its Indiana service territory. The Company estimates this effort will include approximately 817,000 advanced meters and associated communications and IT infrastructure. The project consists of a four-year phased deployment of most meters for Duke Energy Indiana residential and commercial customers. However, some larger commercial and industrial (C&I) customers in Indiana already have an advanced metering solution including the ability to automatically communicate with the Company. There is no need to change out these large C&I meters.

Q. PLEASE DESCRIBE THE METERING SOLUTION THE COMPANY IS PROPOSING.

A. The AMI metering solution is not a simple meter change-out. In addition to changing out the meters, the AMI metering solution covers all of the components necessary to communicate with the advanced meters and collect usage data and event information from them. The overall solution includes advanced meters, a two-way communication network, and central computer systems. Advanced meters – often referred to as "smart meters" – are electricity meters that have advanced features beyond traditional electricity meters. Some of the advanced features include two-way communications capability, interval usage measurement, tamper detection, voltage and reactive power measurement, and net

metering capability.

In order to create the two-way communications path to the advanced meters, the Company will install a neighborhood area network ("NAN"). This represents the network connecting advanced meters to a collection point. The NAN will use a mesh architecture, as depicted in figure "A" – AMI Solution Architecture below. Mesh networks are flexible in that the meters within the mesh network establish an optimized communication path to a collection point either through other meters or, in some cases, through network range extenders. Range extenders may be used to extend the mesh signal to meters that would have otherwise been outside the reach of the mesh network. Mesh communications throughout the NAN occur using wireless radio frequency ("RF") transmissions in the 902-928 MHz spectrum band.

Collection points serve as the interchange between NAN communications and the Company's central computer systems. Collection point devices aggregate the communications from all advanced meters within a NAN and communicate the information over a Wide Area Network ("WAN") to the central computer systems, and they also communicate commands, firmware/program updates, and instructions from the central computer systems out to the advanced meters within a NAN. The WAN is the two-way communication network used to move data and instructions between the collection points and the central computer systems. The Company will utilize a virtual private network over a public cellular network in Indiana as its WAN.

The third component of the AMI solution is the central computer systems. The central computer systems of an AMI solution include three major systems. One is referred to as the head-end system, and this is the system responsible for sending information to and receiving information from the advanced meters. Another system is the network management system, which is the system responsible for maintaining the health and reliability of the communications network. The third system is the Meter Data Management ("MDM") System, and it is responsible for processing the data and events from the advanced meters. Processing involves validating, editing, estimating, and packaging data for billing and other uses. Additional systems are interfaced to conduct other corporate functions, but are not considered part of the AMI solution.

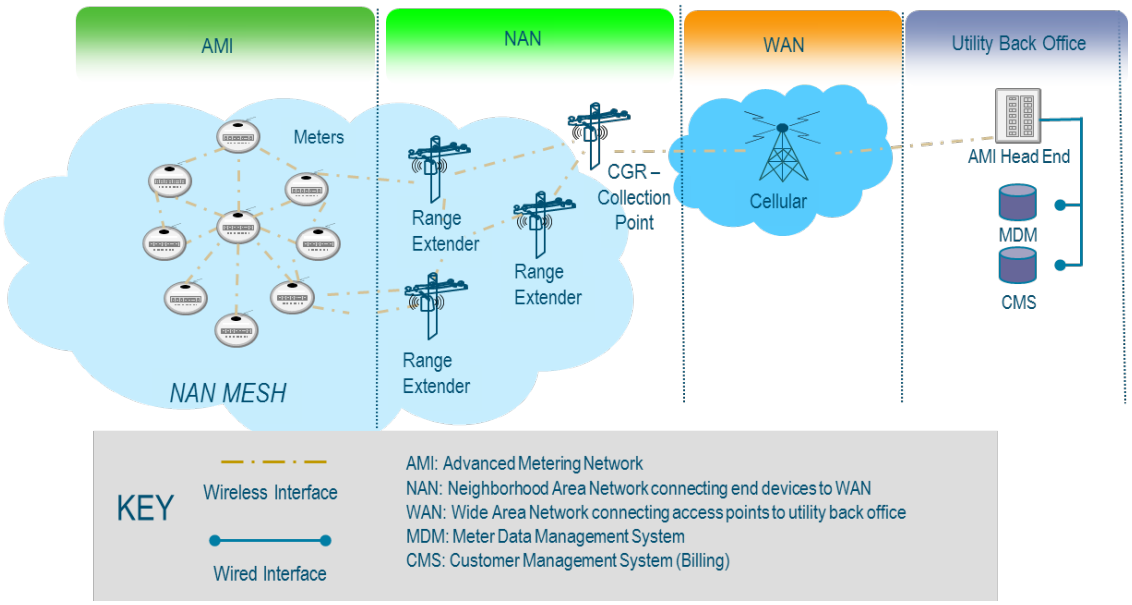


Figure "A" – AMI Solution Architecture

Q. PLEASE DESCRIBE THE PRIMARY VENDORS FOR THE PROPOSED METERING SOLUTION.

A. The Company plans to implement the Itron OpenWay solution. This is the same solution that Duke Energy is deploying in Ohio as its meter solution for commercial and industrial customers and in the Carolinas for residential, commercial and industrial customers. The Duke Energy AMI project will include deployment of advanced meters and range extenders manufactured by Itron, as well as collection point devices manufactured by Cisco, which are called Cisco Grid Routers ("CGRs"). As noted above, the AMI solution also involves expansion of the Company's current central computer systems, which are being used today for deployments in Ohio and Carolinas. The head-end system is from Itron; the network management system is from Cisco, and the MDM is from Oracle. All three of these companies are considered leaders in their respective industries.

