

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**PETITION OF PECO ENERGY COMPANY
FOR APPROVAL OF ITS
SMART METER TECHNOLOGY PROCUREMENT AND
INSTALLATION PLAN**

DOCKET NO. M-2009-2123944

DIRECT TESTIMONY

WITNESS: ANN P. KELLY

SUBJECT: COSTS OF PECO'S SMART METER PLAN

DATED: AUGUST 14, 2009

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1 **DIRECT TESTIMONY OF**
2 **ANN P. KELLY**

3 **I. INTRODUCTION AND PURPOSE OF TESTIMONY**

4 **1. Q. Please state your full name and business address.**

5 A. My name is Ann P. Kelly and my business address is 2301 Market Street,
6 Philadelphia, Pennsylvania 19103.

7 **2. Q. By whom are you employed and in what capacity?**

8 A. I am employed by PECO Energy Company (“PECO” or the “Company”) as Director
9 of Finance Operations.

10 **3. Q. What are your current duties and responsibilities as Director of Finance**
11 **Operations?**

12 A. As Director of Finance Operations, I am responsible for PECO’s operating and
13 maintenance (“O&M”) and capital expenditures as well as project evaluation
14 activities.

15 **4. Q. Please summarize your prior professional experience.**

16 A. I began my professional career as a fund accountant for Dean Witter Intercapital and
17 then worked as an auditor for Price Waterhouse LLC. I then was employed at Radnor
18 Holdings Corporation for ten years in various financial capacities, including
19 consolidation and corporate reporting, external financial reporting, cash management
20 and treasury rising to the position of Treasurer. I have worked for the Exelon
21 organization for the past three years. Prior to my current position, I served as the

1 Director of Financial Planning and Analysis for Exelon Generation and Director,
2 Office of the President for Exelon Generation's Power Team.

3 **5. Q. What is your educational background?**

4 A. I received a Bachelor's degree in accounting with a minor in business from Ohio
5 Wesleyan University in 1992. I earned my Master's degree with a concentration in
6 finance from Villanova University in 2000.

7 **6. Q. What is the purpose of your testimony?**

8 A. The purpose of my testimony is to describe the estimated costs of PECO's Smart
9 Meter Technology Procurement and Installation Plan ("Smart Meter Plan" or "Plan").
10 I provide a breakdown of the projected costs for PECO's Plan and explain the process
11 by which PECO estimated those costs, net of potential savings.

12 **II. COSTS OF PECO'S SMART METER PLAN**

13 **7. Q. Please explain what cost estimates PECO is required to provide as part of its**
14 **Plan.**

15 A. The Pennsylvania Public Utility Commission ("Commission") issued an
16 Implementation Order identifying several categories of costs which PECO must
17 describe in its Plan, including:

- 18 • capital and expense items relating to all Plan elements, equipment and facilities
19 (including depreciation, O&M, and a return component based on PECO's
20 weighted cost of capital, and taxes);

- an analysis of all related administrative costs (including Plan development, cost analysis, measurement and verification, and reporting); and
- cost estimates for testing upgrades, maintenance and personnel training.

See Smart Meter Procurement and Installation, Implementation Order, Docket No. M-2009-2092655 (Order entered June 24, 2009) (“Implementation Order”), p. 29. In addition, PECO is required to provide a breakdown between costs of meeting “minimum requirements” under Act 129 and the individual incremental costs of each Commission-imposed requirement beyond the minimum. *Id.* All cost projections must reflect potential O&M savings and be supported by estimates from at least two vendors where available. *Id.* at 30-31.

8. Q. Has PECO prepared estimated costs for its Plan?

A. Yes. PECO’s estimated costs are attached to my testimony as PECO Exhibit APK-1. As set forth on Exhibit APK-1, PECO has divided its Plan costs into separate categories that correspond to PECO’s new planned Advanced Meter Infrastructure (“AMI”). The categories include: (1) smart meter purchase and installation, (2) network communications system, (3) Information Technology (“IT”) applications and support, (4) management and internal labor, and (5) customer acceptance testing of dynamic pricing programs.

