

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY :
 : No. 12-_____
Petition for Statutory Approval of a Smart Grid :
Advanced Metering Infrastructure Deployment :
Plan pursuant to Section 16-108.6 of the Public :
Utilities Act :

Direct Testimony of
JAMES C. EBER
Manager,
Demand Response & Dynamic Pricing
Commonwealth Edison Company

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1 **I. Executive Summary and Introduction**

2 **A. Witness Identification**

3 **Q. Please state your names and business addresses.**

4 A. My name is James C. Eber. My business address is 3 Lincoln Centre, Oakbrook Terrace,
5 Illinois.

6 **Q. Mr. Eber, by whom and in what position are you employed?**

7 A. I am employed by ComEd as Manager – Demand Response & Dynamic Pricing.

8 **B. Purpose of Direct Testimony**

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

10 A. The purpose of my testimony is to sponsor Chapter 3 of ComEd’s Smart Grid Advanced
11 Metering Infrastructure Deployment Plan (“AMI Plan” or “Plan”) in connection with
12 ComEd’s request for approval of that Plan. As required by the Energy Infrastructure
13 Modernization Act (“EIMA”), Chapter 3 shows how the Plan enhances and enables
14 customers’ ability to take advantage of Smart Grid functions beginning at the time an
15 account has billed successfully on the AMI network; sets annual milestones and metrics
16 for the purposes of measuring the success of the AMI Plan in enabling Smart Grid
17 functions; and enhancing consumer benefits from Smart Grid AMI; and secures the
18 privacy of personal information and establishes the right of consumers to consent to the
19 disclosure of personal energy information to third parties through electronic, web-based,
20 and other means in accordance with State and federal law and regulations regarding
21 consumer privacy and protection of consumer data. I will also explain the anticipated
22 cost of implementing some of the “customer-side” applications related to the deployment
23 of AMI meters and AMI technology.

24 **C. Personal Background and Qualifications**

25 **Q. Mr. Eber, what are your current duties and responsibilities?**

26 A. As Manager of Demand Response and Dynamic Pricing, I am responsible for ComEd's
27 portfolio of customer products in the areas of demand response, dynamic pricing, and
28 energy data services products. Current products include Voluntary Load Reduction
29 (VLR), AC cycling, Residential Real Time Pricing (RRTP), Energy Insights Online, and
30 Energy Usage Data System.

31 **Q. Have you been involved with other projects relevant to the AMI Plan project?**

32 A. Yes. I was responsible for the design of ComEd's Voluntary Load Reduction program,
33 which has since become one of the largest programs of its type in the nation. I have
34 supervised the launch of several new demand response products, managed four distinct
35 load management notification and control systems, and have been responsible for the
36 participation of over 4,500 business customer sites and 70,000 residential customers'
37 homes. I was responsible for the integration of the ComEd portfolio of demand response
38 resources into the PJM Interconnection, L.L.C. ("PJM") markets, and I represent ComEd
39 at various PJM working groups, which are responsible for the continuous improvement of
40 the PJM market framework for customer participation through demand response. In
41 addition, I have been on the Executive Counsel of the Peak Load Management Alliance,
42 the nationally prominent trade association for demand response, for four years, and was
43 in charge of the PECO demand response portfolio for three years, doubling the amount of
44 resources within that portfolio. In 2010, I was responsible for the Customer Applications
45 Pilot program that tested a variety of demand response rate structures and technologies

46 for customers receiving AMI meters. Many of the lessons learned from the CAP pilot
47 have been applied in shaping ComEd's plans described in Chapter 3 of the AMI Plan.

48 **Q. Mr. Eber, what is your educational background and professional experience?**

49 A. I graduated from Bradley University with a Bachelor of Science in Mechanical
50 Engineering. I have been employed by ComEd since 1988. My professional experience
51 includes over twenty years of experience in the design, operation and management of
52 customer-related utility programs. I have been engaged fully in demand response
53 products since 1997, and I have been managing the ComEd portfolio of demand response
54 products since 1999.

