

In support of this Petition AIC submits the following:

1. The Direct Testimony of Craig Nelson (Ameren Ex. 1.0HR)
2. The Direct Testimony of Ryan Ellen (Ameren Ex. 2.0HR)
 - a. Ameren Ex. 2.1RH - AMI Plan Revised
 - b. Ameren Ex. 2.2 RH- AMI Plan Revised with Blacklines
3. The Direct Testimony of Miachael Abba (Ameren Ex. 3.0RH)
 - a. Ameren Ex. 3.1RH - AMI Cost/Benefit Analysis Revised
 - b. Ameren Ex. 3.2RH - AMI Cost/Benefit Analysis Revised with Blacklines
4. The Direct Testimony of James Mazurek (Ameren Ex. 4.0RH)
5. The Direct Testimony of Amhad Faruqui (Ameren Ex. 5.0RH)
 - a. Ameren Ex. 5.1RH – Customer Classes
 - b. Ameren Ex. 5.2RH – Relevant Terms
 - c. Ameren Ex. 5.3RH – Program Participation
 - d. Ameren Ex. 5.4RH – Per Customer Impacts
 - e. Ameren Ex. 5.5RH – Technology Costs
 - f. Ameren Ex. 5.6RH – Summary of Costs and Benefit
 - g. Ameren Ex. 5.7RH – Nominal Sum of Net Benefits

ILLINOIS COMMERCE COMMISSION

DOCKET No. 12-0244

DIRECT TESTIMONY ON REHEARING

OF

CRAIG D. NELSON

Submitted on Behalf Of

**AMEREN ILLINOIS COMPANY
d/b/a Ameren Illinois**

JUNE 28, 2012

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1 **ILLINOIS COMMERCE COMMISSION**

2 **DOCKET No. 12-0244**

3 **DIRECT TESTIMONY ON REHEARING OF**

4 **CRAIG D. NELSON**

5 **Submitted on Behalf Of**

6 **Ameren Illinois**

7 **I. INTRODUCTION**

8 **Q. Please state your name and business address.**

9 A. My name is Craig D. Nelson. My business address is 300 Liberty Street, Peoria, Illinois
10 61602.

11 **Q. Are you the same Craig D. Nelson who previously provided testimony in this**
12 **proceeding?**

13 A. Yes, I previously provided rebuttal testimony on behalf of Ameren Illinois Company
14 d/b/a Ameren Illinois (AIC or Company) in this proceeding.

15 **Q. Please describe your education and relevant work experience.**

16 A. See my Statement of Qualifications, attached as an Appendix to this testimony.

17 **II. PURPOSE OF TESTIMONY**

18 **Q. What is the purpose of your direct testimony on rehearing?**

19 A. The purpose of my direct testimony on rehearing is to give an overview of the Company's
20 rehearing filing and to respond to concerns the Commission raised in its May 29, 2012 order
21 about the Advanced Metering Infrastructure (AMI) Plan that AIC initially filed. My direct

22 testimony also identifies the witnesses who are submitting testimony in this matter and the scope
23 of their testimony.

24 **III. EIMA AND AMI**

25 **Q. Please explain why AIC wants to deploy AMI in its service territory.**

26 A. As we know, in recognition of the need to modernize the State's electrical grid, the
27 General Assembly has passed landmark legislation – the Energy Infrastructure Modernization
28 Act (EIMA) – to encourage eligible electric utilities to participate in an investment infrastructure
29 program that will fundamentally change and improve the delivery of electric energy to
30 consumers. By electing to participate in the EIMA program, AIC has pledged to make
31 significant incremental capital expenditures over the next ten years to strengthen and upgrade its
32 electrical systems. The State's grid modernization effort is two-fold: rebuild the core distribution
33 systems that deliver energy to us (i.e., cables, lines and substations); and advance the network
34 (i.e., automation and smart grid) to allow us to better control and more smartly consume that
35 delivered energy. These grid modernization investments will help AIC reduce outages and give
36 customers the tools to manage their energy usage. The deployment of an AMI communications
37 network and meters to electric customers in the AIC service territory is intended to be a key
38 component of AIC's investment program and a signature item to result from AIC's participation
39 in EIMA.