Q. WHAT TYPE OF DATA WILL THE NEW METERS BE SENDING TO THE COMPANY?

A. The Company plans to collect interval kilowatt-hour ("kWh") usage on all meters for billing purposes as well as time tagged event and alert data such as tamper alerts. Other site specific parameters such as voltage, amperage, phase angle, etc., may be collected as needed.

Q. WHY IS THE COMPANY INTERESTED IN COLLECTING THIS TYPE OF DATA?

A. Outside of the kWh usage information for billing purposes, various alerts will allow the Company to better manage the distribution grid. Tamper alerts will

allow for more efficient theft detection, allowing the Company to pinpoint investigations, rather than simply conduct random meter audits. Site-specific parameters will be used to improve system models for system planning and system operations purposes.

Q. DID THE COMPANY CONSIDER OTHER METERING TECHNOLOGIES?

A. Yes. Duke Energy issued a request for quotes ("RFQ") to the leading AMI solution vendors within the United State for bid proposals in 2013. A team of individuals with diverse business and technical backgrounds performed the evaluation of these bids and recommended Itron as the preferred solution provider based on technical expertise, commercial merits, and price. The team also concluded Itron was best aligned with the Company's overarching grid strategy and architectural guidance.

Four qualified vendors responded to our bids; three of the vendors proposed an RF mesh solution and one vendor proposed an RF point-to-point solution. These four vendors represent the large majority of AMI deployments in the United States. One reason RF technologies are now predominant in North America is economics. Due to the nature of the grid in North America (low number of customers per distribution transformer) and the ease of installation and functionality of wireless communication solutions compared to wired communication solutions, most utilities that have deployed AMI solutions have opted to install RF technologies.

Q. WHAT ABOUT AUTOMATED METER READING ("AMR") SOLUTIONS?

A. An AMR solution is more advanced than our current technology (no remote read capability – walk by reads). However, an AMR solution typically requires a drive-by meter read each month. With the additional capabilities of AMI over AMR, there has been a general shift in the electric utility industry over the past 6 to 8 years away from installing AMR. Utilities are opting to install AMI instead, due to the additional business value and customer options which AMI can offer. For a utility like Duke Energy Indiana which has not previously invested in AMR, making the switch directly from walk-by meters to the increased functionality and cost savings of an AMI solution was the better choice.

III. DEPLOYMENT PROCESS AND SCHEDULE

Q. PLEASE DESCRIBE THE PROPOSED DEPLOYMENT TIMEFRAME FOR THE AMI METERS AND COMMUNICATIONS EQUIPMENT.

A. Duke Energy Indiana plans a four-year deployment schedule for the AMI meters and communications equipment. Deployment will occur over the first four years of the seven-year T&D Infrastructure Improvement Plan ("T&D Plan") with a ramp up for years two and three.

Q. HOW IS THE INSTALLATION OF AMI DEVICES COORDINATED THROUGHOUT THE DEPLOYMENT?

A. Based on previous experience deploying AMI in other service territories, Duke Energy Indiana anticipates deploying the AMI technology by zones. See

Petitioner's Exhibit D-1 for an example of deployment zones. To efficiently and effectively deploy the metering solution, the Company first strategically places CGRs in a deployment zone. Then the Company installs the meters that will communicate through that CGR or a neighboring CGR, allowing some overlap for redundancy purposes. This process is repeated on a rolling basis, in that the Company will begin new zones while deployment in other zones is underway. Once deployment is complete in a zone, there may still be ongoing work to relocate CGRs or install range extenders in order to optimize the communication network.

Q. HAS DUKE ENERGY DEPLOYED AMI METERS IN OTHER JURISDICTIONS?

A. Yes, AMI meters are becoming the standard for Duke Energy and for the industry as a whole. In fact, the penetration rate for smart meters (which include two-way communication) is almost 40% in the U.S., according to a report from Innovation Electricity Efficiency (IEE), an Institute of The Edison Foundation. Our affiliate, Duke Energy Ohio, plans to complete its AMI deployment in 2014, which included a blend of earlier generation AMI technology as well as the wireless mesh AMI technology proposed for implementation in Indiana. Duke Energy is incrementally rolling out AMI meters in North Carolina, South Carolina, and Florida, and is considering further deployments.

Q. DESCRIBE THE LESSONS LEARNED FROM THOSE DEPLOYMENTS THAT WILL BE HELPFUL IN INDIANA.

A. Duke Energy Indiana is proposing technology proven not only across the industry, but specifically proven by Duke Energy in other jurisdictions, particularly Duke Energy Ohio and the Carolinas. Each service territory presents its own challenges, and Duke Energy Indiana will benefit from learned lessons in those areas. Our customer engagement is a proven strategy, and will likely require only minor tweaks between jurisdictions. The Company learned how to deploy multiple AMI technologies in Ohio, including the technology proposed for Indiana. Because AMI deployments will continue in the Carolinas throughout the Indiana deployment, those project teams can share experiences and lessons learned for any emergent challenges that may arise in Indiana. Each service territory presents its own challenges for communication network optimization in terms of topography and population density, among other things. The Company has extensive experience in the approaches to communication network optimization and is working with solid vendors with an even broader range of experience in that area.

