

BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of West Penn Power Company :  
d/b/a Allegheny Power for Expedited : Docket No. M-2009-2123951  
Approval of its Smart Meter Technology :  
Procurement and Installation Plan :

DIRECT TESTIMONY

OF

NANCY BROCKWAY

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

OCTOBER 16, 2009

## Contents

INTRODUCTION .....	1
ALLEGHENY POWER’S PLAN TO DEPLOY SMIP BY 2014 .....	6
PROPOSED SCHEDULE FOR ALLEGHENY POWER SMIP .....	6
ASSERTED NEED FOR ACCELERATING SMIP DEPLOYMENT .....	9
THE VALUE OF PROVIDING IN-HOME DEVICES FOR 100% OF RESIDENTIAL CUSTOMERS .....	16
IMPACTS OF AMI AND SMIP ON VULNERABLE CUSTOMERS.....	31
INFORMATION TECHNOLOGY STANDARDS NOT YET IN PLACE .....	36
CONSUMER PROTECTION .....	43
CONCLUSIONS AND RECOMMENDATIONS .....	49

### LIST OF EXHIBITS

Exhibit NB-1	Resume and list of testimonies of Nancy Brockway
Exhibit NB-2	EPRI – Gaps in research about impacts of feedback on usage
Exhibit NB-3	NIST principles for privacy protection

1 **INTRODUCTION**

2 **Q. Please state your name, your business affiliation, and your address.**

3 A. My name is Nancy Brockway. I am the principal of NBrockway & Associates, a firm  
4 providing consulting services in the areas of energy and utilities. My address is 10 Allen  
5 Street, Boston, MA 02131.

6 **Q. On whose behalf are you testifying in this proceeding?**

7 A. I am testifying on behalf of Pennsylvania Office of Consumer Advocate (OCA).

8 **Q. Please briefly describe your qualifications and experience.**

9 A. Since 1983, my professional focus has been the energy and utility industries, with  
10 particular attention to the role of regulation in the protection of consumers and the  
11 environment. I was a Commissioner appointed to the New Hampshire Public Utilities  
12 Commission, serving from 1998 to 2003. Earlier, I was for several years a hearing  
13 officer and advisor to the Maine Public Utilities Commission and then to the  
14 Massachusetts Department of Public Utilities, where I served two years as General  
15 Counsel of the commission. I was an expert witness on consumer and low-income utility  
16 issues for seven years, with the National Consumer Law Center. Since leaving the New  
17 Hampshire Commission, I have been a consultant on regulatory utility issues to  
18 regulatory commissions, ratepayer advocates, low-income energy groups, and others. I  
19 also spent several months serving as the Director of Multi-Utility Research and Analysis  
20 with the National Regulatory Research Institute. While at NRRI, I researched and wrote  
21 a key objective study of the impact of advanced metering structure and related pricing  
22 options on residential consumers. I have written comments and filed testimony in the

1 Massachusetts Smart Grid proceedings now ongoing. My resume is attached as Exhibit  
2 NB-1.

3 **Q. Have you previously testified before this Commission?**

4 A. Yes, I have testified before the Pennsylvania Public Utility Commission on numerous  
5 occasions.

6 **Q. Have you testified on utility matters before other Commissions?**

7 A. Yes. I have filed testimony in over 30 proceedings. I have appeared before fifteen state  
8 or provincial regulatory commissions.

9 **Q. What is the purpose of your testimony today?**

10 A. I have been asked to review the Smart Meter Procurement and Installation Plan (SMIP or  
11 Plan) filing of West Penn Power, d/b/a Allegheny Power (Allegheny) to:

- 12 • analyze the Company's basis for seeking expedited consideration of its SMIP and  
13 rapid deployment of meters and infrastructure, particularly with respect to the  
14 asserted need for SMIP to meet Act 129 energy efficiency and demand response  
15 targets through initiatives in the residential and small commercial classes.
- 16 • analyze the evidence regarding the asserted benefits of in-home devices,
- 17 • review uncertainties in the evolution of Smart Grid technology and standards that  
18 could affect costs and timing of prudent investments,
- 19 • review potential adverse impacts of the Company's proposed rates on vulnerable  
20 customers,
- 21 • analyze the impact of the proposed Smart Grid Implementation Plan on residential  
22 consumer rights and protections, and

- 1           •       make recommendations for assuring that key planning milestones can be met  
2                   without risking SMIP obsolescence, and for mitigating adverse impacts associated  
3                   with the proposed Smart Grid Implementation Plan.

4   **Q.    Is your testimony intended to be a stand-alone presentation?**

5   A.    No. My colleague J. Richard Hornby, of Synapse Energy Economics, is presenting  
6           testimony dealing with, among other things, the analysis of costs and benefits for the  
7           proposed SMIP. He will discuss the extent to which uncertainties in key assumptions  
8           that I discuss bear on the strength of the cost-benefit analysis.

9   **Q.    Please summarize your conclusions.**

10  A.    My conclusions are as follows:

- 11           •       Allegheny Power has not demonstrated the prudence of or necessity for moving  
12                   ahead with full AMI deployment on the extremely expedited basis that it has  
13                   proposed.
- 14           •       Allegheny Power’s proposal to install in-home-devices in the home of every  
15                   residential customer is unsupported and unreasonable.
- 16           •       Allegheny Power’s SMIP plan is unnecessarily costly, and will result in the  
17                   highest SMIP surcharge in Pennsylvania.
- 18           •       Implementation of dynamic pricing and a costly Smart Metering Infrastructure  
19                   without an adequate basis to understand thoroughly its impacts would put  
20                   vulnerable customers at risk. The 30-month grace period established by the  
21                   Commission provides time to undertake research and test out implementation to

1 learn of the potential issues for vulnerable customers, and develop policies and  
2 techniques to address them.

- 3 • Standards and protocols necessary to design and operate an advanced metering  
4 infrastructure are still in a state of flux, and certain investments made now, before  
5 the standards have been more settled, are at risk of obsolescence.
- 6 • Privacy concerns of customers about their usage and other personal information  
7 need to be addressed and work is ongoing to develop standards to protect  
8 personally identifying information.
- 9 • The 30-month grace period established by the Commission provides time for  
10 Allegheny Power to monitor the development of smart grid standards,  
11 incorporate those standards in its SMIP, and take steps to understand how the  
12 SMIP as initially designed will be accepted and used by customers (so that  
13 appropriate revisions can be made) rather than proceeding with full deployment  
14 on the assumption that vendors and technology chosen now will meet the  
15 standards once established at a reasonable cost. Some techniques for obtaining  
16 understanding of the customers' attitudes toward and likely acceptance of the  
17 initial design include surveys, focus groups, deliberative polling, and  
18 implementation of trial deployments of the SMIP in areas where the cost of  
19 deployment is relatively small to obtain information about how customers will  
20 react and make use of the SMIP.
- 21 • Allegheny's proposal contemplates practices such as involuntary remote  
22 disconnection, prepayment metering, and use of service limiters, all of which

1 threaten customer access to service, and are not a necessary part of a smart meter  
2 plan.

3 **Q. Please summarize your recommendations.**

4 A. I recommend the following:

- 5 • Allegheny Power should not rush full SMIP deployment on the schedule it  
6 proposes, but should use the grace period to review its SMIP in light of ongoing  
7 research and development in the industry, including results of trial projects now  
8 underway and actual SMIP deployments.
- 9 • Allegheny Power should use the grace period to review its plan, identify ways to  
10 reduce the plan's costs and maximize its benefits to customers, and return with a  
11 revised SMIP for Commission approval.
- 12 • Allegheny Power should use the grace period to conduct customer-focused  
13 research such as the techniques to which I refer in my testimony, in order to be  
14 able to anticipate likely customer responses towards the various smart grid  
15 initiatives it proposes, and use that information to improve its SMIP design.
- 16 • Allegheny Power should use the grace period to review its plan, identify ways to  
17 reduce the plan's costs and maximize its benefits to customers, and return with a  
18 revised SMIP with more reasonable costs for Commission approval.
- 19 • Allegheny Power should take steps to identify potentially vulnerable customers  
20 and to provide assistance in dealing with issues they face arising from the SMIP  
21 installation.
- 22 • Allegheny Power should eliminate the universal in-home display deployment  
23 component of its SMIP.

- 1 • SMIP costs should be recovered primarily on a volumetric basis.
- 2 • Allegheny Power should be required to demonstrate that comprehensive and
- 3 effective cyber security, interoperability and privacy standards, and standards
- 4 enforcement mechanisms, are in place before it proceeds with full deployment of
- 5 an advanced metering infrastructure,
- 6 • Allegheny Power should agree that it will not use its proposed SMIP to
- 7 undermine the consumer protections afforded Pennsylvania electricity customers
- 8 now, including the provisions of Chapter 14 and Chapter 56, and before including
- 9 remote disconnection capability in its SMIP present a full cost/benefit analysis, as
- 10 well as a definite plan for its proposed use of remote disconnection containing
- 11 adequate consumer and public safeguards, for Commission review.

12

13 **ALLEGHENY POWER’S PLAN TO DEPLOY SMIP BY 2014**

14 *PROPOSED SCHEDULE FOR ALLEGHENY POWER SMIP*

15 **Q. Please briefly describe Allegheny Power’s Smart Grid Implementation Plan and**  
16 **proposed schedule.**

17 A. Allegheny Power proposes to deploy hourly-read meters with remote disconnect  
18 capability, two-way communications networks, a Meter Data Management System  
19 (MDMS), and a revamped Customer Information System (CIS). Allegheny Power  
20 proposes to begin installation of its MDMS and CIS investments in late 2009. Allegheny  
21 Power proposes to commence installation of smart meters in early 2010, and to complete  
22 smart meter installation by 2014. The bulk of the meter deployment would take place  
23 between 2010 and 2013. See, SMIP at Table 5, and Sections 2.4.4 and 2.4.5.

1 **Q. Does Allegheny Power make full use of the grace period allowed by the Commission**  
2 **in its Smart Meter Implementation Order?**

3 A. No. Under the Smart Meter Procurement and Installation Implementation Order (Order  
4 entered June 24, 2009)(Order or Smart Meter Implementation Order), Allegheny Power  
5 could have 30 months after the approval of its plan to achieve certain milestones in  
6 preparation for rolling out its smart meter plant. Allegheny Power has chosen to  
7 accelerate its SMIP deployment and not use any of this 30-month grace period. Indeed,  
8 Allegheny Power has sought expedited consideration of its SMIP.

9 **Q. What are Allegheny Power’s smart metering installation obligations under the Act?**

10 A. Act 129 establishes an obligation for each EDC with 100,000 or more customers to file a  
11 Smart Meter Technology and Installation Plan with the Commission. Section 2807(f)(2)  
12 requires that EDCs furnish Smart Meter Technology: (i) upon request from a customer  
13 that agrees to pay the cost of the Smart Meter at the time of request; (ii) in new building  
14 construction; and (iii) in accordance with a depreciation schedule not to exceed 15 years.  
15 Further, EDCs are, “with customer consent,” to make available direct meter access and  
16 electronic meter access to customer meter data to third parties, including electric  
17 generation suppliers and providers of conservation and load management services.

18 **Q. What timing obligations has the Commission imposed on utilities under Act 129?**

19 A. In its Implementation Order, the Commission authorized a 30-month grace period for  
20 subject utilities to develop their smart meter network following Plan approval.  
21 Specifically the Implementation Order required electric distribution utilities (EDCs) to  
22 include in their smart meter procurement and installation plan filing a proposal for  
23 meeting specific milestones within this 30 month grace period. Each covered EDC was

1 to set out its plan for meeting the following milestones, together with its justification of  
2 the proposed schedule:

- 3 • Assessment of needs and technological solutions.
- 4 • Selection of technologies and vendors.
- 5 • Establishment of network designs.
- 6 • Establishment of plans for training personnel.
- 7 • Establishment of plans for installation, testing and rollout of support equipment  
8 and software.
- 9 • Installation, testing and rollout of support equipment and software.
- 10 • Establishment of plans to design, test and certify EDI transaction capability  
11 consistent with this order.
- 12 • Establishment of plans for installation of meters consistent with the rollout  
13 requirements described.

14 Each plan was to include a schedule to meet each of these milestones, as well as specific  
15 reporting deadlines when the EDC will provide the Commission with reports on the  
16 status of its plan. Implementation Order at 7-8.