40 **Q. Please explain how you see the function of AMI within the General Assembly's**
41 **overall plan to modernize the State's grid.**

42 A. At its most basic level, AMI represents customer empowerment in the information age.
43 Other incremental investments in core systems will ensure AIC can keep the lights on more

44 reliably. AMI technology, however, will enable consumers on average to keep those lights on at
45 a lower cost, and allow AIC to react more quickly to outages and customer requests. AIC
46 expects AMI to bring improved efficiency and reduced operating costs from automated meter
47 reading and remote connect/disconnect features, a reduction in estimated bills, service
48 activation/deactivation on the date requested, access to usage and other information to aid in
49 energy and cost management, improved reliability through faster response to restoring power,
50 and monitoring of the system to proactively address issues that might lead to service problems.
51 Unlike other distribution investments, the General Assembly designed EIMA to specifically
52 emphasize AMI technology upfront in this process, before AIC had even installed its first AMI
53 meter. The focus is warranted: AMI is a principal benefit of EIMA for the communities AIC
54 serves and the most significant EIMA investment that AIC will make.

55 **IV. AMI – THE ROAD SO FAR**

56 **Q. Please explain why AIC has filed a plan to deploy AMI with the Commission before**
57 **deployment even begins.**

58 A. EIMA establishes a regulatory framework by which the Commission can review the
59 central tenets of a participating utility's plan to deploy electric AMI, before deployment begins.
60 It requires participating utilities to file an AMI plan with the Commission by a certain date soon
61 after the enactment of the legislation. It establishes a process and timetable of review by the
62 Commission of the plan's contents. It sets forth a limited number of requirements that the plan
63 must satisfy. And it creates an annual oversight of the plan's progress. The purpose of this
64 docket is to demonstrate to the Commission that AIC can deploy AMI technology to its electric
65 customers in a cost beneficial manner, i.e., that AMI will result in operational, customer and

66 societal benefits that exceed AIC's costs to implement the AMI investments.

67 **Q. Please describe the AMI Plan that AIC initially filed on March 30, 2012.**

68 A. The AMI Plan filed on March 30, 2012 presented AIC's initial plan to deploy an AMI
69 communications network and meters to 62% of its electric customers over a 10 year period, and
70 100% of its electric customers over a 15 year period. It contained the necessary information:
71 AIC's vision for extending AMI to its customers, its strategy for realizing that vision, its
72 proposed schedule for deploying the AMI network and meters, the metrics and milestones to
73 track the Plan's progress, and its approach for educating customers about the benefits of AMI
74 and dynamic pricing programs. In addition, the Plan was accompanied by a cost benefit analysis
75 that demonstrated that the resulting direct operational and customer benefits alone exceeded the
76 costs to implement the technology over the expected life of the smart meters. Among the
77 assumptions in the cost benefit analysis supporting the original Plan was the allocation of
78 network and IT costs to gas operations based on the automation of gas meters wherever electric
79 AMI was deployed.

80 **Q. What did the Commission conclude about the AMI Plan initially filed?**

81 A. In its May 29, 2012 order, the Commission concluded that it could not approve the AMI
82 Plan as initially filed. Specifically, the Commission found that the Plan was not cost beneficial.

83 **Q. In its May 29, 2012 order, did the Commission order AIC to modify its AMI Plan or**
84 **submit additional information to support the accompanying Cost Benefit analysis?**

85 A. No, the Commission did neither. It did not modify the original Plan; nor did it seek more
86 information to support the Plan. It simply rejected outright the AMI Plan without providing AIC

87 with a regulatory recourse or process that would allow it to continue to work towards presenting
88 a Plan that satisfied the Commission. Consequently, the May 29, 2012 order has placed in legal
89 limbo AIC's plans to implement AMI in its service territory. It was evident, in particular based
90 on the comments of the Commissioners in public hearings, the Commission wants to see a
91 revised Plan presented as quickly as possible that meets EIMA's cost beneficial standard. AIC
92 too desires and still fully intends to deploy AMI to its downstate electric customers. The
93 Commission's order, however, has caused the Company to slow down the process, as we work to
94 redesign a deployment schedule and recalculate costs and benefits to satisfy the Commission's
95 concerns.