55 **D. Summary of Conclusions**

56 **Q. Please summarize the conclusions of your testimony.**

57 A. First, ComEd's AMI Plan creates customer value by, among other things, enhancing and
58 enabling customers' ability to take advantage of Smart Grid functions beginning at the
59 time an account has billed successfully on the AMI network. ComEd has designed its
60 AMI infrastructure around leading specifications to meet these functionalities and support
61 as many future Smart Grid applications as possible. Moreover, ComEd has developed a
62 process for identifying and evaluating future Smart Grid applications in order to enable or
63 implement those applications that prove to be valuable to customers.

64 Second, the Plan sets appropriate milestones and metrics for the purpose of
65 determining the success of the Plan in enabling Smart Grid functions.

66 Third, the Plan provides for the privacy of personal information in accordance
67 with the law and, by ComEd's participation in the "Green Button" initiative, allows

68 consumers to consent to the disclosure of personal energy information to third parties
69 through electronic, web-based, and other means.

70 Fourth, I identify those estimated costs that will be involved with providing these
71 customer-facing functionalities and that have been used in the overall cost-benefit
72 analysis.

73 **II. ComEd's AMI Plan Will Enhance and Enable the Ability to Take Advantage of**
74 **Smart Grid Functions.**

75 **Q. Please describe how the AMI Plan will enhance and enable the ability to take**
76 **advantage of the Smart Grid's data collection, analysis, and communication**
77 **functions?**

78 A. As described in Chapter Three of the Plan, ComEd's AMI meters will capture hourly
79 interval usage data. However, the AMI meters will have enough memory pre-installed to
80 capture sub-hourly intervals, and ComEd will be able to remotely re-program the meters
81 to collect this shorter interval data if required. The meters will send data back to ComEd
82 through the Silver Spring wireless mesh network every four hours, so ComEd has
83 significant flexibility in how much data needs to be stored by the meter. Given that the
84 wireless mesh network makes it unlikely that ComEd will lose contact with the meter for
85 a significant period of time, ComEd can store the data on the meter for a shorter period of
86 time if it begins to run into memory limitations when storing shorter interval usage data
87 or more detailed power quality, voltage, or other system condition data. The meters will
88 also be capable of measuring voltage, current, and power quality at the interval level,
89 giving ComEd better visibility for planning and grid operations.

90 Second, ComEd's meters will be fully capable of communicating with each other
91 and with ComEd's centralized AMI IT systems using the Silver Spring wireless mesh

92 AMI network. The AMI meters will be able to use the network to send usage data, as
93 well as receive meter re-programming signals, prices, time of use and peak notifications,
94 and text messages.

95 Third, ComEd is installing a meter data management system (MDMS) capable of
96 storing and processing the data it will receive from AMI meters. ComEd's MDMS, as
97 well as the other IT systems it is installing as part of the AMI infrastructure, will enable
98 ComEd operate more effectively in managing the amount of data collected by the AMI
99 system for billing and other operational purposes.

100 **Q. Please describe how the AMI Plan will enhance and enable the ability to take**
101 **advantage of the Smart Grid's energy monitoring, management, and automation**
102 **functions?**

103 **A.** As noted in Chapter Three, customers will benefit from having an AMI meter by being to
104 view their interval usage online. By viewing their hourly interval usage online within a
105 day of the actual usage, customers will be better able to understand how much energy
106 certain appliances/actions use and their associated costs.

107 ComEd's AMI meters will also provide customers with opportunities for savings
108 on their energy bills by recording interval data needed to enable dynamic rates, including
109 the Peak-Time Rebate ("PTR") program that ComEd will be offering in compliance with
110 the EIMA as well as any supplier's dynamic rate offering. In addition, in response to
111 stakeholder input, the Plan notes that the AMI meters will enable quicker, simpler, and
112 more cost-effective enrollment in the Residential Real Time Pricing ("RRTP") program
113 currently offered by ComEd.

114 The meters are also capable of communicating price, usage, and messaging
115 information into the home via the ZigBee[®] radio installed in each meter. As ZigBee[®] is
116 the leading communications protocol for home energy management (“HEM”)
117 technology, ComEd’s meters will be able to broadcast to any certified device or gateway
118 built to the ZigBee[®] specification and certified by SSN. The ZigBee[®] connection is
119 secure and encrypted to enhance privacy of customer-related data transmitted over this
120 signal. ZigBee[®] has established itself as a leading wireless communication standard
121 primarily due to its low cost, low power demand, and ease and reliability of adding
122 devices. ComEd will leverage the processes developed first for the CAP pilot to connect
123 certified ZigBee[®] HEM devices to AMI meters.