17 **Q. What are the rollout requirements ordered by the Commission?**

18 A Of particular note, the Commission's order recognizes that it was the intent of the  
19 General Assembly to have system-wide deployment over a period not to exceed 15 years.  
20 Implementation Order at 14. The Commission stated that the primary goal of the  
21 deployment plan should be to implement a deployment and installation schedule that best  
22 balances the overall efficiency and timeliness of the smart meter installations with the  
23 costs incurred. Implementation Order, at 14.

1 **Q. Under the Act and the Commission's Smart Meter Implementation Order, when**  
2 **does Allegheny Power have to start installing meters (other than customer request**  
3 **meters)?**

4 A. Allegheny Power has until 30 months following the approval of its SMIP to start  
5 installing its smart meters and smart meter infrastructure system-wide, and could take up  
6 to 15 years to complete the installation.

7 **Q. By how many months does Allegheny Power seek to accelerate its SMIP?**

8 A. Allegheny Power proposes to move its SMIP installation up to begin in early 2010, likely  
9 within a month or so after the Commission's review of its plan, and complete installation  
10 by the year end 2014. If Allegheny Power's proposed schedule were approved, it would  
11 accelerate the *commencement* of installations by as much as two years ahead of the  
12 required deadline, and greatly compress the time for full deployment.

13 **Q. Do you find Allegheny Power's proposal to be reasonable?**

14 A. No. As I discuss below, full advanced meter deployment presents many uncertainties,  
15 challenges and changes. Allegheny Power's proposal does not allow sufficient time to  
16 address these uncertainties and challenges to ensure the most cost-effective deployment  
17 plan. From my review and Mr. Hornby's review, I find that the plan is not cost-effective,  
18 reasonable or prudent.

19

20 *ASSERTED NEED FOR ACCELERATING SMIP DEPLOYMENT*

21 **Q. What does Allegheny Power say is its reason for accelerating SMIP deployment?**

22 A. Allegheny Power says it has chosen to accelerate its SMIP deployment in order to meet  
23 its energy savings and demand reduction targets under Act 129. See, e.g., SMIP at 51.

1 **Q. Why, according to Allegheny, must it accelerate its SMIP deployment in order to**  
2 **meet its energy savings and demand reduction targets under Act 129?**

3 A. Allegheny Power has chosen to link its SMIP to its Energy Efficiency &  
4 Conservation/Demand Response (EE&C/DR) initiatives. Allegheny Power states that it  
5 has “developed an implementation plan that has multiple activity streams that must be  
6 performed in parallel to successfully implement Smart Meters and attain the EE&C and  
7 DR targets legislated in Act 129.” SMIP at p. 35. According to Allegheny, rollout of  
8 Smart Metering and Smart Metering Infrastructure must start in 2010, and be complete by  
9 2014. *Id.* at 37-38. The Company states that this schedule is “particularly crucial” for  
10 the EE&C/DR Plan rate and program offerings that it wishes to implement relying on an  
11 AMI platform. SMIP at p. 106.

12 **Q. Did the Company explore alternative schedules using other technologies to provide**  
13 **any of the pricing options and demand response programs it proposes to use to meet**  
14 **its EE&C/DR targets?**

15 A. The Company considered alternatives, but did not appear to study them in depth. With  
16 respect to achieving the EE&C/DR targets, Allegheny Power argued that its decision to  
17 “enable and support the [EE&C/DR] programs as identified through the use of smart  
18 meter technology” was based on the following factors: “1) that a policy decision has  
19 been made by the General Assembly to require the installation of Smart Meter  
20 technology, 2) that while other alternatives may partially support some of the programs,  
21 Smart Metering technology provides the most functionality in the programs as well as the  
22 most timely and informative energy usage communication with customers, and 3) that  
23 since Smart Metering Technology is required, the most cost-effective approach is to

1 leverage the required Smart Metering Technology as opposed to pursuing additional  
2 interim investment in alternative technologies or solutions that are stopgap measures that  
3 postpone and delay Smart Metering technology.” OCA I-2 (c). Further, in response to  
4 OCA II-17, the Company stated that its consultant EDS, an HP company, “modeled an  
5 Act 129 Strategy that, *a priori*, assumes Smart Metering Infrastructure.”

6 **Q. Does the Company explain in its SMIP why various other approaches to EE&C and**  
7 **DR rates and programs are merely “stopgap measures” in its view?**

8 A. No.

9 **Q. Does the statute require the linkage that Allegheny Power makes between its**  
10 **EE&C/DR requirements and its AMI requirements?**

11 A. I do not read the Act to require AMI implementation in order to meet the Act’s near-term  
12 energy efficiency, conservation and demand response targets.

13 **Q. Has any other Pennsylvania utility subject to the requirements of the Act proposed**  
14 **such an accelerated schedule for smart metering deployment?**

15 A. No.

16 **Q. What portion of the Company’s total forecast EE&C/DR program energy efficiency**  
17 **targets does Allegheny Power state it will harvest through the rates and programs it**  
18 **plans to implement on its SMIP platform?**

19 A. My Exhibit NB-2 culls from Table 4 of the Allegheny Power filing the demand and  
20 energy savings Allegheny Power has forecast for the rates and programs it plans to  
21 implement on its SMIP platform. As can be seen on Exh. NB-2, all of these AMI-  
22 supported programs together are forecast to produce less than 1% (0%) of the Company’s  
23 overall energy (mWh) reduction target.

1 **Q. What portion of the Company’s total forecast EE&C/DR program demand**  
2 **reduction forecast does Allegheny Power state it will harvest through the residential**  
3 **rates and programs it plans to implement on its SMIP platform?**

4 A. The Company forecasts that three of the four AMI-supported residential programs will  
5 produce less than 1% (0%) of the Company’s overall demand response (mw) target.  
6 Only Critical Peak Rebate – Residential produced a measurable contribution to the  
7 demand reduction target, but even that was only 4% of the total Company goal.

8 **Q. Are EE&C/DR programs based on AMI forecast to produce greater savings from**  
9 **other classes besides residential?**

10 A. Only from the largest commercial and industrial customers. The low amount of  
11 contribution to demand response can also be observed in the small Commercial and  
12 Industrial classes. The only classes where AMI-supported programs will make a  
13 meaningful contribution to the Company’s energy savings target and total demand  
14 reduction forecast were the large Commercial and Industrial classes.

15 **Q. Do you agree with the Company’s forecast for contributions to EE&C/DR targets**  
16 **from AMI-supported programs?**

17 A. I have not attempted to do an independent forecast of contributions from the Company’s  
18 AMI-supported programs. Below, I discuss uncertainties in the demand response and  
19 energy conservation results that one may reasonably expect to follow from AMI  
20 deployment among residential customers. These uncertainties are consistent with the low  
21 estimate of residential contributions towards EE&C/DR goals that Allegheny Power  
22 forecasts from its AMI-based programs.

1 **Q. Do these levels of demand response and energy efficiency support the Company's**  
2 **claim that it must install universal AMI on an expedited basis in order to achieve its**  
3 **demand response and energy efficiency goals?**

4 A. No. On the contrary, the failure of the Company's SMIP-supported EE&C/DR programs  
5 and rates targeted to smaller customers to produce meaningful contributions to EE&C  
6 and DR goals contradicts the Company's statements to the effect that it requires the full  
7 deployment of its SMIP as a precondition to achieving its EE&C/DR goals.

8 **Q. Are there other factors that give rise to a concern over the Company's desire to**  
9 **expedite SMIP approval and its SMIP deployment?**

10 A. Yes. Below I discuss some of the smart metering infrastructure technology and privacy  
11 issues that should be resolved before proceeding with full smart metering infrastructure  
12 deployment. I also note that parts of the Allegheny Power SMIP, such as the type, roll-  
13 out and usefulness of in-home devices, are still in early phases of determination, and the  
14 Plan does not make clear how and when those aspects of the SMIP will be resolved in a  
15 detailed way that permits orderly deployment of the plan.

16 **Q. What impact has the Allegheny Power linkage of its EE&C/DR programs to its**  
17 **SMIP had on Allegheny Power planning?**

18 A. Allegheny Power has hastened its planning, and as a result left some questions opened  
19 that could later require amendments to its SMIP, after deployment. In particular, the  
20 Company has gathered relatively little customer-focused data on likely responses of its  
21 West Penn customers to various SMIP initiatives. In response to OCA II-7, the Company  
22 stated that it developed its estimates of the benefits of customer participation in energy  
23 efficiency & demand response programs based on "what it can reasonably predict in

1 program performance given time constraints” and other factors. It did not complete any  
2 original market research in its own Pennsylvania service area, OCA I-2, despite the fact  
3 that it recognizes that “every customer will respond differently to energy usage and  
4 pricing information.” OCA I-30.

5 **Q. Has Allegheny Power been open to stakeholder suggestions for improvements to its**  
6 **plan?**

7 A. Allegheny has not been fully effective using the stakeholder process to shape its SMIP.  
8 For example, in response to OCA II-9, when asked if it would entertain suggestions for  
9 additional analyses in the initial phase, specifically market research studies to identify the  
10 preferences of its customers by rate class for various rate offerings and demand response  
11 programs, Allegheny Power replied that it was willing to discuss such suggestions, but  
12 only subject to its insistence that “parties’ suggestions for further study must not in any  
13 way delay or impede the Company’s progress on the Plan, thereby ensuring that the  
14 Company is free to operate and meet all the goals and requirements of Act 129.” Parties  
15 cannot be expected to take an invitation for alternatives and suggestions seriously if from  
16 the outset the utility warns that it will not deviate in any way from its pre-defined  
17 schedule.

18 **Q. Does the Company have alternatives other than expedited full AMI deployment to**  
19 **produce energy savings and demand responses as required by Act 129 and the**  
20 **Commission’s orders?**

21 A. Yes. In testimony filed in the EE&C/DR docket, No. M-2009-2093218, OCA witness  
22 Geoff Crandall discussed a number of alternative opportunities to achieve energy savings  
23 and demand responses. In his testimony filed in this docket, OCA witness Rick Hornby

1 discusses options for harvesting resource savings without the extremely rapid deployment  
2 of its SMIP that the Company has proposed here.

3 **Q. What risks does Allegheny Power run by hastening plan development before it has**  
4 **taken the time for a thorough examination of all its options for SMIP elements?**

5 A, Allegheny has run the risk of committing to large investments in technologies or  
6 programs that on more measured consideration it would agree are not optimal, or perhaps  
7 not even reasonable. Allegheny Power also has deprived the Commission and its  
8 stakeholders reasonable opportunities to help fashion the optimal SMIP for its service  
9 area. This is particularly true with respect to understanding the impact of SMIP elements  
10 from the customers' perspective, including customer desire for a secure network and  
11 personal information privacy.

12 **Q. What do you conclude about Allegheny Power's reasons for its proposal to**  
13 **accelerate smart meter deployment?**

14 A. I conclude that it is unreasonable for Allegheny Power to proceed on its expedited  
15 schedule before resolution of a number of issues key to planning a responsible smart  
16 meter deployment. These include consideration of alternative means of meeting  
17 EE&C/DR goals that do not require rapid deployment of SMIP, consideration of likely  
18 customer interest in various proposed offerings, consideration and accounting for near-  
19 term rapid technological changes in the SMIP area, consideration and satisfaction of  
20 cyber security and privacy concerns, and consideration of less costly means of achieving  
21 its SMIP objectives. I also conclude that Allegheny Power has not shown that its  
22 proposed accelerated smart meter deployment schedule is necessary to meet its Act 129  
23 demand response goals.

1 **THE VALUE OF PROVIDING IN-HOME DEVICES FOR 100% OF RESIDENTIAL**  
2 **CUSTOMERS**

3 **Q. Does Allegheny Power propose to provide all residential customers with in-home**  
4 **devices as part of its SMIP?**

5 A. Yes. Allegheny Power states that in-home devices “are key to providing information to  
6 customers to achieve the required changes in consumer behavior to achieve the  
7 consumption and Demand Response reductions.” SMIP at p. 44.

8 **Q. What is an in-home device?**

9 A. An in-home-device is any one of a number of devices that can be installed in the  
10 customer’s home to permit communication with the smart meter or some other  
11 connection to a utility network, control the operation of an electricity-using appliance  
12 such as a central air conditioner, display information about the customer’s usage, current  
13 price (if on a time- or event-sensitive rate), progress in meeting certain efficiency goals  
14 and the like.