Q. PLEASE DESCRIBE THE CUSTOMER ENGAGEMENT / COMMUNICATION PROCESS DURING THE AMI DEPLOYMENT.

A. Petitioner's Exhibit D-2 depicts the timeline for customer engagement as the Company deploys meters in a zone. Through these multiple outreach attempts, customers are informed of the upcoming installation and have ample time to reach out to the Company if they have any questions that aren't answered in the literature. Once a customer's meter is certified, they receive a notice informing

them that their interval usage data can now be accessed via their customer web-portal. The project team also reaches out to city / town councils ahead of the meter deployment to discuss the AMI solution and deployment methodology.

Q. WHAT HAS THE RESPONSE BEEN TO DUKE ENERGY'S CUSTOMER OUTREACH EFFORTS?

A. Duke Energy's AMI deployment customer engagement process has been greatly appreciated by customers, regulators, and customer advocates. As a result of this approach in Ohio, very few customers initially refused AMI meter installation. Of those who did refuse installation, the Company offered to meet with those customers individually and ensure that all their concerns were heard and addressed. We continue to monitor and adapt our outreach efforts as customer inquiries evolve.

IV. CUSTOMER CONCERNS

Q. WHAT ARE SOME OF THE CUSTOMER CONCERNS THE COMPANY HAS EXPERIENCED WHILE DEPLOYING AN AMI SOLUATION IN OTHER STATES?

A. Overall customer concerns related to our AMI deployments have been minimal and are generally focused on one of five areas: 1) communications, 2) installation, 3) service disconnection for non-access, 4) bill accuracy, and 5) smart meter installation refusal. In most cases, we use existing processes to manage complaints. For issue-based questions and complaints (*e.g.*, AMI meter installation refusal), we connect the customer with internal subject matter experts

to discuss concerns in detail. In some situations, we have been able to use our Envision Centers to explain our deployment program, and that has proven helpful. Duke Energy Indiana witness Mr. Russ Atkins will highlight our plans for an Indiana Envision Center in his testimony. We believe the Envision Center concept has proven successful in other jurisdictions and can be improved upon through lessons learned for our planned Indiana deployment.

The AMI meter installation refusals typically relate to concerns around data security, data privacy and health concerns attributed to wireless RF emissions.

Duke Energy Indiana is committed to using best practices identified through the Company's deployments in several states and to being responsive to customer concerns, while creating the least amount of disruption to the customer during deployment. We continue to review feedback and adjust our communications and processes as needed.

Q. PLEASE DESCRIBE THE APPROACH TO CYBERSECURITY FOR THE AMI SOLUTION.

A. As we implement the AMI metering solution, the Company will follow IT security policies that are based upon National Institute for Standards and Technology ("NIST") guidelines for securing SmartGrid assets and risk management. The data and systems associated with every component of the AMI metering solution are secured against both internal and external security threats. During and after implementation of the AMI solution, periodic audits and security

penetration tests will be performed to ensure the appropriate policies have been applied to defend the potentially affected systems.

Q. PLEASE EXPLAIN HOW THE DATA COLLECTED FROM THE PROPOSED AMI SOLUTION IS TREATED FROM A PRIVACY PERSPECTIVE.

A. Duke Energy Indiana has collected data from meters since the Company's inception and has privacy policies in place to protect customer information. The Company will treat the data from an AMI metering solution with the same level of privacy protection. Customer privacy is of the utmost concern to Duke Energy Indiana, and the Company does not release private customer information to third parties without the authorization of the customer.

Q. SOME PEOPLE HAVE HEALTH CONCERNS REGARDING "SMART METERS". CAN YOU COMMENT ON THIS?

A. Numerous reliable studies by third party and governmental resources show that wireless smart meters – or AMI meters – do not pose any health risk. In the United States, the Federal Communications Commission ("FCC") sets limits for public exposure to RF emissions and requires that all radio communicating devices be tested to ensure that they comply with the FCC standards. The FCC public exposure limits are set at a safety factor 50 times less than the threshold for potentially adverse biological effects, and AMI meters emit low-power RF waves at a fraction of those FCC limits. We plan to include information on the safety of AMI devices in our customer communication plans.

V. CUSTOMER SERVICE

Q. WHAT CHANGES WILL CUSTOMERS SEE IN THEIR SERVICE AFTER THE NEW METERING SOLUTION IS INSTALLED?

A. After AMI meters are installed and certified, customers will be able to view their previous day's hourly interval usage data on the Duke Energy Indiana customer web-portal. Another change in service for customers with certified AMI meters is that they will no longer require monthly walk-by meter reads or estimated bills when the meter cannot be read. Instead, meter reads will be reported back to the Company through the AMI communication network. When customers move in or out of properties, they will no longer need to wait for technicians to arrive to activate or deactivate service, because that can be performed remotely for AMI meters. AMI, working in parallel with grid automation efforts, assists the Company in the outage restoration process. We can have more information about where an outage has occurred and through the ability of pinging meters, we can identify isolated outages more readily and restore service more efficiently.

Q. WHAT NEW INFORMATION WILL BE AVAILABLE TO DUKE ENERGY INDIANA CUSTOMERS ON THE PORTAL WEBSITE?

A. Hourly interval usage data will be accessible to customers on the Duke Energy Indiana customer web-portal the next day. The portal uses interval data in several different views: hourly energy use by day or week, daily energy use by billing cycle, month or week, and average energy use by day-of-week over a billing cycle of month. Those customers that have multiple electric meters will see usage

broken out by meter, if desired. With this new data, customers are more empowered to understand their energy usage and save energy. Petitioner's Exhibit D-3 provides an illustrative example of screen shots showing the customer usage information available on the Duke Energy Indiana customer web-portal.