124 **Q. Please describe how the AMI Plan will enhance and enable the ability to take**
125 **advantage of the Smart Grid’s digitization and automation of electric grid**
126 **functionalities?**

127 A. Silver Spring’s wireless mesh network will allow two-way communication between
128 ComEd and the customer’s AMI meter. This two-way communication enables ComEd to
129 receive usage information from the meter at regular intervals, and to send the meter
130 signals to update its firmware and turn the electricity on/off at premises. Furthermore,
131 the meter design and the interval data collected will make it more difficult for energy
132 theft and will enable ComEd to detect outages automatically.

133 **Q. Please describe how the AMI Plan will enhance and enable the ability to take**
134 **advantage of the Smart Grid’s ability to integrate plug-in electric vehicles (“PEVs”),**
135 **distributed generation (“DG”), and energy storage?**

136 A. As indicated in Chapter Three of the Plan, with respect to PEVs, ComEd has designed its
137 AMI network to accommodate the wide range of possible capabilities, impacts, and
138 timelines for PEV development. First, ComEd's AMI infrastructure enables an entire
139 range of potential charging rates offered by suppliers that will facilitate PEV deployment.
140 Second, the net metering capabilities of the AMI meters will allow customers with
141 qualifying DG the ability to sell back excess power to the grid.

142 ComEd's AMI network will enable integration of DG resources with the electric
143 grid. First, ComEd's AMI meters will all be equipped with net metering capability. As a
144 result, customers will be able to get a bill credit for any energy produced by a DG system
145 that gets sold back to the grid. Second, ComEd's AMI meters will enable dynamic rates
146 that take advantage of DG systems by collecting hourly interval usage from the meters to
147 use in billing. As a result, customers with peak-coincident DG systems (such as solar)
148 will be able to benefit significantly from dynamic rates such as RRTP or similar rates,
149 offered by suppliers that charge high prices for usage during peak hours. Finally, the
150 AMI network can be used to quickly shut off input of DG to the grid remotely when
151 system conditions dictate the need to reduce system supply or when sections of the
152 network need to be safely shut down for maintenance or emergency work

153 In the same way, ComEd's AMI network could enable energy storage
154 applications through three key channels: net metering for distributed applications,
155 measuring interval energy usage to enable dynamic rates, and through two-way
156 communication and control of storage devices through the AMI network.

157 Q. **Does the Plan address future Smart Grid technologies and applications?**

158 A. Yes, as noted in Chapter 3, there are still many uncertainties about what level of
159 additional action ComEd will need to take in the future to facilitate yet-undeveloped,
160 cost-effective technologies and applications. In order to enable these future applications
161 once they become mature enough to deliver customer value, ComEd has developed a
162 process for researching and tracking future Smart Grid applications in order to identify
163 those in which ComEd should invest more heavily to provide additional functionalities
164 directly to customers. Specifically, the Plan discusses ComEd's three-stage process to
165 identify, evaluate, and implement applications that will unlock key functionalities of the
166 Smart Grid. First, ComEd plans to track the availability and demand for potential Smart
167 Grid applications through customer centric technology research. Second, ComEd
168 proposes to develop a model to help systematically identify entities interested in testing
169 and deploying AMI-enabled technologies in the introduction and growth phases. Third,
170 ComEd will facilitate future customer applications as they become required or prove to
171 deliver value.

172 **III. Milestones and Metrics Associated with Enabling Smart Grid Functions.**

173 **Q. Does the AMI Plan comply with the EIMA requirement to provide for milestones**
174 **and metrics associated with enabling Smart Grid functions?**

175 A. Yes. As described in Chapter Three, all Smart Grid functions associated with AMI
176 meters will be enabled as soon as the meters are installed and activated. Thus, the
177 milestones associated with the enablement of those functionalities are those involved
178 with the deployment of the meters themselves as set forth in Chapter Two. The metrics
179 are those pertaining to the successful activation of the meters themselves. In addition,
180 ComEd has identified a number of key metrics around enabling customer applications. In