15 **Q. One often sees the acronym “IHD”. What does IHD stand for?**

16 A. The acronym “IHD” is used to refer to in-home devices, and also to one particular in-  
17 home-device, the in-home display. For clarity in my testimony, I will spell out both  
18 terms rather than using the acronym.

19 **Q. What kinds of in-home devices does Allegheny Power plan to install in consumer**  
20 **premises?**

21 A. Allegheny Power plans to provide two types of in-home devices for residential  
22 customers: in-home displays and programmable communicating thermostats (PCT).  
23 Under its SMIP, all residential customers will receive in-home displays on an “opt-out

1 basis,” in other words, unless the consumer chooses not to accept it. SMIP at p. 44. With  
2 respect to programmable communicating thermostats, Allegheny Power says that its  
3 PCT-based residential demand response (DR) program targets 13% of residential  
4 customers. Allegheny Power “assumes that there will be an equal number of load control  
5 devices for the PCT based DR Programs.” *Id.*

6 **Q. What kind of in-home display does Allegheny Power plan to install in all residential**  
7 **customers’ homes?**

8 A. All the Company has said about the type of in-home display Allegheny Power wants to  
9 install is that it will display near real- time usage and energy costs. SMIP at p. 55. See  
10 also p. 36. There are a number of displays on the market that provide such information  
11 (some of this information is routinely shown on the meter itself). Near real-time  
12 information on consumption and prices can readily be provided via the internet, and the  
13 Company has a plan to provide a portal for this purpose that customers can visit. Other  
14 in-home displays, such as orbs that glow in different colors to let consumers know when  
15 a high-priced period is coming or is over are also available. The Google “TED” can be  
16 installed without need of a smart meter. Inexpensive devices are on the market today that  
17 would allow the homeowner to monitor the usage of a particular energy-intensive  
18 appliance, such as the air conditioning unit. The technology is evolving rapidly, as  
19 vendors strive to understand what features will be most useful to customers and what  
20 price points are most likely to attract interest.

21 **Q. Please explain what a programmable communicating thermostat is.**

22 A. A programmable communicating thermostat (PCT) is a thermostat that can be  
23 programmed to increase or decrease the usage of the appliance to which it is attached,

1 based on signals communicated to it. The typical example is a thermostat on a central air  
2 conditioning system that is programmed to turn the temperature up when a pre-arranged  
3 signal is sent to the device, or when the customer connects to the thermostat remotely and  
4 adjusts the temperature.

5 **Q. What reason does the Company give for its plan to provide all residential customers**  
6 **with an in-home display as part of its initial SMIP?**

7 A. Allegheny Power gives several reasons for its plan to provide all residential customers  
8 with an IHD as part of its accelerated deployment plan. Allegheny Power calls universal  
9 provision of in-home displays “non-discriminatory because exactly the same devices will  
10 be installed in every customer’s home. The Company says it ensures that all customers  
11 will have access to their usage data and pricing information even if they do not make use  
12 of the Internet. SMIP at p. 44. In addition, 100% deployment of IHDs in residential  
13 premises, according to the Company, is required “to ensure all customers can choose to  
14 participate in EE&C and DR programs” including Residential Efficiency Rewards,  
15 Critical Peak Rebate, Critical Peak Pricing, the Hourly Pricing Option, and Pay Ahead  
16 Electric Service.” *Id.*

17 **Q. How much does Allegheny Power propose to invest in distributing and installing in-**  
18 **home devices?**

19 A. According to the SMIP, Allegheny Power identifies a cost of \$97.8 million for in-home  
20 devices. SMIP, p. 131. These estimates include installation of the in-home devices by  
21 the utility, at a cost of roughly \$108 per meter for the display. In addition, the Company  
22 forecasts approximately \$8 million of operations and maintenance (O&M) expense  
23 associated with in home devices.

1 **Q How does the utility propose that in-home displays be installed in customer**  
2 **premises?**

3 A. In its SMIP filing, Allegheny Power indicated that it would distribute and install the in-  
4 home displays itself. SMIP at p. 44. Customers could “opt out” of the in-home display  
5 program. It is my understanding, though, that the Company may be considering other  
6 methods of distribution.

7 **Q. What would be the process for utility installations of in-home-displays in residential**  
8 **customer homes?**

9 A. The Company does not yet have a plan for its in-home display installation. It will require  
10 a separate visit from the installation of the meter according to the SMIP.

11 **Q. Is the Company rethinking its approach to providing information on costs and**  
12 **usage for customers?**

13 A. Yes. I understand the Company is still evaluating whether to install in home displays  
14 itself, or provide them to customers, possibly through the mail. In such a case, the  
15 customers would have to call the customer service center to “provision” the in-home  
16 display to the smart meter and then install them themselves.

17 **Q. What does it mean to “provision” an in-home display to the smart meter?**

18 A. Where, as in the Allegheny Power SMIP, the in-home display will get its usage and other  
19 information through the smart meter (rather than through a direct connection to some data  
20 base), the in-home display must be able to communicate with the smart meter. This  
21 communication will take place over a local radio signal from the meter to the display and  
22 back. The smart meter and the display must be set to the same frequency, and use the

1 same “protocol” for transmitting data (or be able to translate data sent in a different  
2 protocol.”

3 **Q. If the Company distributes in-home displays and relies on customers to install them,  
4 how will it know if the customer has installed the display, or installed it properly?**

5 A. As yet the Company is uncertain whether and how it would determine if a customer had  
6 actually installed the IHD, or had installed it correctly. Possible methods to follow up to  
7 ensure installation and use of the in-home display would likely have to include visits or  
8 calls to the consumer. There is also the possibility that the customer could leave the  
9 premises and take the in-home display along, thus eliminating its availability to the next  
10 homeowner.

11 **Q. How will customers know what to do with the information from the proposed in-  
12 home displays?**

13 A. The Company would need to educate the consumers on what type of information they  
14 could receive from the in-home display and how it is going to help them make smart  
15 energy choices in the future. This will need to be done at the time of the installation visit  
16 or contact.

17 **Q. If Allegheny Power were to install the IHDs itself, would it do so at the same time it  
18 installed the smart meters?**

19 A. No. In-home display installation would require the customer to be home for a separate  
20 visit from an installer.

21

1 **Q. Has Allegheny Power committed to providing IHDs to customers over the long**  
2 **term?**

3 A. No. It is my understanding that the Company intends this to be a one-time distribution of  
4 in-home displays. It is expected that customers will be able to buy IHDs at Big Box  
5 stores, and that, after the market develops, customers could buy IHDs with the  
6 functionalities and appearance they prefer.

7 **Q. What benefits does Allegheny Power attribute to In-Home Displays?**

8 A. Allegheny Power cites four types of benefits from In-Home Displays: Energy  
9 Conservation, Time-of-Use/CriticalPeakPricing/Load Shifting, Residential Inclining  
10 Block Pricing Structure Support, and Increased Consumer Satisfaction. SMIP at p. 55.  
11 Essentially, the Company sees In-Home Displays as devices to provide feedback to  
12 customers on their energy usage in a way “that makes clear cause and effect.” *Id.*  
13 According to Allegheny, consumers who receive near real-time feedback on energy use  
14 are more likely to change the time they use their dryers and to shift use from peak to off-  
15 peak times. *Id.* Customers on inclining block rates can use in-home displays to see if  
16 they are nearing the point in the billing where they will be charged second block prices.  
17 *Id.*

18 **Q. The Company also says that in-home displays will increase customer satisfaction. Is**  
19 **the Company’s support for this proposition sound?**

20 A. The Company appears to have misunderstood the data on which it bases its assumption  
21 that in-home displays will increase customer satisfaction. Allegheny Power references  
22 surveys conducted by the Federal Energy Regulatory Commission (FERC) in 2006,<sup>1</sup>

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<sup>1</sup> Assessment of Demand Response and Advanced Metering, Docket No. AD 06-2-000, issued August 2006 (FERC 2006 Assessment). Available at <http://www.ferc.gov/legal/staff-reports/demand-response.pdf>.

1 asking organizations that had installed SMIP systems to identify the main SMIP features  
2 they used. SMIP at 55. Allegheny Power reports that over 70% reported “Enhanced  
3 customer service” as the reason for their deployment of SMI. The survey asked if  
4 utilities with SMIP used their systems for any one or more of fifteen specific functions,  
5 and invited them to name others. It is true that “enhanced customer service” came in first  
6 in the survey, but this term does not mean enhanced customer satisfaction with in-home  
7 devices. One can glean that from observing that respondents to the same survey question  
8 put “price responsive DR” near the bottom of the list of uses of SMI, and “pricing event  
9 notification capability” dead last. FERC 2006 Assessment, at p. 31. None of the other  
10 uses called out by the survey are provided via an in-home display. Confirmation that  
11 “enhanced customer satisfaction” does not relate to consumer acceptance of IHDs can be  
12 gleaned from the discussion on page 18, in which the example given for enhanced  
13 customer service relates to the ability of the customer service representatives to better  
14 handle high bill complaints if they have access to daily usage numbers. When this was  
15 brought to the Company’s attention, Allegheny Power said in response to OCA I-33 that  
16 customers receiving IHDs will be “more satisfied with their choices about energy  
17 consumption, will be more satisfied in the options they have for using and paying for  
18 electricity, and will recognize an increase in their level [of] satisfaction as a result of  
19 being conveniently able to reduce consumption and/or saving money on their electric  
20 bill.”

1 **Q. What impact would the requirement of separate visits for installation and customer**  
2 **education on in-home display usage and value have on customer acceptance of the**  
3 **IHDs?**

4 A. Based on my thirty years in consumer representation and utility regulation, I believe  
5 consumers would be upset to be asked to make arrangements to miss a half day or more  
6 of work to wait for an installer, and to take the time to be educated on a device they did  
7 not ask for. Many would be equally upset if they had to install the in-home display  
8 themselves, and call the utility to “provision” the in-home display to the particular smart  
9 meter at the premises. Many would resent having the utility make follow-up calls, as an  
10 intrusion on their privacy.

11 **Q. Can you give a recent example of the customer backlash that can surprise a utility**  
12 **that has not carefully considered customer reaction to the distribution of a proposed**  
13 **EE&C/DR device?**

14 A. Yes. The recent controversy over First Energy’s plan to distribute two compact  
15 fluorescent light bulbs to all its Ohio customers illustrates the backlash that the  
16 Company’s in-home display proposal could produce. As is now well-known, First  
17 Energy included a proposal to mail or hand-deliver two CFLs to each residential  
18 customer as part of its energy efficiency programs.<sup>2</sup> This plan was part of an overall  
19 energy efficiency plan approved by the Public Utilities Commission of Ohio (PUCO).  
20 The notice to accompany the bulbs did not advise customers that they would be paying  
21 for the bulbs through their rates. Cost recovery for the First Energy efficiency programs  
22 in Ohio includes the cost of the bulbs, the cost of their delivery to each residential

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<sup>2</sup> See [FirstEnergy Ohio Residential Customers Get Bulbs](#), N.Y. Times.com, October 5, 2009. John Funk, [FirstEnergy to Give Away 3.75 Million Low-Energy Light Bulbs](#), Cleveland Plain Dealer, Oct. 5, 2009.

1 customer, the program administrative costs, and an amount to compensate for estimated  
2 future reduction in electricity used, based on assumptions that customers would actually  
3 use the CFLs to displace less efficient ones that are in regular use (i.e. lost revenue).  
4 Customers swamped the offices of First Energy and the Commission with complaints.<sup>3</sup>  
5 In response to customer objection to the program, the Governor sent a letter to the Chair  
6 of the Commission asking questions about the program and asking that it be suspended  
7 pending answers to the questions. On October 7, 2009, the Commission asked First  
8 Energy to delay implementation of the light-bulb give-away as it considered the issues  
9 raised by the governor, members of the Ohio General Assembly and FirstEnergy  
10 customers, related to program details and costs.<sup>4</sup>

11 **Q. Should Allegheny Power be especially sensitive to the issues raised by new and**  
12 **complex programs rolled out without sufficient customer acceptance research?**

13 A. Yes. According to the Associated Press article cited above, nearly two years ago,  
14 Allegheny Power's affiliate apologized for mailing energy-efficient bulbs to its 220,000  
15 Maryland customers without letting them know they would be footing the bill. Maryland  
16 regulators said the company ignored instructions to inform customers about the program.  
17 Allegheny Power is proposing a SMIP component here that it should know based on its  
18 own experience could raise public concerns and resistance to the underlying cooperation  
19 it wishes to have with its customers.