Q. WHAT FUTURE OFFERINGS COULD BE POSSIBLE THROUGH THE AMI?

A. Provided customer interest and Commission approval, the AMI metering solution could enable such offerings as dynamic pricing and flexible billing and payment options, such as prepayment and pick your due date. The Company proposes that these future offerings be developed in coordination with the OUCC and interested stakeholders in a collaborative fashion. As discussed in more detail below, the deployment schedule for AMI meters is phased-in over four years. The Company proposes collaborative discussions begin upon approval of its Plan, so that future pilot offerings could be developed for roll-out soon after meters are installed.

VI. AMI BUSINESS CASE

Q. HAS DUKE ENERGY PREPARED A BUSINESS CASE FOR THE NEW METERING SOLUTION?

A. Yes. We have looked at proposed costs of our chosen AMI metering solution and compared those costs to estimated benefits. There are benefits from AMI solutions that can be readily quantified, such as savings from meter reading, and those that are much more difficult to quantify, such as assumed energy efficiency

savings due to better customer understanding of their usage and reduced safety incidents by elimination of walk-by meter reading and driving. The Company took the approach of limiting the business case cost / benefit analysis to include only the quantifiable benefits, while also discussing the potential for future benefits from new customer offerings of products and services. Petitioner's Exhibit D-4 provides a summary of the cost/benefit results.

Q. PLEASE DESCRIBE THE COSTS ASSOCIATED WITH THE PROPOSED METERING SOLUTION INCLUDED IN THE BUSINESS CASE.

A. The estimated cost for deploying the AMI solution in Duke Energy Indiana is about $181 M over the first four years of the 7-Year T&D Plan. That includes approximately $28 M in the first year, $52 M in the second, $56 M in the third, and $45 M in the fourth year. The costs include the cost of technology components and the installation labor –including the AMI meters, communication devices/grid routers, and IT systems.

In order to complete a 20-year business case, additional costs were added in the out-years to reflect additional estimated expenditures necessary for ongoing maintenance of the equipment as well as some equipment replacement costs as equipment nears its life expectancy.

Q. PLEASE DESCRIBE THE BENEFITS THAT WERE INCLUDED IN THE BUSINESS CASE SUPPORTING THE AMI SOLUTION.

A. As stated, we did not attempt to quantify every conceivable benefit from AMI, but

rather focused on quantifiable benefits. The main quantifiable benefits arise from the elimination of monthly manual meter reads, enhanced theft detection that can be conducted without a truck roll, and the ability to conduct customer-requested service disconnects and reconnects remotely. Also included are the quantifiable benefits from remote reconnects for non-pay. We have excluded benefits for savings in remote disconnects for non-pay, as under current Commission rules, the Company is still required to roll a truck in those situations. However, this is an additional area of savings that could be achieved in the future. The Company may propose alternate communication efforts for non-pay disconnects (based on results of monitoring in-person notifications) in the future T&D Plan proceedings, so these additional saving may be realized.

The business case also recognizes that the AMI solution serves as an enabler to provide qualitative benefits expected to be achieved over time. Examples include; integration of advanced technologies such as distributed generation, energy storage and electric vehicles with our distribution system; ability to offer our customers advanced products and services, such as choose your own due date, usage alerts, pay-as-you-go offers, and time-differentiated peak pricing rates; ability to offer expanded options for energy efficiency and demand response programing.

The Company proposes to work collaboratively with interested stakeholders on these customer offer-related qualitative benefits as the AMI solution is rolled-out.

Q. WHAT WERE THE RESULTS OF THE AMI BUSINESS CASE THE COMPANY PERFORMED?

A. Based on the business case, over a 20-year period, the net present value ("NPV") of the AMI solution is estimated to be approximately $38M. Essentially, the analysis demonstrates that over 10.4 years the investment in the advanced metering solution pays for itself.

Q. ARE THE ESTIMATED COSTS OF THE AMI SOLUTION INVESTMENTS INCLUDED IN THE 7-YEAR T&D PLAN JUSTIFIED BY INCREMENTAL BENEFITS ATTRIBUTABLE TO THE PLAN?

A. Yes, the business case cost / benefit analysis demonstrates that there are quantifiable benefits that outweigh the costs of the plan. Additionally, there are qualitative benefits and future functionality that will result in further benefits.

Q. IN YOUR OPINION, ARE THE COST/BENEFIT ESTIMATES REASONABLE BASED ON YOUR REVIEW AND EXPERIENCE?

A. Yes.

VII. CONCLUSION

Q. WERE PETITIONER'S EXHIBITS D-1 THROUGH D-4 PREPARED BY YOU OR UNDER YOUR SUPERVISION?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PREFILED TESTIMONY?

A. Yes, it does.

VERIFICATION

I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: _____ Dated: August 29, 2014
Donald L. Schneider, Jr.