181 regards to research efforts, ComEd plans to perform a quarterly refresh of both the
182 technology tracking outlook and the customer research relating to AMI. For metrics
183 pertaining to PTR, ComEd will: 1) file a proposed tariff with the ICC within 60 days of
184 the ICC's approval of ComEd's AMI Plan; 2) customers with installed and certified AMI
185 meters will be eligible to enroll in PTR as soon as the PTR tariff is approved by the ICC;
186 3) the first PTR event is expected take place in the summer of 2013; and 4) after the
187 fourth year of the PTR program, ComEd will submit a report detailing: number of
188 customers eligible for the PTR program, number of customers enrolled in the PTR
189 program, average peak reduction for enrolled customers, average rebate for enrolled
190 customers, total events called by year, and total program energy and bill savings by year.
191 For metrics pertaining to Web Presentment, customers will: 1) have access to the web
192 portal as soon as their AMI meter is functional; 2) have access to "Green Button"
193 functionality as soon as they have access to the web portal; and 3) the web portal will be
194 part of ComEd.com by the fourth quarter of 2012.

195 **IV. ComEd's AMI Plan Will Secure the Privacy of Personal Information**

196 **Q. As required by EIMA, does the Plan show how ComEd will secure privacy of**
197 **personal information?**

198 **A.** Yes. Chapter Three reviews the technical cyber security aspects of ComEd's AMI
199 deployment. It also reviews the relevant privacy-related laws with which ComEd will
200 comply. The Plan also describes how ComEd's active participation in the White House's
201 "Green Button" initiative will allow customers to arrange for the disclosure of personal
202 energy information to third parties via a convenient electronic, web-based means, which
203 will facilitate the provision of energy management services to customers.

204 **V. Costs of the Customer-Side Aspects of the AMI Plan.**

205 **Q. Are you familiar with the costs of the customer-side aspects of the AMI Plan that**
206 **have been used in the cost-benefit analysis that is being filed with the Plan?**

207 A. Yes. I am familiar with the costs associated with implementing and offering the PTR
208 program and with expanding the web portal capability that was available to ComEd
209 customers during the AMI pilot.

210 **Q. What are the estimated costs ComEd will incur to deliver the the PTR program?**

211 A. My testimony includes estimates for all estimated costs associated with PTR, which are
212 set out in ComEd Exhibit 3.01. Line 1 of the exhibit includes projected costs for project
213 management, customer research, and customer support, among other things totaling \$53
214 million through 2032. Lines 2a, 2b, and 3 show projected costs for changes required to
215 ComEd systems and other IT related expenses totaling \$99 million through 2032.

216 **Q. What are the estimated costs ComEd will incur to deliver the web portal that will**
217 **provide customers with access to their usage data?**

218 A. Those costs are shown on ComEd Exhibit 3.02, a total of \$87 million in expense
219 (primarily the service of OPower) and \$1.4 million in capital costs through 2041.
220 OPower will provide an integrated solution with the ComEd.com website that will enable
221 customers to view their interval usage data directly from the “My Account” area within
222 ComEd’s website. The IT costs ComEd will incur are related to this integration effort, so
223 that the customer experience is seamless, and that the data transfer between ComEd and
224 OPower is secure and reliable.

225 **VI. Conclusions**

226 **Q. What are the conclusions of your testimony?**

227 A. Chapter 3 of ComEd's AMI Plan shows how the Plan fulfills the EMIA requirements and
228 describes how it enhances and enables customers' ability to take advantage of Smart Grid
229 functions beginning at the time an account has billed successfully on the AMI network;
230 sets annual milestones and metrics for the purposes of measuring the success of the AMI
231 Plan in enabling Smart Grid functions; and enhancing consumer benefits from Smart Grid
232 AMI; and secures the privacy of personal information and establishes the right of
233 consumers to consent to the disclosure of personal energy information to third parties
234 through electronic, web-based, and other means in accordance with state and federal law
235 and regulations regarding consumer privacy and protection of consumer data. In
236 addition, I have described the costs associated with the PTR program and the web portal
237 that were used in the cost benefit analysis filed with ComEd's AMI Plan.

238 **Q. Does that conclude your testimony?**

239 A. Yes.