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<sup>3</sup> See, Mark Williams, Light Bulb Program Has Customers Seeing Red, AP, available at [http://www.google.com/hostednews/ap/article/ALeqM5ihZf--K1AYYK\\_gaZJH2\\_Zj-9bD3AD9B763E80](http://www.google.com/hostednews/ap/article/ALeqM5ihZf--K1AYYK_gaZJH2_Zj-9bD3AD9B763E80)

<sup>4</sup> See, [Statement from PUCO Chairman on FirstEnergy's compact fluorescent light bulb program](http://www.puco.ohio.gov/PUCO/MediaRoom/MediaRelease.cfm?id=9732), available at <http://www.puco.ohio.gov/PUCO/MediaRoom/MediaRelease.cfm?id=9732>.

1 **Q. What are some ways for the Company to obtain information on likely customer**  
2 **response before deciding on the details of a program like the distribution of in-home**  
3 **displays to all customers?**

4 A. There is no failure-proof single method, but there are a number of methods for gauging  
5 likely customer response that can be used. Looking at what has been the response to  
6 similar programs in other utility service areas is helpful. Telephone or written surveys  
7 can be used, and have the benefit of allowing the utility to obtain responses from a  
8 random sample of its customers. Focus groups are only roughly representative of the  
9 customer base (the limit on numbers in any one group prevent a random sample  
10 approach). At the same time, they are fairly inexpensive, and they get at consumer  
11 attitudes that cannot be ascertained through a multiple choice survey. In addition, pilot  
12 deployment of the program can help identify ways in which it does or does not suit  
13 consumer needs. Some utilities have used the so-called “deliberative polling” approach,  
14 in which a group of customers (larger than a focus group, but small enough to fit in a  
15 modest-sized auditorium) are invited by the utility to give their opinions about a certain  
16 topic. Then the participants are led through a series of presentations and exercises to  
17 explore factual and policy issues of which they might not have been aware. The  
18 participants are then polled again, with the idea that the interactive and educational  
19 process of the deliberations might change some participants’ views, and thus better  
20 represent how consumers might respond after sufficient education and a sensitive  
21 deployment.

1 **Q. Do you have experience as a regulator with these methods?**

2 A. Yes. When I was a Commissioner in New Hampshire, we were trying to steer the  
3 electricity industry to competition. We hired a firm that conducted a number of  
4 telephone surveys for us to help us understand how different policies would be received,  
5 and help us decide on timing of various initiatives. The results were instructive and  
6 helpful. In addition, as we decided whether to extend retail competition to the natural gas  
7 industry, we conducted focus groups to learn what customers knew about the topic and  
8 how they would react if we opened the business to competition. I personally had my eyes  
9 opened to likely customer interest in natural gas competition by the contributions of focus  
10 groups (some of which I was able to observe via a remote video hookup).

11 **Q. Turning now from customer reaction to a program to customer participation in a**  
12 **program, what is the basis for the Company's assertion that having timely energy**  
13 **usage and pricing information, as from IHDs, will lead to energy conservation or**  
14 **demand response on the part of customers?**

15 A. Allegheny Power replies in response to OCA I-31 that the basis for its assertion as to the  
16 usage effects of in-home displays and pricing feedback is largely common sense:

17 In most utility pilots and energy conservation programs,  
18 electricity customers easily compute and correlate energy  
19 price signals and information with time of use and extent of  
20 use concepts....Allegheny Power believes that some  
21 customers may shift some load off peak [in response to  
22 feedback on prices and usage]...Though it is possible that  
23 electricity customers can always choose to increase their  
24 electricity usage for any number of reasons, the correlation  
25 between the consistent communication of energy prices –  
26 particularly high prices – is well established.”  
27

28

1 **Q. Does the Company claim any specific demand reduction or energy savings**  
2 **attributable to the In Home Displays themselves?**

3 A. No. Allegheny Power has not claimed any specific demand reduction or energy savings  
4 attributable to its installation of In Home Displays. The Company has not presented a  
5 clear picture of the value it ascribes to the IHDs.

6 **Q. Are there pilots or other studies that have attempted to quantify the extent to which**  
7 **consumers will respond to the information provided by In Home Displays?**

8 A. Yes, there have been scattered studies of so-called direct feedback, such as that provided  
9 by in home displays. There are pilot studies under way today, in which utilities are trying  
10 to determine the benefits that in-home displays give to customers, and their impacts.

11 **Q. Does the literature on feedback studies demonstrate a clear and quantifiable benefit**  
12 **for in-home displays?**

13 A. No. The reviews do not paint a very clear picture of likely responses to in-home displays.  
14 Some literature reviews conclude that in-home displays produce measurable reduction in  
15 usage. Others are less definitive, or even cautionary. Often-cited in support of in-home  
16 displays is a literature review prepared 2006 by Sarah Darby of the Oxford [England]  
17 University Environmental Change Institute, entitled “The Effectiveness of Feedback on  
18 Energy Consumption.”<sup>5</sup> Additional study results compiled by SMIP advocates include  
19 reports by the Brattle Group.<sup>6</sup>

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<sup>5</sup> Available at <http://www.eci.ox.ac.uk/research/energy/downloads/smart-metering-report.pdf> .

<sup>6</sup> Ahmad Faruqui and Lisa Wood, *Quantifying the Benefits of Dynamic Pricing in the Mass Market*, Appendix G, January 2008. Available at [http://www.brattle.com/\\_documents/UploadLibrary/Upload663.pdf](http://www.brattle.com/_documents/UploadLibrary/Upload663.pdf). and Ahmad Faruqui, Sanem Serguci and Ahmed Sharif, *The Power of Informational Feedback on Energy Consumption: A Survey of the Experimental Evidence.* 2009. The Brattle Group: Discussion Paper. Available at [http://www.brattle.com/\\_documents/UploadLibrary/Upload772.pdf](http://www.brattle.com/_documents/UploadLibrary/Upload772.pdf)

1 **Q. Does the Darby study support the Company's expectations as to energy reductions**  
2 **from in-home displays?**

3 A. The Darby study does collect some apparent support for the idea that some kinds of  
4 feedback can induce energy conservation, and suggests usage reductions could range  
5 from 5% to 15%. However, Darby's conclusions should not be the basis for \$100 million  
6 in investments for immediate universal deployment of in-home displays. The results  
7 cited in the study are mixed, some of the often-cited studies are not relevant to North  
8 America, and the studies do not yet answer all the relevant questions, as can be seen from  
9 the characteristics of the studies Darby reviewed. Darby looked at a total of 38 studies.  
10 However, only 18 of them were related to the kinds of direct feedback that Allegheny  
11 Power asserts will lead to significant conservation, such as in-home displays. Of these,  
12 only four actually studied effects of in-home-displays; the balance involved improving  
13 feedback by going from bimonthly billing to monthly billing. Ten of the relevant studies  
14 were done in Europe; Darby herself acknowledges that cultural and other differences can  
15 affect the results. Darby Report, at p. 9. Of the 18 relevant studies, six included  
16 intensive education (such as home visits or conservation affinity groups), which is not  
17 proposed for the Allegheny Power service territory. Seven of the 18 had no controls, or  
18 very small sample sizes, including three of the studies of some form of in-home display.  
19 Fourteen were done before 2000 (including two of the four studies of in-home displays).  
20 Eight of the studies were done before 1990 (including one of the four in-home display  
21 studies). Half the studies ran 5 months or fewer, with 6 running only 1 or 2 months in  
22 total. Sustainability over several years was not established by these studies.

1 **Q. Are there other recent reviews of the value of real-time feedback, such as through**  
2 **in-home displays?**

3 A. Yes. Recently, the Florida Solar Energy Center (FSEC) published a report on the  
4 potential of residential energy feedback devices.<sup>7</sup> In this study, the authors recited  
5 earlier studies suggesting a meaningful reduction in overall energy as a result of real-time  
6 feedback. The authors cautioned, however, that more research is needed to understand  
7 how and the extent to which real-time feedback causes lower usage (citations omitted):

8 Early research suggested that effective energy information  
9 to consumers can be a powerful means of altering behavior and  
10 consumption....However ... behavioral influences of feedback [are]  
11 largely un-researched in recent years. Also, occupant interest in  
12 energy feedback will likely be influenced by the relative price of  
13 energy...another area where available research information is  
14 dated. Little, too, is known about the degree to which feedback  
15 display design itself determines the magnitude of reduction,  
16 although the available information would suggest that bold, vivid  
17 displays are best...Another potentially critical topic is the potential  
18 interaction with critical utility pricing signals....Information is also  
19 lacking on behavioral persistence...

20  
21 **Q. Does the FSEC study on feedback devices include any further cautionary**  
22 **information?**

23 A. Yes. First, one wall-mounted display feedback device tested by the authors took nearly  
24 three hours to install. The device also measured apparent power without correction for  
25 power factor, resulting in readings that were inaccurate by 7.9% on average. The other  
26 device had an average relative error of 3.7%. The devices were also unable to discern  
27 small loads, such as a garage door opener or a cordless phone.

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<sup>7</sup> Danny Parker, David Hoak, Alan Meier and Richard Brown, *How Much Energy Are We Using? Potential of Residential Energy Demand Feedback Devices*, FLEC-CR-1665-06, originally published as part of the Proceedings of the 2006 Summer Study on Energy Efficiency in Buildings, ACEEE, Alsilomar, CAS, August 2006. Available at <http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CF-1665-06.pdf>.

1 **Q. Is there further support for your view that utilities should be cautious in simply**  
2 **assuming significant energy savings from installation of in-home displays?**

3 A. Yes. The Electric Power Research Institute (EPRI) recently issued a comprehensive  
4 report on the state of current knowledge about the effects of “feedback” on customer  
5 usage behavior.<sup>8</sup> EPRI reviewed studies discussed in the Darby and Faruqui papers in an  
6 effort to quantify the value of in-home displays in producing a conservation effect  
7 (energy savings). EPRI considered the Darby study and others, including studies of the  
8 effects of time-varying pricing as a form of feedback. EPRI concluded that “residential  
9 electricity use feedback” can be an effective tool. However, EPRI cautioned that further  
10 research is necessary on such points as “participation levels, the persistence of feedback  
11 effects, the relative value of different types of feedback, dynamic pricing interactions,  
12 and distinguishing the effects of feedback among different demographic groups.”  
13 Feedback Research Synthesis, Executive Summary, p. i. EPRI’s identification of gaps in  
14 the state of our knowledge about impacts of feedback is attached to my testimony as  
15 Exhibit NB-3.

16 **Q. What do you conclude about the reliability of the Darby paper and similar**  
17 **compilations of studies of feedback pilots in predicting usage reductions in response**  
18 **to feedback?**

19 A. The Darby study and similar compilations of studies published to date cannot support  
20 robust predictions about energy conservation responses to feedback on electricity usage  
21 and bills. More research is necessary, and some of the necessary research is ongoing  
22

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<sup>8</sup> *Residential Electricity Use Feedback: A Research Synthesis and Economic Framework*. EPRI, Palo Alto, CA: 2009. 1016844 (*Feedback Research Synthesis*). Available at <http://www.opower.com/LinkClick.aspx?fileticket=MFQLSk4GQD4%3D&tabid=76>.

1 **Q. What do you find as to Allegheny Power’s proposal to deploy IHDs to 100% of its**  
2 **residential customer as part of its accelerated SMIP?**

3 A. Allegheny Power’s proposal to deploy IHDs to all residential customers is costly and not  
4 supported. This aspect of the plan has not been shown to be cost-effective and risks  
5 significant customer backlash, particularly as customers see their monthly bills increase  
6 dramatically as a result of Allegheny Power’s proposed substantial SMIP monthly  
7 surcharge. Allegheny Power should do additional research as I have described to  
8 determine a more reasonable approach to IHDs.

9

#### 10 **IMPACTS OF AMI AND SMIP ON VULNERABLE CUSTOMERS**

11 **Q. Turning now to the impacts of the proposed AMI and SMIP rates on vulnerable**  
12 **customers, please explain what you mean by the term “vulnerable.”**

13 A. A vulnerable customer in this context would be one who is unable to move load off the  
14 critical peak, or at least cannot do so without risk to health and safety.