96 **Q. Does AIC agree with the Commission's findings in the May 29, 2012 order that the**
97 **AMI Plan initially filed was not cost beneficial?**

98 A. No, it does not for the reasons and the arguments presented in AIC's case in chief.
99 Nonetheless, we feel it is time to move on, rather than continue to debate the merits of the AIC's
100 initial proposal. We have heard and taken to heart the Commission's concerns and criticisms and
101 we have revised our AMI strategy accordingly. In this filing, we revisit the AMI Plan that we
102 first filed, respond to the Commission's concerns and criticisms, and present new evidence for
103 the Commission's consideration in the form of a revised AMI Plan and Cost Benefit Analysis.

104 **Q. In the face of Commission opposition to the initial AMI Plan, why is the Company**
105 **choosing to continue to pursue this matter?**

106 A. As I explained above, the AMI Plan is just one part of a comprehensive legislative
107 scheme designed to improve Illinois' electric delivery system infrastructure, reform ratemaking
108 to reduce regulatory lag and ensure utilities recovery only their actual costs, create jobs for

109 Illinois, implement a smart grid system to reduce outages, and educate consumers about ways in
110 which they can better monitor and manage their energy usage. I do not know of resistance by
111 any party to these proceedings or any interested stakeholder involved in this process, including
112 this Commission and the Governor, who disagrees with EIMA's core objectives. I believe the
113 Commission is desirous that all consumers receive the benefits of AMI, not just consumers in
114 upstate Illinois. More importantly, the General Assembly has provided the Commission with
115 meaningful oversight of the deployment of AMI by providing for an initial and annual review of
116 the Plan.

117 **Q. Does the Company agree with EIMA's policy objectives?**

118 A. Yes. We, too, see the vast benefits to our customers that will come from enhancing the
119 reliability of the delivery system and deploying smart grid and AMI technologies. The informed
120 consumer is the smart consumer, but information alone is not always adequate by itself. The
121 tools necessary to better manage the consumer's decision-making must be at hand. AMI
122 provides the consumer with such tools. We believe the General Assembly intended Illinois
123 consumers, both upstate and downstate, to have equal access to these benefits and these tools.

124 **Q. But doesn't the Company also benefit from the EIMA?**

125 A. Yes, in the sense it is eligible for formula rate making. Regardless of the substantial
126 benefits to customers, financing the incremental investments necessary to deploy AMI is
127 critically important for the Company. EIMA provides the means to finance that investment
128 through a formula rate mechanism under which the actual, reasonable and prudent costs,
129 including the costs of deploying the AMI Plan, are to be recovered, as they are incurred. EIMA
130 intends investments, and the recovery of the investment costs, to be made within a predictable

131 regulatory environment. The rate-setting process is more efficient by reducing regulatory lag,
132 providing some certainty regarding the return on these investments, and by allowing for annual
133 reconciliations to “true up” actual costs to costs upon which the annual initial filing was based.
134 This is not meant to re-litigate the formula rate cases but only to acknowledge the flip side of the
135 equation, that is, the assurance of customer benefits regarding smart grid and our AMI plan
136 comes with a form of regulatory predictability when the costs of the plan are being incurred.

137 **Q. Since the Commission’s May 29, 2012 order, has AIC continued to move forward**
138 **with its plans to implement AMI?**

139 A. From a regulatory perspective, AIC has moved forward in the sense that it has taken a
140 hard look at its original proposal and made revisions to address concerns the Commission had.
141 From a business perspective however, AIC has not made as much progress as we had hoped. We
142 continue to meet with the Smart Grid Advisory Council. We continue to talk with vendors and
143 collect their responses to our Requests for Proposal. And we continue to prepare internally for
144 the eventual rollout of AMI. But for all intents and purposes, the Company’s preparations to
145 rollout AMI remain somewhat at a standstill, until we get a better indication from the
146 Commission that it will support this sizeable investment.

