COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF DUKE ENERGY KENTUCKY, INC. FOR (1) A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AUTHORIZING THE CONSTRUCTION OF AN ADVANCED METERING INFRASTRUCTURE; (2) REQUEST FOR ACCOUNTING TREATMENT; AND (3) ALL OTHER NECESSARY WAIVERS, APPROVALS, AND RELIEF	))))))))	CASE NO. 2016-00152

ATTORNEY GENERAL'S PRE-FILED TESTIMONY
PUBLIC REDACTED VERSION

Comes now the intervenor, the Attorney General of the Commonwealth of Kentucky, by and through his Office of Rate Intervention, and files the following testimony in the above-styled matter.

Respectfully submitted,
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Certificate of Service and Filing

Counsel certifies that: (a) the foregoing is a true and accurate copy of the same document being filed in paper medium; (b) pursuant to 807 KAR 5:001 § 8(7)(c), there are currently no parties that the Commission has excused from participation by electronic means in this proceeding; and (c) the original and copy in paper medium is being filed with the Commission on July 19, 2016.

I further certify that in accordance with 807 KAR 5:001 § 4 (8), the foregoing is being contemporaneously provided via electronic mail to:

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this 18th day of July, 2016

Assistant Attorney General

BEFORE THE

PUBLIC SERVICE COMMISSION OF THE

COMMONWEALTH OF KENTUCKY

In the matter of:

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DIRECT TESTIMONY

OF

PAUL ALVAREZ

ON BEHALF OF THE

OFFICE OF THE ATTORNEY GENERAL

Wired Group
PO Box 150963
Lakewood, CO 80215

JULY 18, 2016

BEFORE THE

PUBLIC SERVICE COMMISSION OF THE

COMMONWEALTH OF KENTUCKY

In the matter of:

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DIRECT TESTIMONY OF PAUL ALVAREZ

I. QUALIFICATIONS AND SUMMARY

Q. Please state your name and business address.

A. My name is Paul Alvarez. My business address is Wired Group, PO Box 150963, Lakewood, CO 80215.

Q. What is your occupation?

A. I am the President of the Wired Group, a consultancy specializing in the optimization of distribution utility businesses and operations as they relate to grid modernization (including smart meters), demand response, energy efficiency, and renewable generation.

Q. On whose behalf are you submitting testimony?

A. I am testifying on behalf of the Kentucky Office of the Attorney General.

Q. Please describe your work experience and educational background.

A. My career began in 1984 in a series of finance and marketing roles of progressive responsibility for large corporations, including Motorola's Communications Division (now Android/Google), Baxter Healthcare, Searle Pharmaceuticals (now owned by Pfizer), and Option Care (now owned by Walgreens). My combined aptitude for finance and marketing were well suited for innovation and product development, leading to my first job in the utility industry in 2001 with Xcel Energy, one of the largest investor-owned utilities in the U.S.

At Xcel Energy I served as product development manager, overseeing the development of new energy efficiency and demand response programs for residential, commercial, and industrial customers, as well as programs in support of voluntary renewable energy purchases and renewable portfolio standard compliance (including distributed solar incentive program design and metering policies). I learned the economics of traditional monopoly ratemaking and associated utility economic incentives, as well as the impact of self-generation, energy efficiency, and demand

response on utility shareholders and management decisions. I also learned a great deal about utility program impact measurement and verification (M & V).

I left Xcel Energy to lead the utility practice for sustainability consulting firm MetaVu in 2008. At MetaVu I employed my M & V experience to lead two comprehensive, unbiased evaluations of smart grid deployment performance. To my knowledge these are the only two comprehensive, unbiased evaluations of smart grid deployment performance completed to date. The results of both were part of regulatory proceedings in the public domain and include an evaluation of the SmartGridCity™ deployment in Boulder, Colorado for Xcel Energy in 2010,[1] and an evaluation of Duke Energy's Cincinnati-area deployment for the Ohio Public Utilities Commission in 2011.[2]

In 2012 I started the Wired Group to focus exclusively on distribution utility businesses and operations as they relate to grid modernization, demand response, energy efficiency, and renewable generation. Wired Group clients include utilities, regulators, consumer and environmental advocates, and industry associations. In addition I serve as an adjunct professor at the University of Colorado's Global Energy Management Program, where I teach an elective graduate course on electric technologies, markets, and policy. I have also taught at Michigan State University's Institute for Public Utilities, where I've educated new regulators and staff on grid modernization and distribution utility performance measurement.