15 **Q. Please identify the key categories of vulnerable residential customers.**

16 A. Vulnerable customers include low-use customers, low-income customers, disabled  
17 customers, and the socially isolated, among others. Low-use customers tend to use only  
18 the electricity they need for essentials, such as lighting and refrigeration. Low-income  
19 customers are disproportionately low-use, and in general, low-income customers have  
20 tended to reduce loads in response to critical peak tariffs at a lower rate than non-low-  
21 income customers. Others who may have difficulty moving or reducing their existing  
22 peak loads include low-income shift workers, and parents with small children at home.  
23 Disabled customers include residential customers who must have electricity to power

1 medical equipment. Along with socially isolated customers, the especially at-risk group  
2 also includes customers who are not capable of taking initiatives to respond to peak time  
3 rebates.

4 **Q. Are low-income customers the only customers who tend to have lower usage?**

5 A. No. Many customers can have relatively low usage.

6 **Q. Allegheny Power states that all customers can be enabled to participate in energy  
7 and load reduction by its SMIP deployment. See e.g. SMIP at 106, bullet 3. How  
8 then do you reason that these customer groups are vulnerable?**

9 A. Not all customers can reduce load safely. Customers who cannot reduce critical peak  
10 loads must still pay for the AMI system and smart metering investment. These bill  
11 impacts will not be trivial, especially in the case of low-income customers. With all their  
12 functionalities and the infrastructure investment, the smart meters Allegheny proposes to  
13 obtain will cost \$600 apiece. OCA I-40. Altogether, Allegheny Power has estimated by  
14 far the largest bill impact of any Pennsylvania utility for its SMIP. By June 2013,  
15 residential customers in the Allegheny Power service territory will be paying at least \$15  
16 more *per month* because of the SMT surcharge and associated taxes. Response to OCA  
17 I-36. Not only is this burden excessive, but in order to economize and take advantage of  
18 the rebates, low-income and other vulnerable customers may reduce their usage below  
19 levels consistent with health and safety.

20 **Q. How does Allegheny Power respond to requests for information on its analysis of the  
21 potential impact of its SMIP on low income customers?**

22 A. Allegheny Power states that “due to time and budget constraints” it has not pursued  
23 exhaustive research on the potential impacts of all its smart-meter related EE&C/DR

1 programs on low-income customers. OCA I-28. The Company cites a list of the general  
2 benefits it asserts its SMIP will provide, and states that low-income customers will be  
3 particularly interested in these benefits. The Company states that it has “not singled out  
4 or targeted any specific customers subsegment...” OCA I-28. See also OCA I-17, I-18.

5 **Q. Is a “one-size-fits-all” product likely to be valuable to all customers?**

6 A. No. In competitive markets, vendors and service providers try to tailor their offerings to  
7 customers, and do not expect all customers to pay for equipment and devices they neither  
8 want nor need. For low-income and low-use customers, accelerated deployment of costly  
9 high-functionality meters and in-home devices are not likely to provide such customers,  
10 on average, with benefits sufficient to cover the additional costs they must bear under the  
11 SMIP.

12 **Q. Why do you say that low-use customers have difficulty moving load off critical  
13 peaks to take advantage of peak time rebates?**

14 A. One analysis of the California pilot showed that low-use customers did not respond to  
15 critical peak pricing, or peak time rebates.<sup>9</sup> Another evaluation found some load  
16 response on the part of low-use customers, but significantly less than the response of  
17 high-use customers.<sup>10</sup> This stands to reason, as such customers are unlikely to have large  
18 amounts of discretionary demand that can be moved off critical peaks. There have been  
19 hard-to-explain variations in customer responses to dynamic pricing. For example, in one  
20 year of the Chicago pilot offered by Commonwealth Edison, customers living in “low-

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<sup>9</sup> Karen Herter, “Residential implementation of critical-peak pricing of electricity,” *Energy Policy* 35 (2007): 2121-2130 (“Herter”). Available at [www.elsevier.com/locate/enpol](http://www.elsevier.com/locate/enpol), at 2122.

<sup>10</sup> Charles River Associates, *Impact Evaluation of the California Statewide Pricing Pilot*, March 16, 2005 (“CRA”). Available at: <http://www.energy.ca.gov/demandresponse/documents/index.html#group3>.

1 income” zip codes reduced demand as much as others.<sup>11</sup> The evaluators of the program  
2 the same year noted, however, that participants receiving high price notices via  
3 computers (still disproportionately absent from low-income homes) had a stronger  
4 response.

5 **Q. How did low-income high-use customers fare in the California special pricing pilot?**

6 A. According to Herter’s analysis, low-income high-use customers experienced adverse bill  
7 impacts (higher bills) under the pilot tariffs, even before counting the cost of the  
8 advanced metering infrastructure. For reasons that are not yet well enough understood,  
9 they did not reduce loads at the critical peak times. While low-income customers may be  
10 expected to try to reduce their bills by taking advantage of the SMIP rate, many will be  
11 unable to do so and will not receive rebates.

12 **Q. What should be done to address the problems facing vulnerable customers under  
13 critical peak tariffs?**

14 A. The most important step is to keep the costs of the deployment down as much as possible.  
15 This will help mitigate the bill impacts on customers who cannot take advantage of the  
16 rebates. Requiring a robust benefit/cost ratio will help to keep the pressure on  
17 deployment costs and ensure that the optimal plan is chosen. Holding customers  
18 harmless from (a) excessive spending on accelerated deployment, (b) insufficient savings  
19 to offset deployment costs for all customers, or (c) both, would also help protect  
20 customers who cannot participate directly in the Peak Time Rebate.

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<sup>11</sup> 2005 ESPP Evaluation, at 15. Available at [http://docs.google.com/gview?a=v&q=cache:TmCHAeRf21wJ:ies.lbl.gov/drupal.files/ies.lbl.gov/sandbox/Evaluation%2520of%25202005%2520Energy\\_Smart%2520Plan.pdf+ESPP+Summit+Blue+2005+Evaluation&hl=en&gl=us&sig=AFQjCNGJtcak9JDfLf7SeFZ2ywu83yic7g](http://docs.google.com/gview?a=v&q=cache:TmCHAeRf21wJ:ies.lbl.gov/drupal.files/ies.lbl.gov/sandbox/Evaluation%2520of%25202005%2520Energy_Smart%2520Plan.pdf+ESPP+Summit+Blue+2005+Evaluation&hl=en&gl=us&sig=AFQjCNGJtcak9JDfLf7SeFZ2ywu83yic7g).

1 **Q. Do you recommend a specific category of SMIP costs that can be eliminated, to help**  
2 **keep overall rates down?**

3 A. Yes. For the reasons discussed above, the Company should not deploy in-home-devices  
4 with its smart meters and smart meter infrastructure. This step alone will reduce forecast  
5 SMIP costs by about \$100 million.

6 **Q. Are there other ways to mitigate the burdens that SMIP will place on vulnerable**  
7 **customers who cannot take advantage of SMIP rebates?**

8 A. Yes, SMIP costs should be recovered primarily on a volumetric rather than fixed basis.  
9 In this way, low-use customers who cannot take advantage of SMIP tariff benefits will  
10 not be as burdened with costs of the new system as they would be under fixed charge cost  
11 recovery. For more discussion of volumetric cost recovery, please refer to the testimony  
12 of OCA Witness Rick Hornby on this topic.

13 **Q. Are there other steps the Company can take in an effort to mitigate the adverse**  
14 **impacts on vulnerable customers?**

15 A. Yes. Utilities generally should also do in-depth research to identify customers who are  
16 vulnerable to the adverse effects of SMIP pricing and AMI costs, and understand why  
17 they have difficulty moving usage off critical peaks (or do reduce loads but at risk to their  
18 own health and safety). Based on this knowledge, and working with community groups,  
19 the utility can develop targeted outreach to such customers to assist them in  
20 understanding the tariff, taking advantage of rebates where it is reasonable, and  
21 connecting such customers with resources that can help them manage their usage and  
22 bills most effectively, given their circumstances. I should caution, however, that such  
23 efforts are unlikely to identify and protect all vulnerable customers. They should not be

1           seen as a solution for the problems that inadequately planned deployment of advanced  
2           metering will bring for such customers.

3  
4   **INFORMATION TECHNOLOGY STANDARDS NOT YET IN PLACE**

5   **Q.    Are there other challenges and uncertainties that call into question Allegheny**  
6           **Power's proposal for expedited full deployment?**

7    A.    Yes. There are still many issues outstanding regarding AMI.

8   **Q.    Please turn to the question of the dynamic nature of information technology in the**  
9           **advanced metering industry. To what extent has the industry developed protocols**  
10          **and standards of general applicability?**

11   A.    Advanced metering infrastructure is still experiencing rapid technological development.  
12          Vendors are promoting their solutions to technical problems, while industry groups are  
13          meeting, with government facilitation, in an attempt to establish common standards,  
14          especially in key areas such as cyber-security and interoperability.

15   **Q.    Please explain what you mean by cyber-security.**

16   A.    Cyber-security refers to the security of the information passing over the communications  
17          networks of the Smart Grid, and to the security of controls over system components, such  
18          as circuit breakers and other components of the system essential to the functioning of the  
19          grid. It also refers to the security of customer data (privacy). Security may be  
20          compromised by equipment or operational faults, as well as intentional breaches by  
21          hackers, and unauthorized access to data and controls.

1 **Q. What is “inter-operability”?**

2 A. Interoperability refers to the ability of any given component of the Smart Grid to  
3 communicate with the other components to which it is connected, passing data and  
4 commands smoothly, quickly and accurately back and forth. Protocols for data transfer  
5 must be compatible, if not identical, for components to be interoperable.

6 **Q. Does the interconnection of elements of the grid under AMI create openings for**  
7 **breaches in the cyber security of the grid?**

8 A. Yes. AMI is essentially a huge and complicated communications and data processing  
9 network, or more accurately, a network of networks. Sensitive information will pass over  
10 the communications networks set up to administer dynamic pricing and to manage grid  
11 functions. New and remotely-programmable controls of various grid components will be  
12 installed. Communications systems such as enterprise networks for core business data  
13 processing, network access and backhaul, neighborhood or local area networks, and home  
14 area networks, will be created and interconnected. The systems will be tied together  
15 more than ever. They will be more complex than ever. Interoperability, size, complexity  
16 and novelty provide opportunities for unauthorized data and control access.

17 **Q. In what ways will the advanced metering and Smart Grid infrastructure be**  
18 **vulnerable to cyber-attacks?**

19 A. There are a number of cyber-security vulnerabilities of AMIs that have been identified so  
20 far, and as with all complex information technology solutions, there are vulnerabilities  
21 that have not yet been, and cannot reasonably be, foreseen. Among the known  
22 vulnerabilities are (a) physical tampering with elements of the network, (b)  
23 eavesdropping in on or jamming wireless signals that connect Smart Meters to

1 neighborhood data collection points, (c) password compromises, (d) unauthorized data  
2 collection, (e) suboptimal priority for data transfer over public (e.g. cellular) networks, (f)  
3 lack of control of internet paths and reliability, and (g) denial-of-service attacks (in which  
4 an unauthorized user generates a huge number of messages to go over the system, which  
5 overloads the communications system and triggers interruptions of the system).

6 **Q. Please describe the privacy issues that arise in the case of the Smart Grid and**  
7 **advanced metering infrastructure.**

8 A. As noted above, the interconnectedness of the Smart Grid makes data carried over the  
9 communications networks vulnerable to improper access by unauthorized persons. The  
10 advanced metering infrastructure will at a minimum capture and store data on all  
11 consumers' hourly usage. Some argue that this information could be used to estimate  
12 which customers have which types of appliances and equipment at home. It could be  
13 used to estimate whether a customer is home, weekdays, or for several weeks during  
14 vacation. If customers install Home Area Networks and tie their appliances and  
15 computer in to the network, that network could be hacked, and specific information about  
16 electricity usage could be obtained. To the extent all these systems are hooked into the  
17 customer's internet connection, the customer's computers could be at risk, as well.

18 **Q. Are there standards in place for utilities to follow to minimize threats to the cyber**  
19 **security of the Smart Grid, to assure customer control of personally identifying**  
20 **information, and to assure the smooth interoperability of its various parts?**

21 A. There are some standards in place for some aspects of the Smart Grid. For example, the  
22 ZigBee(r) protocol is becoming the standard for communications within a home area  
23 network. The industry is working hard to develop a comprehensive set of standards to

1 provide guidance for SMIP implementation. Utilities are making use of existing privacy  
2 protocols developed in other contexts such as banking or credit card security, pending  
3 development of privacy programs tailored to the Smart Grid.