147 **Q. If the AMI Plan as revised is similarly rejected by the Commission, what will be the**
148 **consequences?**

149 A. The revised AMI Plan should not be approved simply because there may be adverse
150 consequences. It needs to stand on its own and meet EIMA’s requirements. And it does. With
151 that said, if an AMI plan is not approved, the benefits that the General Assembly expects to flow
152 from AMI and EIMA’s investment program in AIC’s service territory cannot be realized.

153 Approval of an AMI Plan is a precondition to execution of an AMI Plan. All parties agree that
154 AMI can create operational, customer and societal benefits. But the path to achieving those
155 benefits runs through the Commission. Without an approved plan by the Commission, there will
156 be no AMI in downstate Illinois anytime soon. No AMI for AIC means no AMI-related benefits,
157 no AMI-related metrics, no AMI-related trust funds beyond the initial funding amount and no
158 AMI-related peak time rebate program. Removing AMI entirely from AIC's future investment
159 plans also would have potentially broader implications. It might mean changing or reducing
160 AIC's investment strategy and spending under EIMA; it might mean possibly cutting back the
161 number of jobs created to reflect that reduced spending; and it might even mean forcing a
162 departure from EIMA altogether. Let me be clear: we intend to honor our EIMA investment
163 commitments – a portion of which is the implementation of AMI. We believe an AMI Plan will
164 be and can be approved as cost beneficial. We believe the Plan presented on rehearing satisfies
165 the Commission's earlier concerns. And we believe Illinois' downstate citizens deserve – and
166 will receive – AMI technology. But until approval of a plan occurs, uncertainty as to the timing
167 of those investments remains.

168 **V. AMI REVISITED – THE RESPONSE TO THE COMMISSION**

169 **Q. Please describe the material changes to the AMI Plan that AIC has submitted on**
170 **rebuttal.**

171 A. In response to the Commission's May 29, 2012 order and the Commissioners' stated
172 concerns, we have made several material adjustments to the AMI Plan and Cost-Benefit analysis.
173 We have shortened up and given more details on our deployment schedule. We have reworked
174 and firmed up our approach to consumer education. We have stripped out any Capital and O&M

175 cost allocations to gas operations that will occur if gas AMI technology is installed wherever the
176 electric AMI network is deployed. We have calculated and added in the costs (and resulting
177 benefits) from the use of "manual methods" to meet certain AMI-related metrics. We have
178 looked again at quantifiable operational and consumer benefits. We have brought in additional
179 expertise to quantify other operational, consumer and societal benefits. We have considered the
180 costs that AIC will incur if the Commission retains the existing premise site visit before
181 disconnection for nonpayment. We have revisited all of these issues in the expectation the
182 Commission will reconsider its decision in regard to the deployment of AMI in the AIC service
183 territory.

184 **Q. The Commission's May 29, 2012 order suggested the original AMI Plan that AIC**
185 **presented only minimally met EIMA's informational requirements. What additional**
186 **details have been incorporated into the revised AMI Plan?**

187 A. The revised AMI Plan now contains more details on the planned deployment schedule
188 and consumer education efforts. One item in particular that parties felt was lacking from the
189 Plan was a deployment schedule by operating center, not just by number of meters. The revised
190 Plan illustrates the operating centers that would be reached in the initial deployment. The costs
191 and benefits of this deployment are reflected in the revised Cost Benefit analysis. This
192 deployment also indicates how much of the existing radio frequency (RF) network for automated
193 meter reading (AMR) would be utilized or replaced in the initial deployment. AIC witness Mr.
194 Ryan Ellen further explains these changes and sponsors the revised AMI Plan.

