PECO ENERGY COMPANY
RESPONSES TO SUB-HOURLY METERING QUESTIONS
AND
COST-BENEFIT ANALYSIS FOR SUB-HOURLY METERING[1]

Responses to Sub-Hourly Metering Questions

1. What are the capabilities and limitations of proposed smart meters to measure and record sub-hourly usage?

Consistent with the requirements of Pennsylvania Act 129 of 2008 ("Act 129"), PECO will deploy smart meters which will be able to measure and record sub-hourly usage in 15-minute increments. PECO intends to have hourly readings recorded and transmitted to PECO for billing and web presentation and to support reliability-improvement programs. Furthermore, smart meters have the capability to stream current consumption values in near-real time via a Smart Energy Profile 2.0 compliant Zigbee RF signal.

2. What are the capabilities and limitations of proposed smart meter communication and data storage systems to transmit and store sub-hourly usage information?

PECO's smart meter communication and data storage system is being designed to transmit and store hourly data. The system will be capable of collecting and storing data in 15-minute intervals and transmitting data in hourly intervals.

---

[1] *See Petition of PECO Energy Company for Approval of its Smart Meter Technology Procurement and Installation Plan,* Docket No. M-2009-2123944 (Order entered May 6, 2010) at pages 26-27.

3. What are the sub-hourly PJM requirements for participation in ancillary service markets?

PJM Manual 11 "Energy & Ancillary Services Market Operations" Revision 45 Effective Date: June 23, 2010 describes Demand Resources (Section 4.2.9) metering-information requirements. Demand Resources providing Synchronized Reserve are required to provide metering information at no less frequently than a one-minute scan surrounding a synchronized reserve event. Demand resources providing Day-ahead Scheduling Reserve are required to provide telemetry that is capable of providing metering information at no less than a one-minute scan rate.

4. What are the Company's incremental smart meter, communication, data storage, and data sharing costs associated with these sub-hourly requirements for ancillary services?

PECO's smart meter communication and data storage system does not have the ability to provide information in one-minute intervals, which is required for the provision of ancillary services, nor is PECO aware of any AMI system that is currently able to provide information on that basis. Accordingly, PECO is not able to determine the incremental smart meter, communication, data storage and data sharing costs associated with sub-hourly requirements for ancillary services.

5. What are the incremental equipment and installation costs of pulse data recorders used to measure sub-hourly meter data?

PECO does not have this information because PECO does not provide pulse data recorders. Currently, PECO would provide an auxiliary contact to its existing meter for a customer desiring to install a pulse data recorder used to measure sub-hourly data, and the customer would then supply its own metering.

6. **Is a pulse data recorder attached to the Company's meter sufficiently accurate for use by PJM in its ancillary markets, or is redundant metering required to meet PJM standards?**

PECO does not install or operate pulse data recorders and, therefore, does not have the information required to comment on their accuracy. PECO believes that "additional" metering would be required to meet PJM standards; however, PECO would not characterize this additional meter as "redundant" because it would be serving a purpose different from that of PECO's deployed smart meters.

7. **What are the additional customer costs associated with (1) transferring pulse meter information from the meter to inside the customer's premise, (2) processing this data into a usable format, (3) communicating the data to a third party or PJM?**

PECO can only provide the costs for providing the auxiliary contacts upon a customer request. PECO typically would charge $1,200 to $1,500 to install the auxiliary contacts needed to transfer the pulse meter information, depending on customer location, access and other factors. PECO does not provide the specific services described in this question and is not aware of the additional costs to process and communicate the data to third parties or PJM.

8. **To the extent a customer requests sub-hourly data, what, if any, cost recovery charge is appropriate. For example, would it be appropriate to have a customer charge that varies with the level of sub-hourly metering requested, and, if so, what would those sub-hourly metering charges be?**

The answer to this question varies depending on the model.

- Under the current approach where a customer utilizes auxiliary contacts in the meter to pull sub-hourly data for its internal use, no cost recovery is required as the customer is responsible for equipment necessary for recording and

analyzing the sub-hourly metering data. PECO will charge the customer a fee to cover parts and labor associated with the installation of the auxiliary contacts as described in the response to question 7 above.

- In the case where a customer will be receiving sub-hourly metering information through the Zigbee chip directly from the smart meter, the customer will need to purchase an In Home Display device to capture the data. Potential cost recovery may be required for any network or meter configuration required to activate the chip and any associated incremental labor required to enable this functionality.