4 **Q. Please outline the status of efforts to develop industry-wide cyber security and inter-**  
5 **operability standards.**

6 A. Under the Energy Independence and Security Act (EISA) of 2007, the National Institute  
7 of Standards and Technology is taking the lead in promoting comprehensive standards in  
8 the area of interoperability.<sup>12</sup> As part of this effort, NIST convened the Cyber Security  
9 Coordinating Task Group, and is promoting the development and implementation of  
10 associated cyber security standards. As yet, it is not possible to be sure when NIST and  
11 the entities developing the standards themselves (i.e. IEEE, NERC) will be able to  
12 complete their work. NIST has issued a “roadmap” for the work needed to get from here  
13 to standards (the draft NIST Framework and Roadmap for Smart Grid Interoperability  
14 Standards on September 24, 2009)(Roadmap), and has set timing goals for release of  
15 standards in the most important topic areas by the end of 2010. The roadmap itself,  
16 however, is not a set of standards. And the timing goals for standard release are very  
17 ambitious.

18 **Q. How does NIST characterize the problem of safeguarding consumer data privacy in**  
19 **the Smart Grid era?**

20 A. In the draft Roadmap released September 24, 2009, NIST noted that the major benefit  
21 provided by the Smart Grid, the ability to get richer data to and from customer meters and  
22 other electric devices, “is also its Achilles’ heel from a privacy viewpoint.” Roadmap, p.

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<sup>12</sup> <http://www.nist.gov/smartgrid/>

1 84. NIST went on to say that privacy advocates have raised concerns about the type and  
2 amount of billing and usage information flowing through the various components of the  
3 Smart Grid, information "...that could provide a detailed time-line of activities occurring  
4 inside the home."

5 **Q How is NIST handling privacy concerns?**

6 A. NIST has set up a task force to coordinate efforts to identify privacy issues and develop  
7 ways to address them.

8 **Q. What does the NIST draft report on cyber security recommend about protecting**  
9 **privacy of personally identifiable information (PII)?**

10 A. The NIST report authors set out ten high-level principles for which specific standards  
11 must be developed in the areas of (1) Management, Accountability and Training, (2)  
12 Notice and Purpose for PII Use, (3) Choice & Consent to use PII, Collection of PII, (4)  
13 Use and Retention of PII, (5) Individual Access, (6) Disclosure and Limiting Use of PII,  
14 (7) Security and Safeguards, (8) Accuracy and Quality of PII, (9) Openness, and (10)  
15 Monitoring and Challenging Compliance. The principles are set out in my Exhibit NB-3.  
16 The NIST draft report recommends that standards be developed to address the privacy  
17 risks it has identified.<sup>13</sup>

18 **Q. Are there reasons to expect that important Smart Grid standards will not be in**  
19 **place before the end of 2010, if not later?**

20 A. Yes. NIST and industry members are pushing hard to complete the primary standards  
21 work. But NIST cautions that "several hundred standards that are identified or developed  
22 over the span of several years may be required to achieve secure, end-to-end

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<sup>13</sup> NIST Cyber Security Draft 7628, pp, 9-10.

1 interoperability across a fully implemented Smart Grid.”<sup>14</sup> The NIST Roadmap uses  
2 qualifying language to describe its expectations for full standard release by the end of  
3 2010, saying for example that its priority action plan will address “many” (as opposed to  
4 “all”) of the needed modification to standards already denoted as “consensus”  
5 standards.<sup>15</sup> In prepared comments released with the Roadmap, Commerce Secretary  
6 Locke likened the Roadmap to a designer’s first detailed drawing of a complex structure.  
7 “It presents a high-level conceptual model to ensure that everyone is on the same page  
8 before moving forward to develop more detailed, formal Smart Grid architectures.”<sup>16</sup>  
9 Similarly, as NIST describes the challenge on its web page:

10 The task is akin to developing standards for the next-  
11 generation telecommunications network. This effort has  
12 spanned many years, continues to evolve, and involves  
13 dozens of standards development organizations. Also, like  
14 the telecom network, the Smart Grid is almost entirely  
15 owned and operated by industry. Therefore, Smart Grid  
16 interoperability and cybersecurity standards must reflect  
17 industry consensus, with active participation, and where  
18 required, leadership and coordination by government.  
19

20 **Q. Are there other technology issues facing Allegheny Power in the decision to move**  
21 **rapidly to full AMI deployment?**

22 A. Yes. The rapid development of not only the technologies but also of the rate designs and  
23 related AMI functionalities makes the job of the system planner very complicated. Best  
24 practices require that the designers of the hardware, software and communications  
25 networks engineer the system to a well-defined end-state of functionalities for the system  
26 (use cases). Utilities such as PG&E in California and Oncor in Texas have experienced

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<sup>14</sup> <http://www.nist.gov/smartgrid/standards.html>, last viewed October 4, 2009 (Roadmap).

<sup>15</sup> Roadmap, p. 38.

<sup>16</sup> [http://www.nist.gov/public\\_affairs/releases/smartgrid\\_092409.html](http://www.nist.gov/public_affairs/releases/smartgrid_092409.html).

1 difficulties when they chose technologies that turned out not to have certain desired  
2 functionalities (in these cases, desired by the regulators). PG&E customers are paying  
3 incremental costs for functions that conceivably could have been integrated less  
4 expensively had they started with those specifications in mind before designing and  
5 bidding out the metering project. Oncor finds itself trying to recover the costs of a  
6 metering choice that was rendered obsolete when the state of Texas determined that  
7 utilities must provide different functionalities in their smart meters. The continuing  
8 evolution of the Smart Grid presents challenges to system planners, especially at this  
9 early stage in its development.

10 **Q. Are there financial risks of moving ahead with full scale deployment before the**  
11 **industry and government have settled on standards for cyber security and**  
12 **interoperability?**

13 A. Yes. The fact that some technical standards are still being developed creates a risk that  
14 additional costs may need to be incurred if some of the technologies deployed now prove  
15 to be incompatible with the standards that are ultimately established in the future.

16 **Q. Have policy leaders on Smart Grid issues recognized the risk facing pioneers and**  
17 **early adopters?**

18 A. Yes. Commerce Secretary Gary Locke spoke to these risks in his presentation to the  
19 GridWeek conference in Washington on September 24, 2009. As he said on regarding  
20 the need for cyber security and interoperability standards:

21           These standards are needed immediately to ensure we don't  
22           prematurely render otherwise viable products obsolete. For  
23           example, we don't want Smart Grid meters—the key

1 communication device that links utilities with consumers—to  
2 suffer from “beta versus VHS” rivalries.<sup>17</sup>  
3

4 **Q. Can the risks of moving ahead before technological standards are in place be**  
5 **eliminated by contractual provisions with vendors?**

6 A. Not fully.

7 **Q. Given the risks of moving ahead before standards are settled, and the difficulty of**  
8 **using contract provisions to protect consumers, should Allegheny Power go ahead at**  
9 **this time with its proposed accelerated full deployment schedule?**

10 A. No. It would be prudent to use the grace period to see if the ambitious national  
11 standards-development schedule has been successful. In such a case, Allegheny Power  
12 would not have to take all the risks of an early adopter. In any event, the utility should  
13 follow the principles set out by the NIST privacy task force, and set out in Exhibit NB-3.  
14

## 15 CONSUMER PROTECTION

16 **Q. Please turn now to the issues of risks to consumer rights and protections posed by**  
17 **the universal deployment of an advanced metering infrastructure.**

18 A. In this section I will discuss the risks of unfair and unnecessary disconnections created by  
19 the use of smart metering capability for remote disconnection, prepayment metering and  
20 service limiting in the absence of adequate consumer protections. Allegheny has  
21 proposed all three of these uses as prospective applications.  
22

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<sup>17</sup> [http://www.commerce.gov/NewsRoom/SecretarySpeeches/PROD01\\_008443](http://www.commerce.gov/NewsRoom/SecretarySpeeches/PROD01_008443).

1 **Q. How does implementation of Smart Grid technology increase the risks of**  
2 **unnecessary and unfair disconnections of residential households?**

3 A. Smart meters can be used to introduce three practices, each of which pose risks to certain  
4 customers of unnecessary or unfair disconnections. First, smart meters can be installed  
5 with modules that permit the utility to disconnect the power to a customer's house  
6 remotely, by flicking a switch at the utility's offices, without sending a technician to  
7 disconnect the meter. Second, smart metering provides a relatively inexpensive  
8 foundation for implementing pre-payment metering. Indeed, the Company proposes to  
9 introduce pre-payment metering using its AMI platform. Third, smart metering provides  
10 a relatively inexpensive foundation for implementing service limiters.

11 **Q. How does remote disconnection increase risks of unnecessary and unfair**  
12 **disconnection?**

13 A. Today, to cut off power to a customer, the utility sends a technician to the premises to  
14 "pull the meter." This process provides an opportunity to avert disconnection in the case  
15 of a payment-troubled household threatened with disconnection for non-payment. When  
16 a technician comes to pull the meter, the customer gets final notice of the impending  
17 shut-off. Also, the customer has an opportunity to pay any delinquencies on the bill, and  
18 avert shut-off. This "last knock" notice and opportunity help prevent unnecessary shut-  
19 offs by providing an opportunity for the customer to fix the problem that led to the  
20 disconnection decision. The in-person disconnection also provides an opportunity to  
21 work out problems with the utility. Remote disconnection eliminates this "last knock"  
22 notice to the customer, and final opportunity to resolve bill issues.

1 **Q. Are there circumstances where remote disconnection makes sense and does not**  
2 **threaten consumers' access to utility service?**

3 A. There may be. In the event of voluntary terminations, such as at move-in and move-out  
4 of premises, remote disconnection need not threaten consumer rights. It will be  
5 important for the Commission to review the potential uses of the remote disconnection  
6 function, and consider additional procedures to ensure that if the utility intends to use  
7 remote disconnection for any purpose, the health and safety of the public is not put in  
8 jeopardy. Even where such use might seem non-controversial, as in the case where a  
9 tenant moves out of an apartment, procedures will need to be established to assure that  
10 the property is indeed vacant as represented to the utility. If such confirmation is not  
11 achieved and the premises are remotely disconnected, the result could be property  
12 damage, and danger to the life and health of tenants still in the apartment. Disconnecting  
13 a property from electric service, sight unseen, even where the disconnection is asserted  
14 voluntary or even sought by the customers, is a delicate business, and the actions could  
15 have unintended, and adverse, consequences.

16 **Q. Has Allegheny Power met the terms of the Smart Grid Implementation Order, at 18**  
17 **and 30-31, with respect to presenting a cost/benefit analysis supporting the decision**  
18 **to include a remote disconnection module?**

19 A. Not fully. The cost of a remote disconnect module is about \$40 or \$50 per meter, leading  
20 to an overall cost of roughly \$10 million. I understand the operational benefits claimed  
21 for this capability are inclusive of remote disconnections in the case of involuntary  
22 terminations. It will be hard to develop procedures whereby remote disconnection in  
23 such cases complies with all consumer protections. These "savings" should be identified

1 and removed. In addition, the Commission needs to know what alternative procedures  
2 are to be put in place to preserve health and safety in the event of remote disconnection.  
3 These costs cannot be specified until the Commission has considered how remote  
4 disconnection can be implemented consistent with the Public Utility Code and with  
5 public health and safety.

6 **Q. Turning now to prepayment meters, how does prepayment metering risk unfair and**  
7 **unnecessary disconnections?**

8 A. Under a prepayment metering approach, power will flow only so long as the customer  
9 has paid in advance. The customer puts money in the meter to get power, typically  
10 through a smart card, which operates much like a prepaid wireless or long-distance card.  
11 If the smart card amount is used up, and the card is not “recharged,” the customer’s  
12 service stops. In effect, the customer is disconnected. Some prepayment programs  
13 include grace periods and information on the amount of power left (at current prices).  
14 These are supposed to give the customer an opportunity to recharge the card and maintain  
15 service. In practice, the result is that customers are often disconnected without the  
16 advance notice and consumer protections afforded by regulation and utility practice.

17 **Q. Is there evidence that customers end up shut off from service as you suggest?**

18 A. Yes. The French distribution utility, Electricité de France, at one time required  
19 delinquent customers to accept prepayment metering as a condition of continuing to  
20 receive service. They abandoned that practice after their sociologist’s research found that  
21 low-income and other vulnerable customers were cutting themselves off, inadvertently,  
22 when they were unable to charge up their prepayment smart cards. Because the  
23 disconnection was automatic, and “remote” (at least from the awareness of the utility),

1           there was no advance notice, nor an opportunity to work with the customer to arrange for  
2           help paying the bill, make payment arrangements, or otherwise manage the customer's  
3           payment difficulties in a humane and practical way. As a result of this research, EDF  
4           changed its policy, and does not allow such vulnerable customers to take service under a  
5           prepayment arrangement.