195 **Q. The Commission in its May 29, 2012 order found that the original Plan satisfied**
196 **EIMA's informational requirements. Are you requesting that the Commission rehear**

197 **whether the revised Plan meets those requirements as well?**

198 A. No, we are not. We are simply providing the Commission with more details as they
199 become known and the AMI project develops. The open issue for rehearing, in AIC's opinion, is
200 whether the revised Plan meets EIMA's "cost-beneficial" standard. But the point of this entire
201 process, i.e., the Commission's review and oversight of the evolution of AMI in Illinois, is
202 transparency. As we indicated in the original filing, we intend to keep the Commission and
203 stakeholders informed on key decisions and milestones for AMI, as soon as they occur.
204 Updating the revised AMI Plan with more information is in line with that commitment.

205 **Q. Certain parties originally questioned whether AIC should deploy AMI at a faster**
206 **pace in its territory. Has AIC changed the pace of deployment in its revised Plan?**

207 A. Yes, we have. The revised AMI Plan now contemplates deployment of the AMI network
208 and meters to 62% of AIC's electric customers over an eight year period (2012-2019).

209 **Q. There were complaints that the initial AMI Plan identified the number of meters**
210 **that would be deployed per year, but did not identify the sequence of deployment by**
211 **operating center. Has AIC provided additional detail on that aspect of deployment?**

212 A. Yes, as mentioned above, the revised AMI Plan now demonstrates a deployment schedule
213 by operating center. It may change here and there as we contract with vendors and work our way
214 through the deployment process. But this is the schedule that AIC broadly intends to follow and
215 we will update the Commission next April, and the Smart Grid Advisory Counsel in the interim,
216 with any changes to that schedule.

217 **Q. In the revised AMI Plan, the initial eight-year deployment still reaches only 62% of**

218 **AIC's electric customers. Why hasn't AIC proposed to extend AMI to all of its electric**
219 **customers during the first eight years?**

220 A. There are a number of reasons we have limited our initial AMI deployment under EIMA
221 to 62% of our electric customer base. The Company continues to look for guidance on the extent
222 of initial deployment from the General Assembly. We believe the General Assembly has
223 required us to deploy AMI to 62% of our electric customer base in connection with our EIMA
224 investment commitments and cost recovery under formula rates. In addition, we are mindful of
225 the current statutory limitations on capital expenditures that can be included in the infrastructure
226 investment program, as well as the statutory customer impact test on the average annual increase
227 in the average amount paid per kilowatt hour for residential eligible retail customers. Lastly, we
228 are mindful of limitations on our own available capital that could occur during the next eight
229 years. We are operating a combination utility that has committed to a significant amount of
230 incremental electric delivery investment that must be funded before we recover the costs in rates.
231 We need to continue to invest in gas and transmission businesses. We need to continue to invest
232 in our ongoing electric projects and needs. We need to continue to make other incremental
233 EIMA investments. We need to be mindful of our reliability metrics, and not just our AMI-
234 related metrics. All of these factors limit the breadth of our planned initial AMI investment. But
235 when considering all of those factors, we believe an initial deployment of AMI to 62% of our
236 electric customers over eight years is reasonable and in line with what the General Assembly has
237 required us to do under EIMA.

238 **Q. Does AIC still intend to deploy AMI to all of its electric customers?**

239 A. Yes, we still intend to deploy AMI to all of our electric delivery customers. But that is

240 for another day. In this rehearing proceeding, we are not asking for Commission approval under
241 EIMA for deployment of AMI to all of our electric customers, just to 62% of our electric
242 customers over the next eight years.

243 **Q. In the underlying action, Staff had questioned whether the benefits from AMI**
244 **investment to reach the remaining 38% of customers after the first ten years could be**
245 **considered. Does the revised Cost Benefit analysis include the benefits of AMI investment**
246 **beyond the first ten years when judging whether the revised AMI Plan is cost beneficial?**

247 A. No, the base case that AIC is asking the Commission to approve (62% over eight years)
248 does not rely on benefits that would result from the deployment of AMI to the remainder of
249 AIC's electric customers. AIC witness Michael Abba discusses and sponsors the Cost Benefit
250 Analysis and knows more of the details and assumptions underlying its results. But, I certainly
251 can tell you this much: the Cost-Benefit Analysis only considers the benefits that we expect
252 would flow from the AMI investment that will be made to reach 62% of AIC's electric customers
253 over the eight year period. It does not consider any benefits from additional investment that AIC
254 would need to make outside of the ten-year period set forth in EIMA to extend AMI to its
255 remaining electric customers.