[1] Alvarez et al, MetaVu. "SmartGridCity™ Demonstration Project Evaluation Summary". Report submitted to the Colorado Public Utilities Commission in the testimony of Michael G. Lamb, Exhibit MGL-1, proceeding 11A-1001E. Report dated October 21, 2011; filed December 14, 2011.

[2] Alvarez et al, MetaVu. "Duke Energy Ohio Smart Grid Audit and Assessment". Report to the Staff of the Public Utilities Commission of Ohio in proceeding 10-2326-GE-RDR. June 30, 2011.

Finally, I am the author of Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment, a book that helps laypersons understand smart grid capabilities, optimum designs, and post-deployment performance optimization. I received an undergraduate degree in Finance from Indiana University's Kelley School of Business in 1983, and a master's degree in Management from the Kellogg School at Northwestern University in 1991.

Q. Have you appeared before the Kentucky Public Service Commission previously?

A. No.

Q. What experience do you have before other state utility regulatory commissions?

A. I have testified or developed evidence in cases before state utility regulatory commissions on smart meters, associated rate designs, grid modernization, and distribution utility performance measures in California, Colorado, Kansas, Maryland, and Ohio. Brief descriptions of these proceedings, and case numbers for each, are provided in the "Regulatory Appearances" section of my Curriculum Vitae, attached as Appendix A.

Q. What is the purpose of your testimony in this proceeding?

A. I provide testimony supporting the Attorney General's position that the smart meter CPCN request submitted by Duke Energy Kentucky in this case should not be considered independently, but rather in the context of a base rate case. I present several supporting arguments, and my testimony is organized as described immediately below. While none of the arguments are necessarily true of a CPCN proceeding, all are true of a rate case:

- The rate impact of stranded cost recovery can be determined in advance;
- The shifting of several types of risk from shareholders to ratepayers is reduced;
- The design of new rates made possible by smart meters can be determined in advance;
- The data required to properly evaluate the Company's cost-benefit analysis is more readily available.

I will conclude with a recommendation that the Commission postpone CPCN consideration until the Company submits a rate case. I will also describe some consumer protection concepts the Commission should consider as conditions for CPCN approval in the event the Commission elects to approve the current docket.

Q. Before you present these arguments, can you please provide your overall impression of the Company's smart meter CPCN and smart meter investments in general?

A. Certainly. In its application the Company seeks approval to invest in a "smart" metering system which enables remote, two-way communications between electric meters and the Company. The characteristics, approaches, and technologies the Company describes in its smart meter CPCN are typical for a combination gas and electric utility. The use of a wireless network to communicate with electric meters, and combination customers' gas meters, while using a more traditional "drive by" radio approach to communicate with gas-only customers' meters, is common. The advanced electric meter and gas meter transmitter technologies selected by the Company have been installed for millions, if not tens of millions, of U.S. utility customers.

The Company's CPCN is accompanied by a projected cost-benefit analysis, which has become standard practice in smart meter applications as well as grid modernization applications. I endorse the use of cost-benefit analyses in all smart meter and grid modernization applications, both as an effective planning exercise for utilities and as effective decision support and post-deployment governance tools for regulators. I do not believe any Commission should consider a smart meter or grid modernization application which does not include a cost-benefit analysis.[3]

Finally, the Company's CPCN is like many other smart meter deployments in that it involves retiring existing assets before the ends of their useful lives. The Company states it will recover the associated stranded costs from ratepayers, which is also a common request. However, the Company's application is notable for the large size of these asset write-offs relative to the smart meter deployment cost. I also note the Company has not included stranded costs in its cost-benefit analysis. I believe the omission of such a large cost misrepresents smart meter deployment economics, and I discuss these issues below.

The most important summary observation I can make about smart meter investments is that they are unlike any other investment a utility can make. Power plants, substations, circuit breakers, conductors – almost any utility investment one can name – are generally considered "used and useful" for customers once operational. Smart meter capabilities are different; the value delivered to consumers is wholly dependent on what a utility does to optimize capabilities on behalf of customers once deployed. Since utility

[3] On a related note, I do not believe state legislatures should be involved in smart meter or grid modernization legislation without close co-operation and guidance of experienced state regulatory staff and utility consumer advocates. I judge state legislatures' collective track records on such matters to be poor to very poor from a customer standpoint.

actions are wholly influenced by regulation and resulting economic incentives, the regulatory context surrounding smart meter investments is critical to securing value for customers. It is for this over-arching reason I believe smart meter investments are best considered in the context of a rate case, and I will provide multiple examples throughout my testimony.