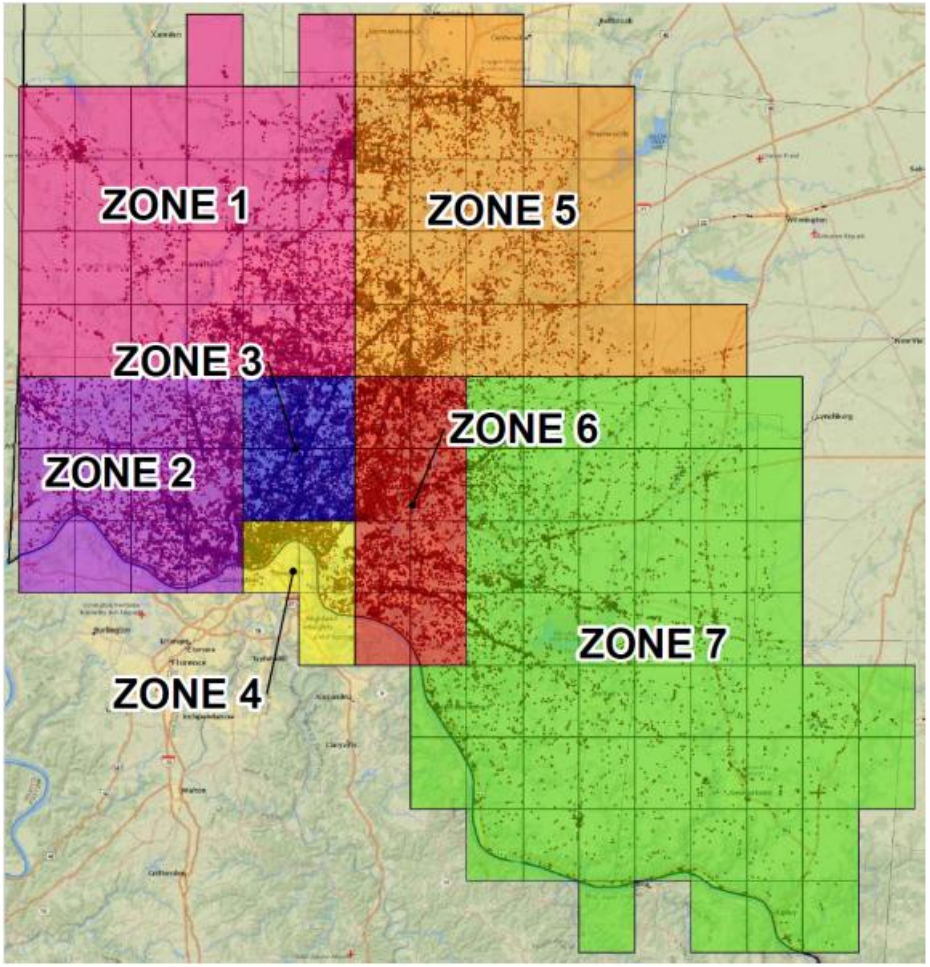
AMI Installation Process by Zone

Deployment Design
- Analyze RF Clusters
- Determine CGR Locations

Mesh Infrastructure and Meter Installations
- Install CGRs
- Install Meters

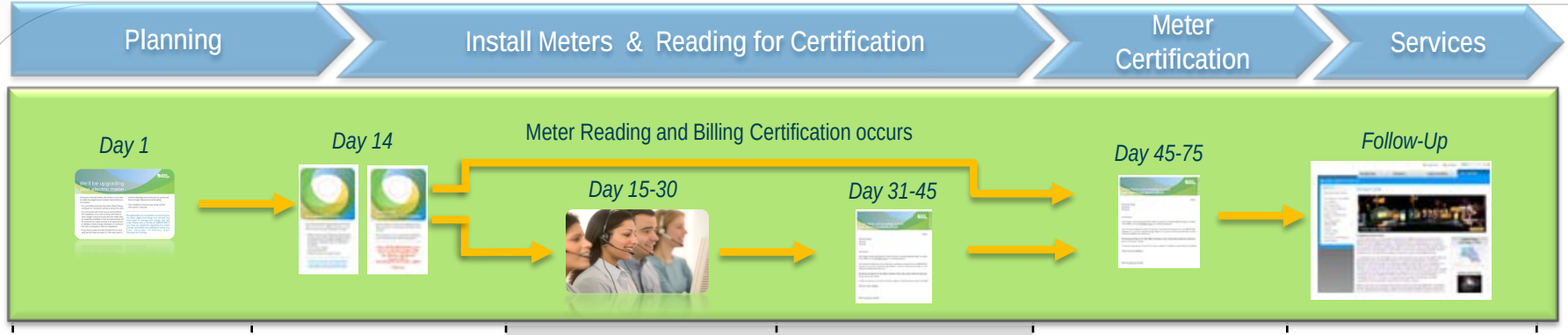
Mesh Mitigation
- Monitor Meter Readings
- Install RF Range Extenders where necessary

Direct Connect Installation
- Install Direct Connect Electric Meters where necessary



Petitioner's Exhibit D-2

AMI Customer Engagement



Postcard Notification	Canvas and Door Hanger	Outbound Calls (if required)	Letter (if required)	Certification Letter	Online Services
First proactive communication sent by Duke Energy to customers. Large Business account managers will reach out to applicable large account customers in advance as needed.	Attempt to notify customer on day of meter exchange or following exchange. Where customer interaction is necessary for the exchange, a door hanger is left encouraging customer to call and schedule an appointment.	If meter exchange is unsuccessful, Duke proactively attempts to contact customers to schedule an appointment.	If outbound calling attempts are unsuccessful, a letter may be sent to encourage customers to schedule an appointment.	Meter certification occurs 30 to 60 days after the new meter is installed. Customer is invited to sign up for Online Services to view daily energy use.	Customer can access the Duke Energy web portal where they can opt to monitor their energy use online.