Within each category, costs are then further detailed. PECO Exhibit APK-1 shows costs for each category by year through the initial deployment period (“Phase One”), which runs until the end of the 30-month grace period established by the Implementation Order, and provides a breakdown of such costs between O&M

1 expenses and capital expenditures. The Plan also describes the estimated range of
2 costs for the full meter deployment.

3 **9. Q. How did PECO estimate these costs?**

4 A. PECO's cost estimates for the AMI infrastructure were developed through a detailed
5 process leveraging input from a variety of sources. PECO and Enspira Solutions,
6 Inc. ("Enspira"), PECO's smart meter project consultant, gathered cost information
7 from PECO and Exelon's prior meter deployment, network and IT experience, as well
8 as from several workshops with AMI vendors. PECO's AMI project team utilized
9 sub-teams in the PECO IT, Supply, Operations and Finance departments to gather
10 cost inputs for their respective areas. As described by Mr. Buxton, PECO met with
11 five AMI vendors to obtain indicative costs for its Smart Meter Plan and assess each
12 vendor's AMI technology, capacity to implement its solutions within various time
13 periods, and possible outsourcing structures. Vendor indicative pricing was utilized
14 to determine the estimated cost for the various AMI components. For IT applications
15 and support, PECO leveraged information from competitively-sourced common
16 MDMS, Middleware, and System Integration providers currently supporting the
17 development of Exelon's AMI programs.

18 For meters and installation, PECO used the average cost PECO obtained from
19 indicative pricing from its vendor workshops. In other areas, such as the AMI
20 Communications Network and IT Applications and Support, where indicative pricing
21 is less certain, PECO used a more conservative estimate from the cost range for its
22 analysis. A more conservative estimate is appropriate because the pricing dynamics

1 within the market are in flux given the increasing demand for these types of products
2 and the customization required in much of the IT work. PECO's cost estimates will
3 be refined through a competitive vendor selection and contracting process, which
4 PECO will employ to procure and install smart meters for early customer
5 deployment.

6 **10. Q. Why did PECO decide to estimate costs in detail through the year 2012?**

7 A. PECO's Phase One initial deployment period runs from Plan approval through the 30-
8 month grace period established in the Implementation Order. During Phase One,
9 PECO will deploy its AMI Communications Network, IT systems and up to 600,000
10 smart meters. The number of smart meters deployed will depend on the outcome of
11 PECO's federal grant application under the American Recovery and Reinvestment
12 Act ("ARRA"). As described in Mr. Adams' testimony, PECO will deploy a
13 minimum of 100,000 smart meters during Phase One, and, if it receives grant monies,
14 will deploy additional smart meters during Phase One up to a total of 600,000. PECO
15 has estimated costs for Phase One initial deployment with and without ARRA grant
16 money.

17 **11. Q. What is PECO's estimate of the total cost of Phase One?**

18 A. The cost of the initial AMI deployment is expected to be \$215 million with a range of
19 \$125 to \$225 million depending on equipment, installation and IT development costs
20 as well as the meter and installation costs. As discussed above, if PECO receives
21 matching ARRA grants for its smart meter expenditures, it will deploy up to 600,000
22 smart meters instead of 100,000. The additional meters purchased would increase the

1 estimated initial deployment cost to \$290 million with a range of \$210 million to
2 \$300 million. The requested ARRA grant for 50% of the project cost, if awarded in
3 full, would reduce the PECO funded portion of the expenditures to \$148 million.

4 **12. Q. Please describe the breakdown of the total Phase One cost into the various**
5 **categories identified by PECO for this analysis.**

6 A. As noted above, PECO has divided its Plan costs into separate categories, including
7 smart meter purchase and installation and project management and internal labor.
8 Section 6.2 of the Plan provides a detailed discussion of PECO's Phase One cost
9 estimates for each category.

10 **13. Q. What administrative costs has PECO included in its Phase One cost estimate?**

11 A. PECO has included approximately \$10 million for project management and internal
12 labor, with a potential range of \$5 to \$15 million. This estimate represents full-time
13 employees in each of two areas: project management staffing and IT production
14 support. Project-management staff will have responsibility for supervision of
15 deployment activities, including contract and vendor management, facilities and
16 quality and safety testing. IT production support staff will perform functions such as
17 system and network monitoring, helpdesk and problem management, and routine
18 system maintenance.