256 **Q. Does the Cost Benefit analysis still measure the benefits that will flow from that**
257 **initial AMI investment over a twenty-year period?**

258 A. Yes. We still consider it appropriate to measure the benefits of AMI investment over a
259 20 year period. It is my understanding this measurement period is consistent with the period
260 used by Commonwealth Edison Company (ComEd) in the measurement of benefits for its AMI
261 pilot and its AMI plan recently approved by the Commission, and consistent with the expected

262 useful economic life of the smart meters that will be deployed during this eight year period.

263 **Q. In the recent Commission order in the proceeding concerning the AMI Plan**
264 **presented by ComEd, the Commission found ComEd's customer perspective discount rate**
265 **to be “dubious.” What discount rate does AIC use?**

266 A. The discount rate used by AIC in the Cost Benefit analysis is 3.62%. This rate is
267 calculated from the 20-year Treasury bond rate. AIC still believes a customer or societal
268 perspective discount rate is appropriate for the reasons I explained in my rebuttal testimony in
269 the underlying action. The use of a higher rate, such as the weighted average cost of capital
270 (WACC), would be useful in evaluating competing uses of AIC-supplied capital, not in
271 evaluating comparable uses of money and investment risk for consumers.

272 **Q. Is the revised AIC Plan still cost beneficial if a higher discount rate were applied?**

273 A. Yes. The revised AIC plan of deploying AMI to 62% of electric customers over an eight
274 year period achieves a rate of return that surpasses 14.3%, far exceeding AIC's WACC.

275 **Q. In the ComEd order, the Commission criticized ComEd for not considering any**
276 **“societal” benefits in its cost benefit analysis. Has AIC included “societal” benefits in its**
277 **calculation of the revised AMI Plan's benefits?**

278 A. Yes. AIC witness Dr. Ahmad Faruqui of the Brattle Group has submitted direct
279 testimony in support of the Brattle Group's analysis and quantification of customer and societal
280 benefits that are expected to be realized from the deployment of AMI in AIC's service territory.
281 These societal benefits have been included in the overall analysis of whether the revised AMI
282 Plan is cost beneficial.

283 **Q. So AIC's Cost Benefit analysis now considers additional benefits that were not**
284 **reflected in the initial filing?**

285 A. Yes. Additional benefits have been quantified and added to the analysis. Mr. Abba's
286 direct testimony and the direct testimonies of Dr. Ahmad Faruqui and Mr. James Mazurek of
287 Accenture support the additional benefits that have been reflected in the updated Cost Benefit
288 Analysis presented on rehearing.

289 **Q. In the underlying action, Staff also had questioned whether the Cost Benefit analysis**
290 **could consider the allocation of shared AMI network and IT costs to gas customers based**
291 **on the assumption AIC would automate gas meters wherever electric AMI was deployed.**
292 **Does the Cost Benefit analysis still consider these costs allocations?**

293 A. No, it does not. For purposes of the cost beneficial analysis on rehearing, we have
294 removed the assumption that AIC would automate gas meters wherever the electric AMI
295 network was deployed. Accordingly, the Cost Benefit analysis on rehearing does not reflect the
296 cost reductions that would be realized for electric customers by virtue of the fact that network
297 and IT costs would be shared by and allocated to AIC's gas operations.

298 **Q. Does that mean AIC no longer intends to automate gas meters to include AMI**
299 **technology?**

300 A. No, it does not. We are still considering the automation of gas meters to install AMI
301 technology wherever the electric AMI is deployed because of the synergies that can be realized
302 by leveraging the same network for our gas customers. If we move forward with this plan, the
303 capital costs and O&M expenses associated with the automation of gas meters, including any
304 shared allocated network and IT costs, would be reflected in the Company's next gas rate filing.