II. THE RATE IMPACT OF STRANDED COST RECOVERY CAN BE DETERMINED IN ADVANCE IF THE CPCN IS CONSIDERED AS PART OF A RATE CASE

Q. Why is it important to determine, in advance, the rate impact of stranded asset cost recovery associated with the Company's proposed smart meter deployment?

A. The principle reason is that the size of the assets to be retired prematurely if the smart meter deployment proceeds, and therefore the size of stranded costs customers will be forced to cover, is significant. The Company estimates the book value of assets to be retired prematurely to be approximately $9.6 million,[4] representing a 20% premium over the $49 million smart meter deployment cost the Company estimates in its cost-benefit analysis.[5] Twenty percent is a significant amount that should be considered in the smart meter cost-benefit analysis and decision, ideally as part of a rate case.

Q. **Why is it inappropriate to exclude stranded cost recovery from the Company's smart meter cost-benefit analysis?**

[4] Laub direct testimony, page 6, line 15.
[5] Schneider direct testimony, page 25, lines 8-9.

A. In addition to the fact that the stranded costs are large relative to the size of the project, and the fact that customers would be forced to cover stranded costs in addition to the cost of smart meters if the CPCN is approved as submitted, the fact that the smart meters are not strictly required to maintain reliable service comes into play in the answer to this question. The assets the Company wishes to retire are functioning as intended, and would not need to be retired prematurely if not for the Company's smart meter CPCN.

Smart meters are not "required" in the same way that generation capacity increases or conductor upgrades can be found necessary to maintain reliability. The primary rationale for a smart meter deployment, as validated by the Company's CPCN, is economic. As such, I believe the only justification for smart meter application approval is a favorable cost-benefit analysis. No cost-benefit analysis can faithfully represent project economics without full consideration of all costs to be recovered from customers, including stranded costs. Therefore, the exclusion of stranded costs from the Company's cost-benefit analysis is inappropriate from a ratemaking perspective.

Q. Why is it important that the rate impact of stranded cost recovery be determined in a rate case?

A. There are two primary determinants of stranded cost recovery rate impact. One is the time period over which the stranded costs will be recovered; the other is the rate of return the Company will be authorized to earn on the stranded assets. The Company proposes these determinants be left for a future rate case, which means the rate impact of retiring assets prematurely will be a significant unknown if the CPCN is approved outside of a

rate case. Approving a CPCN without knowing the full rate impact to customers essentially represents an economic risk to customers. If the Commission elects to consider the CPCN in the context of a rate case, the rate impact can be clearly determined, removing uncertainty and risk for customers.

Furthermore, customers will pay carrying costs on the stranded assets until the next rate case is filed and adjudicated, which may be a number of years. These carrying costs will include a rate of return for the Company, calculated at the most recently authorized rate of return (six years ago), which may no longer be appropriate. All of these points argue for postponing CPCN consideration unless and until filed with a rate case.

Q. Do utilities always receive these favorable considerations related to assets stranded by smart meter investments?

A. No. In a similar case in Indiana involving one of the Company's affiliates (Duke Energy Indiana, or DEI), the regulator's order approving a settlement states: "DEI has agreed to drop its request for a regulatory asset associated with the current meters and if DEI proceeds with AMI, not to request recovery of or on the undepreciated value of such meters at the time of a subsequent retail base rate case or at any other time or in any manner."[6]

[6] "Order of the Indiana Utility Regulatory Commission". Cause 44720. Summarized testimony of Brian P. Davey. Page 17. June 29, 2016.

III. SEVERAL TYPES OF RISK SHIFT FROM SHAREHOLDERS TO RATEPAYERS UNLESS A CPCN IS CONSIDERED AS PART OF A RATE CASE

Q. What risks shift from shareholders to customers when a CPCN is awarded outside of a base rate case?

A. I believe there are two broad categories of risk that shift from shareholders to customers when a CPCN is awarded outside of a base rate case. One is project cost overrun risk, and the other is a collection of issues I aggregate into something I call "Bill Creep" risk. I'd like to discuss each of these individually.

Q. Please describe how project cost overrun risk shifts from shareholders to customers when a CPCN is awarded outside of a base rate case.