1 **14. Q. Are there any other costs that PECO might incur as part of its Smart Meter**
2 **Plan?**

3 A. Yes. PECO may incur additional costs related to training, communications and Plan
4 implementation. The nature and magnitude of these costs will be better understood as
5 PECO moves forward with Plan implementation. Mr. Cohn discusses anticipated
6 Plan filing and approval costs in his testimony.

7 **15. Q. Are PECO's cost projections supported by estimates from at least two vendors,**
8 **where available, as required by the Commission?**

9 A. Yes. As noted earlier in my testimony and in the Plan itself, PECO and Enspira
10 gathered cost information from a variety of sources. This included meeting with five
11 AMI vendors to obtain indicative costs and leveraging competitively-sourced
12 common MDMS, Middleware, and System Integration providers currently supporting
13 the development of Exelon's AMI programs. All of this cost information was used to
14 support PECO's cost analysis for the Plan.

15 **16. Q. Did PECO estimate the total cost of its Smart Meter Plan?**

16 A. Yes. PECO estimates that its total cost to offer smart meters to all of its customers,
17 including the Phase One network and IT infrastructure mentioned above, will range
18 from \$500 million to \$550 million. The actual cost will depend significantly upon the
19 speed of full deployment as well as vendor selection and the results of our dynamic
20 pricing program testing. This estimate does not assume the receipt of any ARRA
21 grant money. If, however, PECO receives ARRA grant money, the amount, net of

1 tax and the costs to achieve the grant, will be applied against the spending and will
2 enable PECO to increase the speed of its smart meter deployment.

3 The costs set forth above relate to PECO's AMI electric meter costs. If PECO
4 decides to replace its existing automated meter reading ("AMR") gas meters with
5 smart meters, additional costs would be incurred. However, procurement, associated
6 costs and cost recovery related to gas meter replacement would be addressed in a
7 separate proceeding, as discussed in Mr. Cohn's testimony.

8 **17. Q. Will PECO incur any stranded costs related to the implementation of its Smart**
9 **Meter Plan?**

10 A. Yes. To the extent that PECO deploys smart meters sooner than required to replace
11 failures of its existing AMR meters and meter communication modules, it will incur
12 accelerated depreciation (i.e., unrecovered investment at the time of retirement) on
13 these existing meters and modules. The total accelerated depreciation on the initial
14 deployment of 100,000 and 600,000 meters is \$5 million and \$42 million,
15 respectively. The total amount of accelerated depreciation will depend on the final
16 timeline for universal deployment of the new AMI meters. For the scenario involving
17 initial deployment of 600,000 meters, PECO assumed a 10-year timeline for universal
18 deployment.

19 The Company may also incur stranded costs related to the fees it pays, or will be
20 required to pay, Landis+Gyr for the existing AMR system.

1 **18. Q. What benefits did PECO identify through its cost-benefit analysis of the Plan?**

2 A. Before discussing the benefits of the Plan, it is important to note that through the
3 installation of PECO's existing AMR system, PECO has realized significant benefits
4 as a result of the elimination of physical meter reading for nearly all of PECO's
5 electric customers. The AMR system has also reduced costs associated with outage
6 notification, meter tampering, and theft. These benefits are discussed more fully in
7 Mr. Pritchard's testimony. While they will continue under PECO's new AMI
8 infrastructure, they do not represent new savings obtained and, therefore, have not
9 been netted against PECO's cost estimates.

10 From an operational standpoint, the greatest benefits of the Plan will be realized by
11 the remote connect functionality of the smart meter system. These benefits are
12 discussed in detail in Section 6.7 of the Plan.

13 **19. Q. Are there any additional benefits expected from the implementation of the Plan?**

14 A. Yes. From a societal standpoint, PECO's Plan will provide customers with an
15 expanded opportunity to participate in energy efficiency and demand response
16 programs, enabling them to better understand and manage their energy needs.
17 Participation in these programs will not only reduce the energy costs paid by the
18 participating customers, but could reduce energy prices for all customers.