Customer Usage Data
From Duke Energy Customer Portal

DUKE ENERGY. | Online Services

Contact Us | Messages | (Log Out) | [redacted]

Add an Account | Account Number [redacted] | Address [redacted]

- My Account Home
- Billing & Payment
  - Pay Bill
  - View Bill
  - Payment Activity
  - Compare Bills
  - Bill Inserts
  - Billing FAQs
  - Third Party Notification
- My Bill Preferences
- Energy Analysis
- My Products & Services
- Meter Reading

Account Summary [redacted]

Account status as of 9/9/2014

Last Payment Received	$200.00
7/31/2014 - Thank you!	
Amount Due	**$0.00**

Pay

Bill Summary ending 7/18/2014 View

Previous Balance/Other Charges	$0.00
Budget Billing/Equal Payment Plan Amount	$173.00
Last bill amount due 8/11/2014	**($63.14)**

For more detailed information on your bill, please see the links under Billing & Payment.

Bill Highlights [redacted]

How does my home use energy? [redacted]

Hourly Energy Usage

Viewable over a Day or Week Timeline

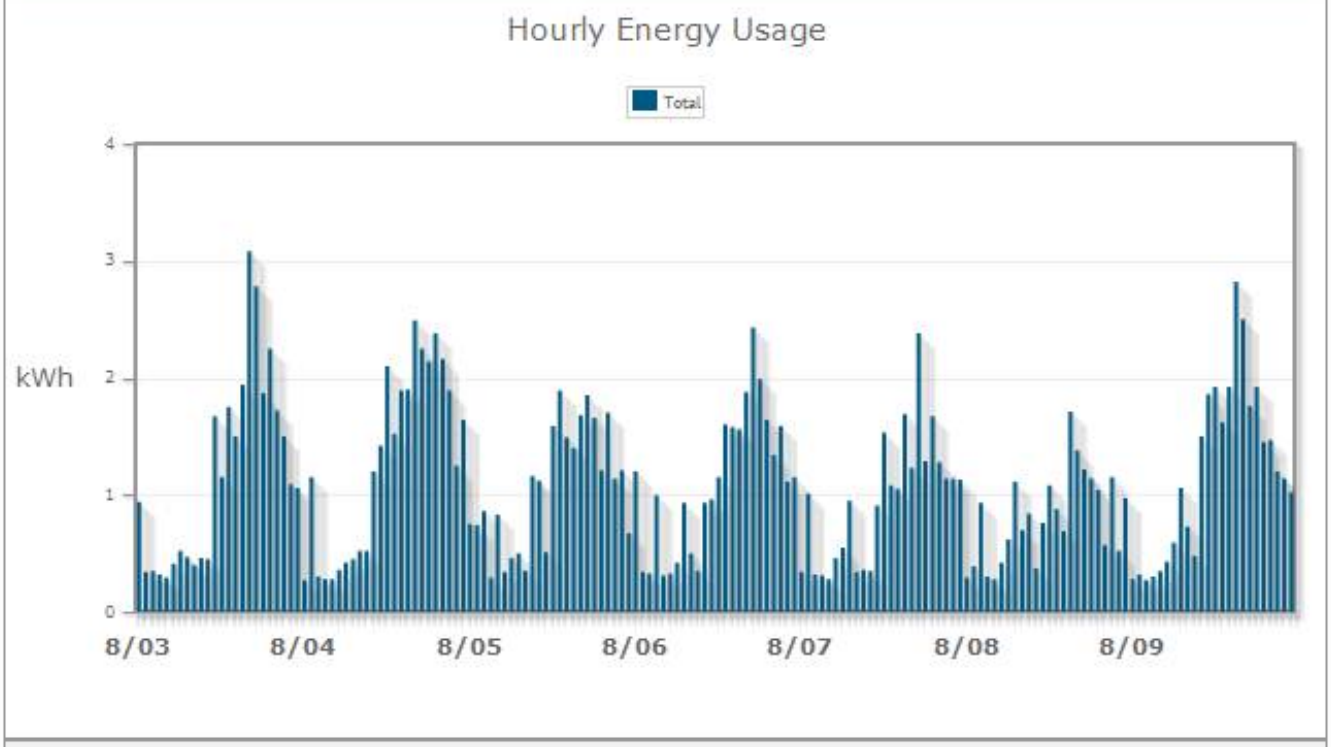
Daily Energy Usage

To change Meter, Graph, or Date, make new selections from the options below.

Meter: [redacted]

Graph: Hourly Energy Usage **Date:** 08/04/2014

Period: Week Day Export Data



Use your daily charts first to identify the days with the highest energy usage, then continue to these hourly charts to identify key hours of energy usage.