A. By approving a CPCN, the Commission signifies its agreement "that public convenience and necessity require the service or construction".[7] The Commission then assumes the cost of construction will be recovered by holders of approved CPCNs in a future rate case. However, the Commission possesses no predefined mechanism to hold a CPCN holder accountable for cost overruns. As the CPCN holder adds to its rate base, it simply recovers those costs from ratepayers in future rate cases. If the costs are higher than anticipated, unless egregiously so (i.e., subject to findings of fraud, misrepresentation, or gross negligence), customers will bear the risk of cost overruns.

[7] KRS Chapter 278.020, paragraph 1.

Q. How does this compare to a CPCN approved in the context of a base rate case?

A. In a base rate case, a utility seeks recovery for capital it has already spent (in the case of a historical test year) or plans to spend (in the case of a future test year.) In either instance, the Commission has predefined mechanisms it may use to protect consumers from cost overruns. In the case of a historical test year, the Commission can deny recovery for any cost overruns it deems imprudent. In the case of a future test year, once rates based on planned capital expenditures have been established, shareholders pay for any cost overruns unless and until the CPCN holder returns to the Commission to request an additional rate increase, which of course the Commission can deny. In addition, in any of these instances, intervenors have the opportunity to conduct discovery, file testimony, and participate in evidentiary hearings on the cost overruns. All of these mechanisms result in reduced risk for customers when a CPCN is considered as part of a rate case.

Q. Please describe the issues you include in "Bill Creep" risk, and how a CPCN awarded outside of a rate case increases such risks for customers.

A. There are several issues that contribute to "Bill Creep" risk. One is the concept of piecemeal ratemaking. Piecemeal ratemaking occurs when certain utility costs or investments are allowed for recovery from ratepayers without consideration of other, perhaps offsetting, cost reductions or depreciation or retirement of plant investment. The effect of this piecemeal ratemaking is a one-way ratchet of increasing rates, making it relatively easier for a utility to secure rates of return in excess of amounts authorized in a rate case.

Q. Can you provide an example to clarify the piecemeal ratemaking concept?

A. Certainly. The reclassification of undepreciated assets made redundant by smart meters presents an excellent example. Once these assets are re-categorized as regulatory assets per the Company's CPCN request, associated depreciation expense will cease. However, as these depreciation expenses were likely included as a cost to be recovered in the last rate case, the Company is likely recouping these depreciation expenses from customers, and will continue to recoup them, until the next rate case. In this example of piecemeal ratemaking, the Company will recover from customers depreciation expenses it is no longer incurring, and it will also collect from customers a second time when stranded asset costs are recovered from customers in the next rate case.

Q. Did you note the Company's statement that rates will not increase immediately as a result of the smart meter deployment?

A. Yes. Company witness Laub states there will be no immediate impact to customer rates with the metering upgrade.[8] However, this does not mean that profits are not being earned, but rather that profits will not be collected until the next rate case. In the meantime, the Company will utilize mechanisms like Construction Work in Process (CWIP) and Allowance for Funds Used During Construction (AFUDC) to accrue profits on spent capital. In addition these profits will be calculated at a rate of return authorized in the last rate case, completed over six years ago, which may no longer be appropriate.

[8] Laub direct, page 4, line 7.

Piecemeal ratemaking and accrued profits contribute to Bill Creep risk for customers, but the risk can be minimized by considering the CPCN as part of a base rate case.

Q. Have other regulators and consumer advocates recognized the customer risks associated with considering smart meter investments outside of a rate case?

A. Yes. In a press release related to the Indiana Utility Regulatory Commission's approval of a grid modernization settlement agreement, a Duke Energy Indiana press release states, "As part of the settlement, Duke Energy reduced the level of capital investments recovered through the plan's customer bill tracker from approximately $1.8 billion to approximately $1.4 billion. Part of the reduction came from $192 million earmarked for new advanced digital meters -- known as smart meters -- but the company retains the ability to pursue the meters . . . in a future rate case."[9]

IV. THE DESIGN OF NEW RATES MADE POSSIBLE BY SMART METERS CAN BE DETERMINED IN ADVANCE IF THE CPCN IS CONSIDERED AS PART OF A RATE CASE

Q. Why is it important to design new rates in conjunction with a smart meter deployment?

[9] *Indiana state utility regulators approve Duke Energy's plan to modernize its statewide energy grid.* Duke Energy press release. June 29, 2016. Paragraph 5.

A. Smart meters can make new rates available that can improve customers' collective cost-benefit ratio. Smart meters can also make new rates available that are detrimental to customers. Finally, smart meters make adjustments to some existing rates advisable. When a smart meter deployment is approved outside a rate case, none of these issues are addressed; in a rate case, all can be addressed.