305 **Q. In the underlying action, Staff also was concerned that the Cost Benefit analysis did**
306 **not consider the “manual methods” costs that AIC may have to incur to meet certain AMI-**
307 **related metrics. Have those costs been considered in the rehearing direct filing?**

308 A. Yes. The costs that AIC may have to incur to utilize "manual methods" in meeting
309 certain AMI-related metrics during the deployment have been quantified and included in the
310 updated Cost-Benefit analysis. The Cost Benefit analysis also considers the expected benefits
311 that these "manual methods" would produce in meeting AIC's annual performance levels. Mr.
312 Abba explains further the "manual methods" that AIC may have to utilize.

313 **Q. In both the AIC and ComEd AMI proceedings, the issue was raised whether the**
314 **Cost Benefit analysis should consider the costs that a utility would incur, if the utility still**
315 **had to conduct a premise site visit before disconnection for non-payment after AMI meters**
316 **were deployed. Would AIC’s revised AMI Plan still be cost beneficial, if the Commission**
317 **retained the existing premise site visit?**

318 A. Yes. As Mr. Abba explains, the Company has calculated the costs that it would incur, if
319 the Commission preserved the current premise site visit before disconnection for non payment.
320 Even if the premise site visit costs were included in the updated Cost Benefit analysis, the
321 calculated net present value of the AMI Plan remains positive, with either a customer perspective
322 discount rate or the use of WACC as the discount rate.

323 **VI. PRESENTATION OF WITNESSES**

324 **Q. Please identify the other witnesses that will be presenting direct testimony on behalf**
325 **of AIC and generally the scope of their testimony.**

326 A. In addition to my testimony, each of the following witnesses provides direct testimony

327 with this filing:

Exhibit Number	Witness	Topics Addressed
2.0RH	Ryan Ellen	Revised AMI Plan, including the Plan's material changes
3.0RH	Michael Abba	Revised Cost/Benefit Analysis, including material changes to cost and benefit assumptions
4.0RH	James Mazurek	Quantified Operational and Customer Benefits
5.0RH	Dr. Ahmad Faruqui	Quantified Customer and Societal Benefits

328

329 **VII. CONCLUSION**

330 **Q. Does this conclude your direct testimony on rehearing?**

331 **A.** Yes, it does.

APPENDIX

STATEMENT OF QUALIFICATIONS
CRAIG D. NELSON

I am Senior Vice President of Regulatory Affairs & Financial Services for the Ameren Illinois Company. I earned a bachelor's degree in accounting in 1977, graduating with highest honors, and earned a master's degree in business administration in 1984. Both degrees were awarded by Southern Illinois University – Edwardsville. I am a Certified Public Accountant.

I worked for Arthur Andersen & Co. from 1977 to 1979, when I joined Central Illinois Public Service Company as a Tax Accountant. In 1979, I was promoted to Income Tax Supervisor. I served in various tax and accounting positions until 1985 when I was appointed Assistant Treasurer. In 1989, I became Treasurer and Assistant Secretary, a position I held for seven years. In 1996, I was elected Vice President of Corporate Services. After Union Electric Company and CIPSCO Incorporated merged, I was named Vice President, Merger Coordination for Ameren Services Company effective December 31, 1997. In 1998, I assumed the additional responsibility of Vice President of Regulatory Planning. Effective June 1, 1999, I was appointed Vice President, Corporate Planning. Effective October 15, 2004, I was appointed Vice President – Strategic Initiatives for Ameren Services Company. Effective September 1, 2006, I was also appointed Vice President – Power Supply Acquisition for AmerenCILCO, AmerenCIPS, and AmerenIP. Effective August 16, 2007, I was appointed Vice President – Regulatory Affairs & Financial Services.

In my current position, as Senior Vice President – Regulatory Affairs & Financial Services, effective December 15, 2009, my role is to direct power procurement, implementation

of SB 1652/HB 3036, asset and risk management, community and public relations, budgeting, financial analysis/reporting, legislative affairs, and regulatory affairs for Ameren Illinois Company.