6   **Q.   Are there other recent examples of consumer protection violations with the use of**  
7   **pre-paid metering of electricity?**

8   A.   Yes. A recent investigative news report from Texas (where deregulated retail electricity  
9           suppliers can offer service on a pre-paid basis) tells of vulnerable pre-paid electricity  
10          customers being cut off without notice.<sup>18</sup> Families with children have had to abandon  
11          their homes. A paraplegic who requires air conditioning to maintain a safe body  
12          temperature lost his electricity on days when the temperature exceeded 100 degrees. A  
13          heart patient who needed power for an oxygen machine was cut off twice in one summer.

14 **Q.   Has another public service commission reviewed the fairness of prepayment**  
15 **metering in connection with advanced metering deployment?**

16 A.   Yes. The Massachusetts Department of Public Utilities recently dismissed the Smart  
17          Grid filing of a major electric distribution utility in the state because it proposed to pilot  
18          prepayment metering among low income customers. The Commission found that such  
19          metering would violate regulations promulgated to ensure safe and reasonable access to  
20          service, including advance notice of pending disconnection and an opportunity to dispute  
21          the bill.

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<sup>18</sup> Steve McGonigle and Ed Timms, "Cutoffs, complaints abound with Texas' prepaid electric providers," Dallas Morning News, October 4, 2009.

1 **Q. Please describe how service limiters present risks of unfair and unnecessary**  
2 **disconnection.**

3 A. Service limiters are just what they sound like: devices that cause a circuit breaker in the  
4 meter to trip open if the amount of electricity used exceeds a preset limit. Like a circuit  
5 breaker, they can be reset under certain circumstances. In essence they put a customer at  
6 risk of the power going off without advance notice if usage happens to exceed the limit.  
7 As in the case of prepayment metering, tripping the service limiter causes a disconnection  
8 without notice and an opportunity to take care of the bill.

9 **Q. Can you give an example of a service limiter causing an unfair and unnecessary**  
10 **disconnection?**

11 A. Yes. This past winter, a 93-year old gentleman from a town in Michigan froze to death  
12 because a service limiter was put on his meter. He had fallen behind in his bill, and the  
13 (municipal) utility had a policy of putting on service limiters until bills were paid up.  
14 The fellow was found dead in his freezing cold house. On the kitchen table was found  
15 money sufficient to pay the bill. The fellow never got a chance to pay his bill before  
16 disconnection – he may not have been able to get to the meter to reset it, he may not have  
17 understood that he could do that, or how. But in any event, he suffered a painful death  
18 because the service limiter tripped in the middle of winter. I should note that just last  
19 week, a bill unanimously passed the Michigan State Senate forbidding the use of service  
20 limiters on delinquent bills in Michigan. It now goes to the Michigan House for  
21 approval.

22

1 **Q. How do you recommend the Commission prevent these risks of unnecessary and**  
2 **unfair termination of service?**

3 A. I understand the Commission will consider the use of prepayment meters and service  
4 limiters in a separate docket. I recommend that the Commission make findings to the  
5 effect that Allegheny must conduct a proper cost-benefit analysis of the remote  
6 disconnection option and receive specific approval before including such functionality in  
7 its SMIP. I also recommend that remote disconnection not be allowed until procedures  
8 are in place to protect property, and health and safety. The grace period will be ample  
9 time for this essential element of the process. I recommend that the Commission find that  
10 prepayment metering and service limiters pose risks of unnecessary and unfair loss of  
11 electric service, and that the Commission will not accept them as an element of smart  
12 metering deployment at this time. Utilities would retain the right to petition for a change  
13 in the policies, practices and regulations, but consideration of such changes should take  
14 place only in proceedings that are focused enough on the issue to permit a full  
15 exploration of the facts and the ramifications.

16

## 17 **CONCLUSIONS AND RECOMMENDATIONS**

18 **Q. Please summarize your conclusions.**

19 A. My conclusions are as follows:

- 20 • Allegheny Power has not demonstrated the prudence of or necessity for moving  
21 ahead with full AMI deployment on the extremely expedited basis that it has  
22 proposed.

- 1 • Allegheny Power’s proposal to install in-home-devices in the home of every  
2 residential customer is unsupported and unreasonable.
- 3 • Allegheny Power’s SMIP plan is unnecessarily costly, and will result in the  
4 highest SMIP surcharge in Pennsylvania.
- 5 • Implementation of dynamic pricing and a costly Smart Metering Infrastructure  
6 without an adequate basis to understand thoroughly its impacts would put  
7 vulnerable customers at risk. The 30-month grace period established by the  
8 Commission provides time to undertake research and test out implementation to  
9 learn of the potential issues for vulnerable customers, and develop policies and  
10 techniques to address them.
- 11 • Standards and protocols necessary to design and operate an advanced metering  
12 infrastructure are still in a state of flux, and certain investments made now, before  
13 the standards have been more settled, are at risk of obsolescence.
- 14 • Privacy concerns of customers about their usage and other personal information  
15 need to be addressed and work is ongoing to develop standards to protect  
16 personally identifying information.
- 17 • The 30-month grace period established by the Commission provides time for  
18 Allegheny Power to monitor the development of smart grid standards,  
19 incorporate those standards in its SMIP, and take steps to understand how the  
20 SMIP as initially designed will be accepted and used by customers (so that  
21 appropriate revisions can be made) rather than proceeding with full deployment  
22 on the assumption that vendors and technology chosen now will meet the  
23 standards once established at a reasonable cost. Some techniques for obtaining

1 understanding of the customers' attitudes toward and likely acceptance of the  
2 initial design include surveys, focus groups, deliberative polling, and  
3 implementation of trial deployments of the SMIP in areas where the cost of  
4 deployment is relatively small to obtain information about how customers will  
5 react and make use of the SMIP.

- 6 • Allegheny's proposal contemplates practices such as involuntary remote  
7 disconnection, prepayment metering, and use of service limiters, all of which  
8 threaten customer access to service, and are not a necessary part of a smart meter  
9 plan.

10 **Q. Please summarize your recommendations.**

11 A. I recommend the following:

- 12 • Allegheny Power should not rush full SMIP deployment on the schedule it  
13 proposes, but should use the grace period to review its SMIP in light of ongoing  
14 research and development in the industry, including results of trial projects now  
15 underway and actual SMIP deployments.
- 16 • Allegheny Power should use the grace period to review its plan, identify ways to  
17 reduce the plan's costs and maximize its benefits to customers, and return with a  
18 revised SMIP for Commission approval.
- 19 • Allegheny Power should use the grace period to conduct customer-focused  
20 research such as the techniques to which I refer in my testimony, in order to be  
21 able to anticipate likely customer responses towards the various smart grid  
22 initiatives it proposes, and use that information to improve its SMIP design.

- 1 • Allegheny Power should use the grace period to review its plan, identify ways to  
2 reduce the plan's costs and maximize its benefits to customers, and return with a  
3 revised SMIP with more reasonable costs for Commission approval.
- 4 • Allegheny Power should take steps to identify potentially vulnerable customers  
5 and to provide assistance in dealing with issues they face arising from the SMIP  
6 installation.
- 7 • Allegheny Power should eliminate the universal in-home display deployment  
8 component of its SMIP.
- 9 • SMIP costs should be recovered primarily on a volumetric basis.
- 10 • Allegheny Power should be required to demonstrate that comprehensive and  
11 effective cyber security, interoperability and privacy standards, and standards  
12 enforcement mechanisms, are in place before it proceeds with full deployment of  
13 an advanced metering infrastructure,
- 14 • Allegheny Power should agree that it will not use its proposed SMIP to  
15 undermine the consumer protections afforded Pennsylvania electricity customers  
16 now, including the provisions of Chapter 14 and Chapter 56, and before including  
17 remote disconnection capability in its SMIP present a full cost/benefit analysis, as  
18 well as a definite plan for its proposed use of remote disconnection containing  
19 adequate consumer and public safeguards, for Commission review.

20 **Q. Does this conclude your testimony?**

21 A. Yes.

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BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of West Penn Power Company :  
d/b/a Allegheny Power for Expedited : Docket No. M-2009-2123951  
Approval of its Smart Meter Technology :  
Procurement and Installation Plan :

EXHIBITS TO THE  
DIRECT TESTIMONY  
OF  
NANCY BROCKWAY

ON BEHALF OF THE  
PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

OCTOBER 16, 2009

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**Experience**

Principal, NBrockway & Associates, energy and utility consulting, 2003 to present  
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Commissioner, New Hampshire Public Utilities Commission (1998-2003)  
Member, New Hampshire Site Evaluation Committee (1998-2003)  
Utilities consultant and attorney, National Consumer Law Center (1991-1998)  
General Counsel, Massachusetts Public Utilities Commission (1989-1991)  
Staff Attorney, Assistant General Counsel, Massachusetts Commission (1986-1989)  
Hearings Officer, Senior Staff Attorney, Maine Public Utilities Commission (1983-1986)  
Executive Director, Maine Legal Services for the Elderly, Inc. (1981-1983)  
Staff Attorney, Directing Attorney, Pine Tree Legal Assistance, Inc. (1979-1981)  
Staff Attorney, UMass Student Legal Services (1977-1979)  
Staff Attorney, Western Massachusetts Legal Assistance, Inc. (1976-1977)  
Staff Attorney, Legal Aid Society of New York (1974-1976)

**NARUC and related Committee Memberships and Public Service  
(1998-2003)**

NARUC Consumer Affairs Committee (Vice-Chair)  
Consumer Affairs Committee, New England Conference of Public Utility  
Commissioners (Chair)  
Steering Committee, National Council on Competition in the Electric Industry  
ISO-NE Advisory Committee  
NEPOOL Review Board Advisory Committee  
NARUC Ad Hoc Committee on Competition in the Electric Industry  
NARUC Ad Hoc Committee on Committee Structure, NARUC  
NARUC Committee on Communications  
FCC Joint Conference on Accounting  
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**Other Activities:**

Former Chair, Board of Directors, PAYS America, Inc., 2003-2008

### **Other Appointments and Professional Activities (1991-1998)**

Independent Conservation & Load Management Expert,  
Commonwealth Electric Co.  
President's Council on Sustainable Development,  
Energy & Transportation Task Force staff  
California Low Income Governing Board  
(Advisory Bd. to CPUC on low-income energy issues)  
Massachusetts Energy Facilities Siting Board  
Massachusetts Board of Registration of Allied Mental Health Professionals

### **Bar Memberships**

Massachusetts  
New York State and Maine (inactive)

### **Education**

B.A. with honors, 1970, Smith College, Northampton, MA  
J.D., 1973, Yale Law School, New Haven, CT  
Coursework in statistics, Northeastern University, Boston, MA