Terms And Conditions

Daily Energy Usage

Viewable over a Billing Cycle, Month or Week Timeline

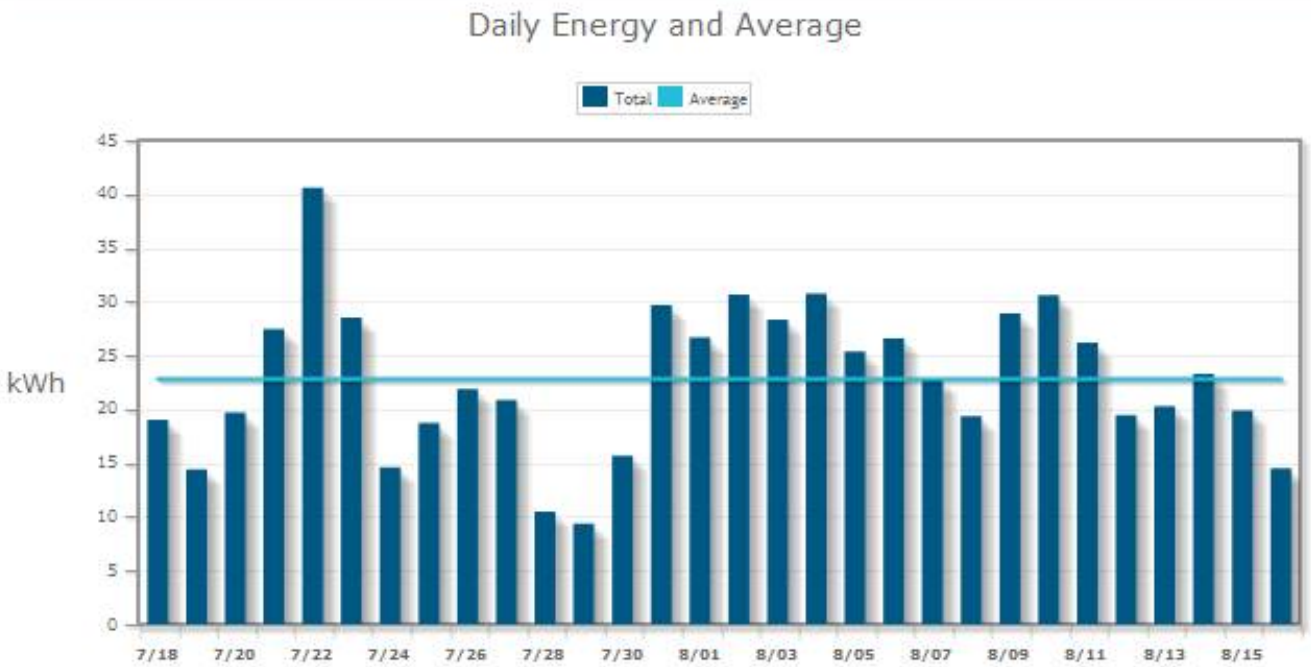
Daily Energy Usage

To change Meter, Graph, or Date, make new selections from the options below.

Meter: [redacted]

Graph: Daily Energy & Average **Date:** 08/04/2014

Period: Billing Cycle Month Week Export Data



Look for trends or irregularities in the daily usage bars, relative to one another and to the average. Look to the Day-Of-Week chart for confirmation.

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Average Energy Usage

Viewable by Day-of-Week over a Billing Cycle or Month Timeline

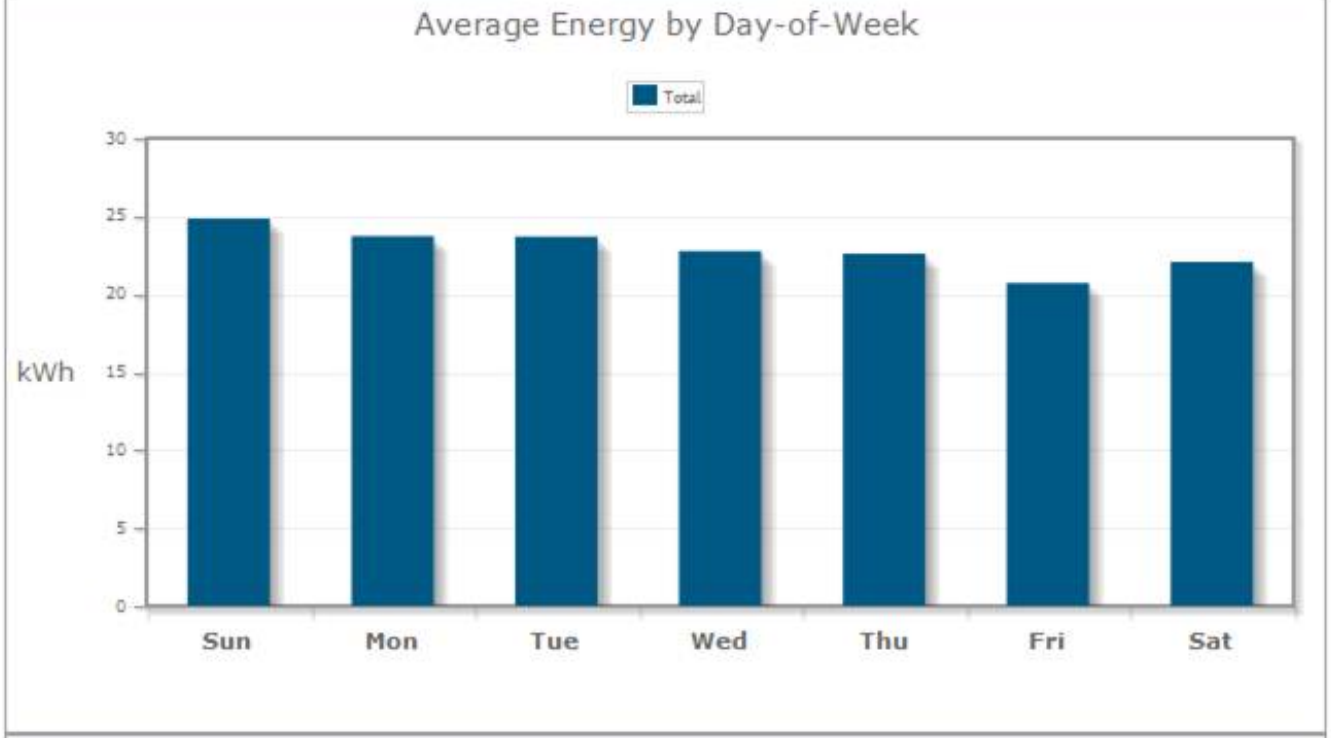
Daily Energy Usage

To change Meter, Graph, or Date, make new selections from the options below.