Q. What relatively new types of rates do smart meters make available for residential customers?

A. The deployment of AMI meters and related infrastructure makes it possible for a utility to introduce two rate designs that are new to the Company's residential customers. These are time-varying rates and demand rates.

Q. Don't new rate options increase the potential benefits available from smart meter deployments?

A. Yes, but the key word is "options". The ability of smart meters to offer demand rates and time-varying rates to consumers on a purely voluntary, "opt-in" basis is indeed part of the attraction of smart meter deployments. In fact, I believe participation of large numbers of the "right" customers in properly-designed and implemented time-varying rate options can contribute to a more favorable smart meter costs-benefit ratio for all consumers, including those who do not choose such rates. However utilities with smart meters are increasingly asking regulators to approve demand rates as the default pricing mechanism, which is detrimental to customers. Other utilities with smart meters fail to offer, design,

or promote optional time-varying rates in a way that delivers net benefits to customers. Considering smart meter deployments in a rate case is a good way to ensure all of these rate issues are addressed in a way that is satisfactory and beneficial to customers.

Q. Who are these "right" customers, who are the "wrong" customers, and how does participation in time-varying rates by the "right" customers help all customers?

A. The "right" customers are those with large discretionary loads, such as central air conditioning and electric clothes dryers, who can readily reduce loads (by increasing a thermostat set point, for example) or shift loads (by drying clothes at another time) during peak demand periods when the cost to the Company of procuring electricity is high. By reducing the amount of high-priced electricity the Company must purchase, changes in consumption behavior by these "right" customers can reduce costs for all customers, although some of the savings are passed along to the "right" customers as a reward. By reducing peak capacity, changes in consumption behavior can reduce the Company's cost to meet required capacity, again to the benefit of all customers.

The "wrong" customers are those without large discretionary loads, or those with medical conditions that reduce their opportunity to change consumption behavior. For such customers, a switch to a time-varying rate without behavior change is likely to result in a higher bill. This is why it is best that time-varying rates remain an option, not an obligation.

Q. Why is it important to offer or promote effective time-varying rate options?

A. By offering a time-varying rate option, the cost-benefit ratio of the smart meter deployment is likely to improve; without such an option, the potential to improve the cost-benefit ratio is lost. Yet the full cost of the smart meter deployment remains for customers to cover. Once the asset has been bought and is being paid for, it only makes sense to maximize its potential value by implementing potentially beneficial capabilities.

I say "potential" value because time-varying rate benefits are dependent on many factors. A large number of the "right" customers must participate, meaning that the promotions to call such customers to action (to switch to a time-varying rate) are critical. Success in getting customers to switch is governed in large part by the specifics of time-varying rate design, though those same specifics can impact benefits delivered. The benefit delivered by participating customers is dependent on many other factors too, such as the cost to recruit each customer; the duration each remains on the rate; the degree of behavior change each exhibits; and the size of the reward paid. By considering the Company's CPCN outside of a rate case, the Commission not only denies customers opportunities to benefit from the time-varying rates smart meters enable, it also denies intervenors such as the OAG the opportunity to have a say in the offer, design, and promotional characteristics which determine the benefits that time-varying rates deliver.

Q. Please describe a rate enabled by smart meters that is detrimental to customers.

A. Demand rates are also made available by smart meters, and again, can be beneficial to some customers as an option. However, demand rates are detrimental to customers when mandated. There are several issues. First and foremost, electric demand is a concept that

is difficult for the average residential consumer to understand and difficult for the average residential consumer to control. As a result, default demand rates take on many of the undesirable characteristics of increased fixed charges, including disproportionate impacts on low-usage customers. Low-usage customers include a disproportionate number of elderly, disabled, and/or low income customers who are the definition of the "wrong" customers described above. Demand rates also reduce incentives; as prices for electric demand are introduced, the rate per kWh of energy falls, reducing conservation incentives. By considering the Company's CPCN outside of a rate case, the Commission denies intervenors such as the OAG the opportunity to state its opposition to default demand rates, increasing the likelihood that such rates could become some type of presumptive outcome of smart meter deployment in the future.

Q. Are there other rates related to smart meter deployments which suggest a rate case is the best place to consider the Company's CPCN?