## NANCY BROCKWAY: TESTIMONIES

Case name	Client Name	Topic	Juris. & Docket No.	Date(s) Filed
IMO BG&E Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge Mechanism for the Recovery of Cost.	Maryland Office of Public Advocate	Smart grid deployment	Maryland PSC Case No. 9208	10/13/09
IMO DTA of FortisAlberta, Phase I/II, 2010-2011	Utilities Consumer Advocate of Alberta	Smart grid deployment	Alberta Utilities Comm'n App. No. 1605170	10/9/09
Appalachian Power Company, etc. ENEC proceeding	Covenant House and West Virginia CAG	Impact of proposed rate increase on low-income customers and means to improve collection procedures.	West Virginia PSC Case No. 09-0177-E-GI	5/26/09
In Re Combined Application of South Carolina Electric and Gas	Friends of the Earth	Need for and cost of proposed Summer nuclear power plant.	South Carolina Public Service Commission, Docket No. 2008-196-E.	Direct: 10/17/08 Surrebuttal: 11/17/08
Nova Scotia Power, Inc.	NS UARB Consumer Advocate	Proposed general rate increase, rate design.	Nova Scotia Utility and Review Board, P-886	12/07
Pike County Commissioners v. PCL&P	Pennsylvania Office of the Consumer Advocate	Options to address rate shock in transition to uncapped competitive POLR rates	Pennsylvania Public Utilities Commission, Docket No. C-20065942	11/06 (hearing in January 07)
Nova Scotia Power, Inc.	NS UARB Consumer Advocate	Extra Large Industrial Interruptible Rates	Nova Scotia Utility and Review Board, P-883	8/06
UGI/Southern Union, Proposed Merger	Pennsylvania Office of the Consumer Advocate	Impacts of the Proposed Merger on Ratepayers and Rates, Risks and Benefits of Proposed Merger, Synergies, Reliability	Pennsylvania Public Utilities Commission, Docket Nos. A-120011F2000, etc.	5/06
SEMCO Energy Services Gas Cost Recovery Plan	PAYS America, Inc.	Relationship Between DSM and Gas Costs	Michigan Public Service Commission, Docket No. U-14718	5/06 (not admitted)
Re: Electric Service Reliability and Quality Standards	Delaware Public Service Commission	Application of Proposed Rules to Competitive Suppliers and Cooperatives	Delaware Public Service Board, Docket No. 50	1/06
Exelon/Public Service Electric & Gas, Joint Petitioners	New Jersey Division of the Ratepayer Advocate	Impacts of Proposed Merger on Service Quality, Reliability, and Gas Safety, and Options to Maintain Historic Standards.	New Jersey Board of Public Utilities, BPU Docket No. EM05020106 OAL Docket No. PUC-1874-05	11/05-12/05
Exelon/Public Service Electric & Gas, Joint Petitioners	New Jersey Division of the Ratepayer Advocate	Risks and Benefits of Proposed Merger of Exelon and PSE&G, Options for Assuring Benefits and Mitigating Risk	New Jersey Board of Public Utilities, BPU Docket No. EM05020106 OAL Docket No. PUC-1874-05	11/05-12/05

## NANCY BROCKWAY: TESTIMONIES

Nova Scotia Power, Inc.	NS UARB Consumer Advocate	Economic Development Rates	Nova Scotia Utility and Review Board, P-882	10/05
Nova Scotia Power, Inc.	NS UARB Consumer Advocate	Revenue Requirements, Cost Allocation, Rate Design, Demand Side Management, Economic Development Rates	Nova Scotia Utility and Review Board, P-882	10/05 – 11/05
Bay State Gas Company	Local 273	Customer Service, Reliability, Low-Income Protections, Revenue Requirements	Massachusetts DTE, Docket No. 05-27	7/05
Nova Scotia Power, Inc.	Nova Scotia Utility and Review Board	Domestic Consumer Perspective on Proposed Rate Case Settlement Agreement	Nova Scotia Utility and Review Board, P-881	1/05
Cincinnati Bell Alt Reg	Communities United for Action	Universal Service and alternative regulation of telephone service	PUCO, Case No. 96-899-TP-ALT	12/97
UGI-Electric Utilities, Inc.	Pennsylvania OCC	Universal Service issues in electric industry restructuring plans	PA PUC, No. R-00973975	1997
West Penn Power Co.	“	“	PA PUC, No. R-00973981	1997
Duquesne Light Co.	“	“	PA PUC, No. R-00974101	1997
PECO, Inc.,	“	“	PA PUC, No. R-00973953	1997
PP&L	“	“	PA PUC, No. R-00973954	1997
Met Ed.	“	“	PA PUC, No. R-00974008	9/97
Penelec	“	“	PA PUC, No. R-00974009	9/97
In the Matter of the Electric Industry Restructuring Plan	New Hampshire Legal Services	Low-income rates and DSM, impacts of restructuring on low-income consumers	New Hampshire Public Utilities Commission, D.R. 96-150	Nov., Dec. 1996
Notice of Inquiry/ Rulemaking. establishing the procedures to be followed in electric industry restructuring.	Mass. CAP Directors Association, Mass. Energy Directors Association, named Low-Income Intervenors	Electric industry restructuring	Massachusetts Department of Public Utilities, D.P.U. 96-100.	to 10/98
Universal Service Docket	Pennsylvania Office of Consumer Advocate	Rate rebalancing, universal service, telephone penetration.	Pennsylvania Public Utilities Commission Docket No. I-00940035	1996
In Re: Complaint of Kenneth D. Williams v. Houston Lighting and Power Co.	Named Low-Income Consumers	Customer service, rate design, demand-side management, revenue requirements	Texas Public Utilities Docket No. 12065	1994-5
Open Access Non-Discriminatory Transmission Services ... and Recovery of Stranded Costs	Direct Action for Rates and Equality, Providence, Rhode Island	Open transmission access in interstate commerce, and stranded costs recovery.	FERC, Nos. RM95-8-000, RM94-7-000.	1994-5

## NANCY BROCKWAY: TESTIMONIES

Bath Water District, Proposed Increase in Rates	Maine Office of Public Advocate	Water district cost allocation, rate design, low-income water affordability	Maine Public Utilities Commission, Docket. No. 94-034	12/94, 3/95
Application of Ohio Bell Telephone Co. for Approval of Alternative Form of Regulation	Legal Aid Society of Cleveland and Dayton	Definition of universal telecommunications service, proposal for Universal Service Access program (USA).	Public Utilities Commission of Ohio, Case No. 93-487-TP-ALT	5/4/94
Pennsylvania PUC vs. Bell Telephone of Pennsylvania	Pennsylvania Public Utility Law Project	Definition of "universal telecommunications service"	Pennsylvania PUC No. P-930715	filed 12/93
Joint Application for Approval of Demand-Side Management Programs, etc.	LG&E; Legal Aid Society of Louisville, other Joint Applicants	Cost-effective DSM programs for low-income customers; collaborative process to design DSM programs; cost allocation and cost recovery.	Kentucky PSC No. 93-150	11/8/93
Texas Utilities Electric Company	Texas Legal Services Center	Costs and benefits of DSM targeted to low-income customers	Texas PUC No. 11735	1993
Texas Utilities Electric Company	Texas Legal Services Center	Proposed Maintenance of Effort Rate for low-income customers	Texas PUC No. 11735	1993
Philadelphia Water Department	Philadelphia Public Advocate	Costs of Unrepaired System Leaks	Philadelphia Water Comm'r.	1992
New England Telephone	Rhode Island Legal Services	DNP for non-basic service	Rhode Island PUC, No. 1997	1991
Kentucky Power Co.	Kentucky Legal Services	Low Income Rate	Kentucky PSC No. 91-066	1991
Investigation into Modernization	Invited by Commission	Impact of modernization costs on low income telephone users	New York PSC	1991

**Energy and Demand Savings Forecast from  
EE&C/DR Programs Proposed on the AMI Platform**  
Source: Table 4, Allegheny Smart Grid Implementation Plan Filing<sup>1</sup>

Rate or Program	Class to Whom Rate or Program is offered	Net Lifetime mWh [Energy] Savings	Net Peak Demand kW Savings	% of Total Company Goals: Lifetime mWh [Energy] and kW [Demand]	
				Energy Savings	Demand Reductions
<b>Residential Efficiency Rewards Rate</b>	R	11,023	959	<b>0%</b>	<b>0%</b>
<b>Pay Ahead Smart Service</b>	R	4,724	411	<b>0%</b>	<b>0%</b>
<b>Critical Peak Rebate - Residential</b>	R	2,497	9,513	<b>0%</b>	<b>4%</b>
<b>Programmable Controllable Thermostat</b>	R	4,724	411	<b>0%</b>	<b>0%</b>
<b>TOU with Critical Peak Pricing</b>	C&I-S	7638	2,856	<b>0%</b>	<b>1%</b>
<b>Hourly Pricing Option</b>	C&I-S	1,348	504	<b>0%</b>	<b>0%</b>
<b>Customer Load Response Program</b>	C&I-L	8,074	59,494	<b>0%</b>	<b>28%</b>
<b>Distributed Generation</b>	C&I-L	2,830	28,500	<b>0%</b>	<b>13%</b>

<sup>1</sup> Percent of Total Company kW Demand derived. Total Company Demand reductions given as 216,328 kW.

**NIST PRIVACY GROUP HIGH-LEVEL PRINCIPLES  
ON  
PROTECTION OF CONSUMER PRIVACY IN THE SMART GRID**

**2.5.1 Management, Accountability and Training**

At this time, the Privacy group could find no formally documented privacy responsibilities for Smart Grid management positions. Documented requirements for regular privacy training and ongoing awareness activities for all utilities, vendors, and other entities with management responsibilities throughout the Smart Grid should be created and implemented, and compliance enforced.

**2.5.2 Notice and Purpose for PII Use**

The new smart meters and accompanying potential and actual uses create the need for utilities to be more transparent and clearly provide notice documenting the types of information items collected, and the purposes for collecting the data. Within the Smart Grid implementation a clearly-specified notice must describe the purpose for the collection, use, retention, and sharing of PII. Data subjects should be told this information at or before the time of collection.

**2.5.3 Choice & Consent to use PII**

New smart meters create the need for utilities to give residents a choice about the types of data collected. Utilities should obtain consent from residents for using the collected data for other purposes, and as a requirement before data can be shared with other entities.

**2.5.4 Collection of PII**

In the current operation of the electric grid, data taken from meters consists of basic data usage readings required to create bills. Under a smart grid implementation, meters and will collect other types of data. Some of this additional data may be PII. Because of the associated privacy risks, only the minimum amount of data necessary for the utility companies to use for energy management and billing should be collected. However, the amount of information collected may vary, depending on whether or not power generation occurs on the premises. Home generation services will likely increase the amount of information created and shared.

**2.5.5 Use and Retention of PII**

In the current operation of the electric grid, data taken from meters is used to create residents' bills, determine energy use trends, and allow customers to control their energy usage both on-site and remotely. The new smart meters, and the Smart Grid network, will have the capability to use the collected data in an unlimited number of ways. Information should only be used or disclosed for the purpose for which it was collected, and should be divulged only to those parties authorized to receive it. PII should be aggregated or anonymized wherever possible to limit the potential for computer matching of records. PII should only be kept as long as is necessary to fulfill the purposes for which it was collected.

**2.5.6 Individual access**

In the current operation of the electric grid, data taken from the meters is obtainable by

consumers from their own homes. The data collected in a Smart Grid implementation may be stored in multiple locations. Currently, there is no standardized process to allow residents to access to their own corresponding PII that may be stored throughout the Smart Grid. Currently, customers are able to access their account information through their monthly bill, utility websites, and annual terms and conditions statements. The utilities that comprise the Smart Grid should establish and provide to all customers a process to allow them to inspect their corresponding PII , and to request the correction of inaccuracies. Customers should also be informed about parties with whom PII data has been shared.

#### **2.5.7 Disclosure and Limiting Use of PII**

Significant privacy concerns and risks exist when PII is inappropriately shared without the knowledge and consent of the individuals to whom the PII applies. Data collected through smart meters should be used solely for the specific purposes for which it was collected. If utilities wish to use the data for other purposes, or share the data with other entities, they should notify consumers, clearly communicate their plans, and obtain consent to use and share the data as described.

#### **2.5.8 Security and Safeguards**

The data collected from smart meters may potentially be transmitted to and stored in multiple locations throughout the Smart Grid. Establishing strong security safeguards will be necessary to protect the PII from loss, theft, unauthorized access, disclosure, copying, use, or modification. (The AMI requirements are included in this draft and requirements for the entire Smart Grid will be included in the December draft of this document.)

#### **2.5.9 Accuracy and Quality of PII**

The data collected from smart meters and related equipment will potentially be stored in multiple locations throughout the Smart Grid. Meter data may be automatically collected in a variety of ways. The ability to inappropriately modify data could be significant in utilities where access controls are not appropriately set. Accordingly, establishing strong security safeguards will be necessary to protect the information. Since meter data may be stored in many locations, and therefore, accessed by many different individuals and entities and used for a very wide variety of purposes, PII data may be inappropriately modified. Automated Smart Grid decisions made for home energy use could be detrimental for residents (e.g., restricted power, thermostats turned to dangerous levels), while decisions about Smart Grid power use and activities could be based upon inaccurate information. Every effort must be made to ensure that PII collected throughout the Smart Grid, and at all locations where it is stored, is accurate, complete and relevant for the purposes identified, and remains accurate throughout the life of the PII.

#### **2.5.10 Openness, Monitoring and Challenging Compliance**

In the current electric grid, utilities follow a wide variety of methods and policies for communicating to residents how PII will be used. Some utilities provide no privacy notices to residents. The data collected from new smart meters and related equipment will potentially be stored in multiple locations throughout the Smart Grid, possibly within multiple states. Privacy protections should be applied consistently and at the same level for all PII throughout the entire Smart Grid system to be effective.