1 **20. Q. Did PECO calculate the cost difference between providing “minimum**
2 **requirements” under Act 129’s smart meter provisions and the additional**
3 **functionality required by the Commission in the Implementation Order?**

4 A. Yes. PECO determined that there is virtually no incremental cost for the additional
5 functionality required by the Implementation Order except for one feature – remote
6 connection. The remote connection functionality adds approximately \$35 in cost to
7 each smart meter, based on the information received in PECO’s vendor workshops.
8 However, PECO anticipates that the savings derived from this function will outweigh
9 its incremental costs. As shown in Exhibit APK-2, once fully deployed, the remote
10 connection functionality is expected to generate up to almost \$13 million in annual
11 savings to PECO. Of that amount, approximately \$7 million is in operational savings
12 and about \$6 million is in societal savings. The NPV of the remote connect
13 functionality over 15 years of deployment is \$4 million in the case of the initial
14 deployment proposal and \$17 million in the case of the expanded deployment where a
15 stimulus grant is received, which reduces the cost of the remote connection
16 functionality.

17 **III. CONCLUSION**

18 **21. Q. Does this conclude your direct testimony?**

19 A. Yes.

Exhibit APK-1

	Initial Deployment (100,000 meters)						
	2010		2011		2012		Total
	O&M	Capital	O&M	Capital	O&M	Capital	
AMI Costs							
Meters and Installation	\$ -	\$ -	\$ -	\$ 17	\$ -	\$ -	\$ 17
Network Communication System	-	-	1	52	-	-	53
IT Applications and Support	-	36	12	58	12	4	122
Management and Internal Labor	1	-	5	-	4	-	10
Customer Acceptance Testing	-	-	3	-	10	-	13
Total Initial Deployment Costs	\$ 1	\$ 36	\$ 22	\$ 127	\$ 26	\$ 4	\$ 215
Stranded Costs:							
Accelerated Depreciation	3	-	3	-	-	-	5
Other Stranded Costs	-	-	-	-	-	-	1
Total Stranded Costs	\$ 3	\$ -	\$ 3	\$ -	\$ -	\$ -	\$ 6
Total Costs	\$ 4	\$ 36	\$ 24	\$ 127	\$ 26	\$ 4	\$ 221
	Expanded Initial Deployment (EID)⁽¹⁾						
Adjustments for Expanded Deployment:							
Additional 500,000 meters	\$ -	-	-	\$ 8	-	\$ 69	\$ 77
Savings on installation of 100,000 meters	-	-	-	(2)	-	-	(2)
Total EID Costs	\$ 1	\$ 36	\$ 22	\$ 133	\$ 26	\$ 73	\$ 290
Requested Stimulus Grant⁽²⁾		\$ 18	\$ 11	\$ 66	\$ 10	\$ 36	\$ 143
EID Net of Stimulus	\$ 1	\$ 18	\$ 11	\$ 66	\$ 15	\$ 36	\$ 148
Stranded Costs:							
Accelerated Depreciation ⁽³⁾	14	-	14	-	14	-	42
Other Stranded Costs	-	-	0	-	3	-	3
Total Stranded Costs for EID	\$ 14	\$ -	\$ 14	\$ -	\$ 17	\$ -	\$ 45
Total Costs for EID	\$ 15	\$ 18	\$ 25	\$ 66	\$ 32	\$ 36	\$ 193

⁽¹⁾ Expanded Initial deployment is contingent on PECO's receipt of a DOE matching stimulus grant

⁽²⁾ Stimulus grant will be recorded as contribution in aid of construction, for capital expenditures, or a reduction in O&M expense and is taxable income.