Meter: [redacted]

Graph: Average Energy by Day-of-Week **Date:** 08/04/2014

Period: Billing Cycle Month Export Data



Look for trends or irregularities. Are your weekdays pretty even or does one stand out? How about weekends?

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Duke Energy Indiana T&D Infrastructure Improvement Plan

AMI Business Case

AMI Cost Details

Costs ($MM)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total Deployment	Total TDSIC Period	Total 20 Year
Capital										
Field Technology	*$14.8*	*$45.5*	*$48.5*	*$37.7*	*$0.2*	*$0.7*	*$0.7*	***$146.5***	***$148.2***	***$161.8***
Project Mgmt Office (PMO)	*$3.8*	*$5.0*	*$5.2*	*$5.4*	-	-	-	***$19.4***	***$19.4***	***19.4***
IT&T[1]	*$8.1*	*$0.4*	*$0.4*	*$0.4*	-	-	-	***$9.3***	***$9.3***	***$9.8***
Total Capital Costs	$26.7	$51.0	$54.1	$43.5	$0.2	$0.7	$0.7	**$175.3**	**$176.9**	**$191.0**
O&M										
Field Technology	*$0.2*	*$0.2*	*$0.2*	*$0.2*	*$0.2*	*$0.2*	*$0.2*	***$0.8***	***$1.3***	***$4.4***
Project Mgmt Office (PMO)	*<$0.1*	-	-	-	-	-	-	***<$0.1***	***<$0.1***	***<$0.1***
IT&T[1]	*$0.3*	*$0.4*	*$0.5*	*$0.6*	*$0.6*	*$0.6*	*$0.6*	***$1.8***	***$3.7***	***$14.2***
Other	*$0.4*	*$0.9*	*$0.9*	*$0.9*	*$0.9*	*$0.9*	*$0.9*	***$3.1***	***$5.9***	***$20.2***
Total O&M Costs	$0.9	$1.5	$1.6	$1.7	$1.7	$1.7	$1.8	**$5.7**	**$10.9**	**$38.9**
Total AMI Costs	**$27.6**	**$52.5**	**$55.7**	**$45.3**	**$1.8**	**$2.5**	**$2.5**	**$181.0**	**$187.9**	**$229.9**

[1] IT&T - Information Technology & Telecommunications

Duke Energy Indiana T&D Infrastructure Improvement Plan

AMI Business Case

AMI Benefit Details

Benefits ($MM)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total Deployment	Total TDSIC Period	Total 20 Year
Reduced Equip. Failures	*$0.9*	*$0.9*	*$0.9*	*$1.0*	*$1.0*	*$1.0*	*$1.0*	***$3.8***	***$6.7***	***$21.1***
Misc. Capital Savings	-	*$1.0*	*$1.0*	*$1.0*	*$1.0*	*$1.0*	*$1.0*	***$0.3***	***$0.6***	***$1.9***
Avoided Capital Costs	$0.9	$1.0	$1.0	$1.1	$1.1	$1.1	$1.1	**$4.1**	**$7.3**	**$23.0**
Reduced Meter Reading Cost	-	*$0.7*	*$2.5*	*$4.6*	*$6.2*	*$6.4*	*$6.6*	***$7.8***	***$26.9***	***$127.7***
Reduced COW[1] Costs	-	*$0.7*	*$2.5*	*$4.6*	*$6.2*	*$6.4*	*$6.6*	***$7.8***	***$27.0***	***$128.1***
Reduced Restoration Cost	-	*<$0.1*	*<$0.1*	*<$0.1*	*<$0.1*	*<$0.1*	*<$0.1*	***<$0.1***	***$0.3***	***$1.1***
Misc. O&M Savings	-	*$0.4*	*$0.4*	*$0.4*	*$0.4*	*$0.4*	*$0.4*	***$1.2***	***$2.4***	***$7.6***
Expense Reduction	-	$1.7	$5.4	$9.7	$12.8	$13.3	$13.7	**$16.8**	**$56.6**	**$264.5**
Reduce Theft, Equip Fail, Inst. Errors	-	*$1.8*	*$6.8*	*$12.1*	*$15.9*	*$16.1*	*$16.2*	***$20.7***	***$68.9***	***$287.2***
Improved Rev. Capture	-	$1.8	$6.8	$12.1	$15.9	$16.1	$16.2	**$20.7**	**$68.9**	**$287.2**
Total AMI Benefits	**$0.9**	**$4.5**	**$13.2**	**$22.8**	**$29.8**	**$30.5**	**$31.0**	**$41.5**	**$132.8**	**$574.7**

[1] COW - Consumer Order Worker (meter orders)

Key Financials	
Investment Period	20 Years
Net Present Value (NPV)	$37.9M
Payback Period	10.4 Years
Benefit / Cost Ratio (20 yr)	2.50