- In the case where a customer asks to receive the data from PECO as an electronic file format, there would be additional cost required for PECO. As described earlier, the current system design will enable PECO to collect and store 15-minute interval data from the meters and transmit data on an hourly interval basis through the network. However, the data storage system is being implemented to capture hourly data (and deliver data daily) consistent with *Implementation Order* guidelines. Therefore, PECO would need to recover the incremental costs associated with modifying the system to store 15-minute data along with the incremental data storage requirements. If the Commission were to require PECO to capture, transmit and store 15-minute sub-hourly data, it would be reasonable to socialize the system costs to all customers. The

incremental data storage charge could be individually assessed to customers electing the sub-hourly data.

As to varying levels of sub-hourly metering, from a practical standpoint, PECO does not see this as being feasible. If the requirement is for 15-minute data, then the PECO systems will be designed to support that requirement. Customers seeking sub-hourly meter data with some other sub-hourly interval (i.e. 30-minute), will be able to develop this information from the 15-minute data. Additionally, to the degree that PECO labor is required to process requests and administer interval data requests, PECO should be able to charge customers/suppliers directly for their time at standard fully loaded labor rates.

Cost-Benefit Analysis for Sub-hourly Metering

Benefits

PECO does not receive any benefits from upgrading its baseline design of hourly interval reads and transmission to more frequent interval reads and transmission periods. PECO cannot speculate on benefits that other parties (e.g., customers/curtailment service providers) may receive from this upgraded service.

Costs

PECO's smart meter system, consistent with PUC *Implementation Order* requirements, is currently designed for reading the meter hourly and transmitting the data from the meter to PECO on an hourly basis.

PECO has analyzed two potential options for sub-hourly metering:

1) Move from hourly interval data to 15-minute interval reads with data transmission at 15-minute intervals between the meter and PECO.
2) Move from hourly interval data to 15-minute interval data with hourly data transmission between the meter and PECO.

PECO has estimated the incremental costs to move from PECO's baseline design to Option 1 to be approximately $77 million in upfront costs and $22 million in annual ongoing costs. The costs represent an estimate of the required network upgrades. Recent analysis by PECO's smart meter vendor, however, indicates that the meters would not be capable of transmitting at 15-minute intervals without extensive engineering and redesign. The engineering and redesign costs are not included in the estimate. The incremental cost to move to Option 2 has been estimated by PECO to be approximately

$9 million in upfront costs and $12.5 million in annual ongoing costs. The table below summarizes the incremental upfront and annual maintenance costs by major category:

	Upfront Cost Category:	With 15-min. Transmit ($ M)	With Hourly Transmit ($ M)
*	AMI Tier 2 and 3 Network	$ 64.3	$ -
	Storage	4.3	4.1
	Network Engineering Support	3.2	-
	Hardware/Software - Middleware/MDMS	2.4	2.3
	Backup and Disaster Recovery	2.4	2.3
	Total Upfront Incremental Costs	$ 76.7	$ 8.8
	Ongoing Annual Maintenance Cost Category:		
	Storage	$ 8.2	$ 7.1
*	AMI Tier 2 and 3 Network	7.2	-
	Backup and Disaster Recovery	3.1	2.7
	Hardware/Software - Middleware/MDMS	1.6	1.4
	FTE Support	1.6	1.4
	Network Engineering Support	0.4	-
	Total Ongoing Incremental Costs	$ 22.1	$ 12.5
	Total Upfront and Ongoing Incremental Costs	$ 98.8	$ 21.3

* Estimated costs associated with transmitting data at 15 minute intervals. System may not support this functionality.

The costs listed above can be further detailed as follows:

- Storage costs are primarily associated with increases required for MDMS billing and AMI Head End.
- Hardware/Software costs are primarily related to additional servers required for increased transmit rate.
- Backup and Disaster Recovery costs for increased data volume.
- AMI Network costs primarily related to additional network capacity for 15-minute transmission rate.
- Network engineering costs related to AMI Network costs above.
- FTE Support and oversight costs related to all of the above.

Due to the high level of costs and no identified benefits associated with either Option 1 or Option 2, PECO proposes that the individual customer solutions identified above ((1) adding auxiliary metering contacts to customer smart meters or (2) embedding a Zigbee chip in customer smart meters)) would be superior options for providing sub-hourly data.