⁽³⁾ Assumes a ten-year mass deployment timeframe

100K NO STIMULUS

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Disconnection Operational Costs	-	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.3	1.5	1.7	1.9	2.0	2.2	2.4	2.6	2.7	
Move-In/Move-Out Operational Costs	-	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	
Reductions in Charge Offs	-	0.1	0.4	0.6	0.9	1.1	1.4	1.7	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.6	3.7	
Operational Benefits	-	0.2	0.7	1.1	1.6	2.0	2.5	3.1	3.4	3.9	4.4	4.8	5.3	5.7	6.2	6.7	6.9	
Energy Reduction for Continuous Serve Customers	-	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.7	
Customer Reconnection Charge	-	0.1	0.4	0.7	0.9	1.2	1.5	1.9	2.1	2.3	2.6	2.9	3.2	3.4	3.7	4.0	4.1	
Consumption on Inactive Meters	-	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	
Societal Benefits	-	0.2	0.6	1.0	1.4	1.8	2.2	2.7	3.0	3.5	3.9	4.3	4.7	5.1	5.5	5.9	6.1	
Total Benefits	-	0.4	1.2	2.1	3.0	3.9	4.7	5.8	6.5	7.4	8.2	9.1	10.0	10.8	11.7	12.6	13.0	
Capital Investment	0.7	2.8	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	1.5	
Tax Effect @ 40% rate	(0.0)	0.1	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.7	3.8	
Net Cash Flow	(0.7)	(2.5)	(2.6)	(1.9)	(1.3)	(0.7)	(0.0)	0.7	1.2	1.8	2.4	3.0	3.6	4.2	4.8	6.4	7.7	
NPV																		\$3.8M

Revenue Requirements

Annual Revenue Requirements	0.1	0.7	1.4	2.0	2.6	3.2	3.8	4.3	4.8	5.3	5.7	6.2	6.6	6.9	7.2	7.4	7.3
Benefits	-	0.4	1.2	2.1	3.0	3.9	4.7	5.8	6.5	7.4	8.2	9.1	10.0	10.8	11.7	12.6	13.0
Net Revenue Requirement	0.1	0.3	0.2	(0.1)	(0.3)	(0.6)	(0.9)	(1.5)	(1.7)	(2.0)	(2.5)	(2.9)	(3.4)	(3.9)	(4.5)	(5.2)	(5.7)

600K WITH STIMULUS

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Disconnection Operational Costs	-	0.4	0.7	1.0	1.2	1.5	1.7	2.1	2.3	2.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	
Move-In/Move-Out Operational Costs	-	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Reductions in Charge Offs	-	0.5	1.0	1.4	1.7	2.1	2.5	2.9	3.2	3.6	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
Operational Benefits	-	0.9	1.8	2.5	3.2	3.9	4.5	5.4	5.9	6.6	6.9							
Energy Reduction for Continuous Serve Customers	-	0.2	0.4	0.6	0.8	0.9	1.1	1.3	1.4	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
Customer Reconnection Charge	-	0.6	1.1	1.5	1.9	2.3	2.7	3.2	3.5	3.9	4.1	4.1	4.1	4.1	4.1	4.1	4.1	
Consumption on Inactive Meters	-	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Societal Benefits	-	0.8	1.6	2.2	2.8	3.4	4.0	4.7	5.2	5.8	6.1							
Total Benefits	-	1.8	3.5	4.8	6.0	7.3	8.6	10.1	11.1	12.4	13.0							
Capital Investment (net of stimulus)	2.6	7.9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	-	-	-	-	-	-	-	
Tax Effect @ 40% rate	0.9	3.3	0.5	0.9	1.4	1.8	2.3	2.8	3.1	3.5	3.7	3.8	3.8	3.9	3.9	4.0	4.2	
Net Cash Flow	(3.6)	(9.5)	(1.4)	(0.6)	0.3	1.1	1.9	3.0	3.7	4.5	9.3	9.2	9.2	9.2	9.1	9.1	8.8	
NPV																		\$16.7M

Revenue Requirements

Annual Revenue Requirements	0.7	2.6	3.4	4.1	4.8	5.5	6.1	6.7	7.3	7.8	7.4	7.0	6.7	6.3	5.8	5.1	3.9
Benefits	-	1.8	3.5	4.8	6.0	7.3	8.6	10.1	11.1	12.4	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Net Revenue Requirement	0.7	0.9	(0.1)	(0.6)	(1.2)	(1.8)	(2.4)	(3.4)	(3.8)	(4.6)	(5.6)	(6.0)	(6.4)	(6.7)	(7.2)	(7.9)	(9.1)