A. Yes. As just one example, smart meter deployments generally deliver dramatic reductions in service reconnection costs, as most smart meters are equipped with remotely-enabled service disconnection and reconnection switches. (Service disconnection costs are not likely to fall, as compliance with disconnection rules generally preclude remote disconnection.) Customers who have been disconnected for non-payment are assessed a reconnection fee after a payment has been received and service restored. By approving the CPCN outside of a rate case, the reconnection fee remains the same despite a dramatic reduction in the Company's costs. Should a CPCN filing be brought

simultaneously with a base rate case, however, reconnection fees could be modified accordingly.

V. THE DATA REQUIRED TO PROPERLY EVALUATE THE COMPANY'S COST-BENEFIT ANALYSIS IS MORE READILY AVAILABLE IF THE CPCN IS CONSIDERED AS PART OF A RATE CASE.

Q. What has been your experience with smart meter cost-benefit analyses?

A. In my experience, smart meter cost-benefit analyses are more likely than not to underestimate costs and overestimate benefits. In its review of Southern California Edison's smart meter business case and subsequent deployment, a California Department of Ratepayer Advocacy study found both to be the case.[10] In Colorado, Xcel Energy's SmartGridCity™ project was completed at a cost almost 60% higher than initial estimates, despite critics' claims that many promised capabilities remained unfulfilled.[11] In my book *Smart Grid Hype & Reality,* I make informed claims that cost-benefit expectations of smart grid deployments have been and remain unrealistically high, supported by primary and secondary research from multiple independent sources.[12]

[10] Dietrich, W. and Watts-Zagha, C. *Case Study of Smart Meter System Deployment*. California Department of Ratepayer Advocacy. March, 2012.
[11] Recommended Decision of ALJ Gomez Denying Application for SmartGridCity Cost Recovery. Case 11A-1001E. January 17, 2013.
[12] Alvarez, Paul. *Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment.* Wired Group Publishing. 2014.

Q. What kinds of information have you used to evaluate the reasonableness of smart meter cost-benefit analyses?

A. Smart meter cost-benefit analyses reflect the complexity of the smart meter value proposition. Many different types of value (energy, demand, O&M savings, and revenue enhancement) from a variety of smart meter capabilities must be secured if a favorable cost-benefit ratio for customers is to be achieved. Proper evaluation of a projected cost-benefit analysis therefore involves analyzing details of many different types of information from many different sources. I believe detailed historical and forecasted financial and operating data of the sort typically available in rate case proceedings to be ideal for evaluating smart meter cost-benefit analyses. This data includes, but is not limited to:

- Energy (kWh) and demand (kW) sales volume detail by customer class, historical and projected
- Fuel, purchased energy, and purchased capacity costs, historical and projected
- Cost of Service study, including cost allocations by customer class
- O&M cost detail, historical and projected, by function
- O&M operating policies, details, and planned changes, by function
- Billing & Customer Service cost detail, historical and projected, by function
- Billing & Customer Service operating policies, details, and planned changes, by function
- Intercompany transfers, adjustments, allocations, and methodologies
- Recent construction project capital budgets and spending/CWIP detail
- Forecast construction project capital budgets

- Payroll analyses (regular, on-call, and overtime, wages, etc.), historical and projected

The amount of data available and the level of detail provided in a rate case is far beyond the amount that could be secured in the limited time and scope available through discovery in a CPCN proceeding. The increased data availability and level of detail would certainly contribute to a more accurate evaluation of the likelihood the smart meter cost-benefit analysis presented by the Company will be realized by consumers.

Q. Do you think the cost-benefit ratio presented by the Company will be realized?

A. I do not believe a definitive opinion on a smart meter cost-benefit analysis can be realized without the depth and breadth of data, sources, and detail of the sort typically available in a base rate case. However I believe "concerned" is a proper way to describe my overall impression of the Company's projected benefits. From confidential information provided by the Company in discovery, I feel it is probable that benefits in all three broad categories projected – [redacted] – are aggressive and would prove extremely difficult for customers to realize in full on their electric bills. I would greatly appreciate the opportunity to examine rate case-style data of the quantities, details, and types described in my immediately preceding answer to provide more certainty on this admittedly high-level perception. In the meantime I can say with confidence that smart meter deployment affects many economic aspects of the electric distribution business, including rate design, cost allocation, revenue requirements and depreciation, conservation, tariff changes, and rates

of return. As a result of the breadth and complexity of issues presented by a smart meter deployment, I believe a base rate case is the most appropriate proceeding in which to evaluate smart meter cost-benefit analyses.

VI. RECOMMENDATIONS

Q. What is your overall recommendation?

A. I recommend the Commission postpone consideration of the Company's CPCN unless and until it is submitted with a rate case. As described throughout this testimony, I believe that considering the CPCN in a rate case offers several benefits to consumers relative to considering the CPCN independently:

- The rate impact of stranded cost recovery can be determined in advance;
- The shifting of several types of risk from shareholders to ratepayers is reduced;
- The design of new rates made possible by smart meters can be determined in advance;
- The data required to properly evaluate the Company's cost-benefit analysis is more readily available.

Q. Do you have other recommendations?

A. Yes. In the event the Commission elects to consider the CPCN independently, and in the further event it approves the CPCN, there are several conditions I would suggest the Commission attach to such approval that would serve consumers greatly. These include:

- Establish exactly how prematurely-retired assets will be written off, and the associated rate impact to consumers, *in this proceeding;*
- Establish a mechanism to allocate any cost overruns between customers and shareholders (for example, 50% of capital and O&M costs in excess of those anticipated in the cost-benefit analysis are not recoverable);
- Establish acceptable future rate design parameters *in this proceeding*, particularly as they relate to residential demand rates (prohibit), and time-varying rate options (voluntary only);
- Establish specific requirements for a time-varying rate option *in this proceeding*, to include demand-reduction features, participation rate goals, demand reduction goals, and marketing plans and budgets;
- Establish a mechanism by which failure to secure anticipated benefits within the projected timeframes is penalized (for example, an annual reduction in the smart meter revenue requirement equal to the anticipated economic benefits anticipated in the cost-benefit analysis by year would accomplish this).

Q. Does this conclude your testimony?

A. Yes, it does.

APPENDIX A: CURRICULUM VITAE OF PAUL ALVAREZ

Curriculum Vitae -- Paul J. Alvarez MM, NPDP

Wired Group, PO Box 150963, Lakewood, CO 80215 palvarez@wiredgroup.net 720.308.2407

Profile

After 15 years in Fortune 500 product development and product management, including P&L responsibility, Mr. Alvarez entered the utility industry by way of demand-side management rate and program development, marketing, and impact measurement in 2001. He has since designed renewable portfolio standard compliance and distributed generation rates and incentive programs. These experiences led to unique projects involving the measurement of grid modernization costs and benefits (energy, capacity, operating savings, revenue capture, reliability, environmental, and customer experience), which revealed the limitations of current utility regulatory and governance models. Mr. Alvarez currently serves as the President of the Wired Group, a boutique consultancy serving consumer and environmental advocates, regulators, associations, and suppliers.

Research Projects, Thought Leadership, Regulatory Appearances

Arguments to Reject Pacific Gas & Electric's Request to Invest $100 Million in Its Grid to Accommodate Distributed Energy Resources. Testimony before the California Public Utilities Commission on behalf of The Utility Reform Network, A15-09-001. April 29, 2016

Arguments to Reject Westar Energy's Proposal to Mandate a Rate Specific to Distributed Generation-Owning Customers. Testimony before the Kansas Corporation Commission on behalf of the Environmental Defense Fund, case 15-WSEE-115-RTS. July 9, 2015.

Regulatory Reform Proposal to Base a Significant Portion of Utility Compensation on Performance in the Public Interest. Testimony before the Maryland PSC on behalf of the Coalition for Utility Reform, case 9361. December 8, 2014.

Best Practices in Grid Modernization Capability Optimization: Visioning, Strategic Planning, and New Capability Portfolio Management. Top-5 US utility; client confidential. 2014.

Smart Grid Economic and Environmental Benefits: A Review and Synthesis of Research on Smart Grid Benefits and Costs. Secondary research report prepared for the Smart Grid Consumer Collaborative. October 8, 2013. Companion piece: Smart Grid Technical and Economic Concepts for Consumers.

Duke Energy Ohio Smart Grid Audit and Assessment. Primary research report prepared for the Public Utilities Commission of Ohio case 10-2326-GE. June 30, 2011.

SmartGridCity™ Demonstration Project Evaluation Summary. Primary research report prepared for Xcel Energy. Colorado Public Utilities Commission case 11A-1001E. Filed December 14, 2011 as Exhibit MGL-1. Report dated October 21, 2011.

Books

Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment. First edition. ISBN 978-0-615-88795-1. Wired Group Publishing. 327 pages. 2014.

Noteworthy Publications

Integrated Distribution Planning: An Idea Whose Time has Come. Public Utilities Fortnightly. November, 2014. Republished in the ICER Chronicle, 3rd Edition, March, 2015.

Maximizing Customer Benefits: Performance Measurement and Action Steps for Smart Grid Investments. Public Utilities Fortnightly. January, 2012.

Buying Into Solar: Rewards, Challenges, and Options for Rate-Based Investments. Public Utilities Fortnightly. December, 2009.

Smart Grid Regulation: Why Should We Switch to Performance-based Compensation? Smart Grid News. August 15, 2014.

A Better Way to Recover Smart Grid Costs. Smart Grid News. September 3, 2014.

Is This the Future? Simple Methods for Smart Grid Regulation. Smart Grid News. October 2, 2014.

The True Cost of Smart Grid Capabilities. Intelligent Utility. June 30, 2014.

Notable Presentations

NASUCA Mid-Year Meeting. *Utility Evaluator™ Software: Benchmarking Distribution Utility Performance Using Publicly-Available Data.* New Orleans, LA. June 7, 2016.

NARUC Committee on Energy Resources and the Environment. *How big data can lead to better decisions for utilities, customers, and regulators***.** Washington DC. February 15, 2016.

National Conference of Regulatory Attorneys 2014 Annual Meeting. *Smart Grid Hype & Reality.* Columbus, Ohio. June 16, 2014.

NASUCA 2013 Annual Conference. *A Review and Synthesis of Research on Smart Grid Benefits and Costs.* Orlando. November 18, 2013.

NARUC Subcommittee on Energy Resources and the Environment. *The Distributed Generation (R)Evolution.* Orlando. November 17, 2013.

IEEE Power and Energy Society, ISGT 2013. *Distribution Performance Measures that Drive Customer Benefits.* Washington DC. February 26, 2013.

Canadian Electric Institute 2013 Annual Distribution Conference. *The (Smart Grid) Story So Far: Costs, Benefits, Risks, Best Practices, and Missed Opportunities.* Keynote. Toronto, Canada. January 23, 2013.

Great Lakes Smart Grid Symposium. *What Smart Grid Deployment Evaluations are Telling Us.* Chicago. September 26, 2012.

Mid-Atlantic Distributed Resource Initiative. *Smart Grid Deployment Evaluations: Findings and Implications for Regulators and Utilities.* Philadelphia. April 20, 2012.

DistribuTECH 2012. *Lessons Learned: Utility and Regulator Perspectives.* Panel Moderator. January 25, 2012.

DistribuTECH 2012. *Optimizing the Value of Smart Grid Investments.* Half-day course. January 23, 2012.

NARUC Subcommittee on Electricity. *Maximizing Smart Grid Customer Benefits: Measurement and Other Implications for Investor-Owned Utilities and Regulators.* St. Louis. November 13, 2011.

Teaching

Post-graduate Adjunct Professor. University of Colorado, Global Energy Management Program. Course: Renewable Energy Commercialization: Electric Technologies, Markets, and Policy.

Guest Lecturer. Michigan State University, Institute for Public Utilities. Courses: Performance Measurement of Distribution Utility Businesses; Introduction to Grid Modernization.

Education

Master of Management, 1991, Kellogg School of Management, Northwestern University. Concentrations: Accounting, Finance, Information Systems, and International Business.

Bachelor's Degree in Business Administration, 1984, Kelley School of Business, Indiana University. Concentrations: Marketing and Finance.

Certifications

New Product Development Professional. Product Development and Management Association. 2007.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF DUKE ENERGY KENTUCKY, INC. FOR (1) A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AUTHORIZING THE CONSTRUCTION OF AN ADVANCED METERING INFRASTRUCTURE; (2) REQUEST FOR ACCOUNTING TREATMENT; AND (3) ALL OTHER NECESSARY WAIVERS, APPROVALS, AND RELIEF	)	CASE NO. 2016-00152

AFFIDAVIT OF Paul Alvarez

State of Colorado)

Paul Alvarez, being first duly sworn, states the following: The prepared Pre-Filed Direct Testimony constitutes the direct testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the Pre-Filed Direct Testimony if asked the questions propounded therein. Affiant further states that, to the best of his knowledge, his statements made are true and correct. Further affiant saith not.

Paul Alvarez

SUBSCRIBED AND SWORN to before me this 13th day of July, 2016.

NOTARY PUBLIC

My Commission Expires: 8-7-20

HARLEY TIERHEIMER
Notary Public - State of Colorado
Notary ID 20124048985
My Commission Expires Aug 7, 2020