ILLINOIS COMMERCE COMMISSION

DOCKET No. 12-0244

DIRECT TESTIMONY ON REHEARING

OF

RYAN W. ELLEN

Submitted on Behalf Of

**AMEREN ILLINOIS COMPANY
d/b/a Ameren Illinois**

JUNE 28, 2012

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3 **DIRECT TESTIMONY ON REHEARING OF**

4 **RYAN W. ELLEN**

5 **Submitted on Behalf Of**

6 **Ameren Illinois**

7 **I. INTRODUCTION**

8 **Q. Please state your name and business address.**

9 A. My name is Ryan W. Ellen. My business address is 1901 Chouteau Avenue, St. Louis,
10 MO 63103.

11 **Q. What is your job title and duties?**

12 A. I am the Manager of AMI Strategy and Implementation for Ameren Illinois Company
13 d/b/a Ameren Illinois (AIC or Ameren Illinois). My responsibilities are to deliver the benefits of
14 AMI to Ameren Illinois customers. To accomplish my responsibilities, I lead the AMI Program
15 Management Office (PMO), which was developed by Ameren Illinois to ensure a successful
16 implementation of AMI.

17 **Q. Please describe your education and relevant work experience.**

18 A. See my Statement of Qualifications, attached as an Appendix to this testimony.

19 **II. PURPOSE OF TESTIMONY**

20 **Q. What is the purpose of your direct testimony on rehearing?**

21 A. The purpose of my direct testimony on rehearing is to introduce evidence that identifies
22 the updates to the revised Advanced Metering Infrastructure Plan (AMI Plan or Plan).

23 **Q. Are you sponsoring any exhibits with your direct testimony?**

24 A. Yes, I am sponsoring the following exhibits:

- 25 • Ameren Exhibit 2.1RH: AIC AMI Plan Revised
- 26 • Ameren Exhibit 2.2RH: AIC AMI Plan Revised with Blacklines

27 **III. REVISED AMI PLAN**

28 **Q. Please provide an overview of the revised AMI Plan.**

29 A. As AIC witness Mr. Craig Nelson explains, AIC has carefully reviewed the
30 Commission's May 29, 2012 order in this docket. Accordingly, as Mr. Nelson states, AIC is
31 intent on satisfying the material concerns raised by the Illinois Commerce Commission (ICC or
32 Commission) in this filing. AIC is also providing other information that was not available at the
33 time of the original AMI Plan filing. As explained more fully below, I offer testimony regarding
34 certain information concerning the revised AMI Plan.

35 **Q. Please summarize how AIC has revised the AMI Plan.**

36 A. AIC has revised the AMI Plan as follows:

- 37 • Modified the Vision section to remove qualifying statements related to cost recovery
- 38 • Modified the Strategy section to:
 - 39 ○ Remove gas deployment
 - 40 ○ Remove deployment of electric AMI beyond the 62% threshold
 - 41 ○ Explain the procurement status for the Meter Data Management System (MDMS)
 - 42 customer implementation and AMI, and how updated cost estimates were
 - 43 incorporated into the cost/benefit analysis.
 - 44 ○ Update the Program Management process

- 45 • Modified the Deployment Plan section to:
 - 46 ○ Add a detailed deployment schedule
 - 47 ○ Show the specific network technology selected
 - 48 ○ Update the functionality timeline based on the revised deployment plan
- 49 • Modified the Cost/Benefit Analysis section
- 50 • Modified the Measuring AMI Plan Success section to describe the “manual methods”
51 AIC will utilize to achieve the portion of the EIMA’s AMI related performance
52 metrics not satisfied by the AMI deployment
- 53 • Modified the Consumer Education and Communication Plan section

54 **Q. Has AIC identified the material changes from the original AMI Plan as filed?**

55 A. Yes. A blacklined version of the Plan is attached as Ameren Exhibit 2.2RH. This
56 version details the changes to the original Plan.

57 **Q. Please describe the modification to the Vision section of the Plan.**

58 A. AIC has modified the Smart Grid AMI Vision statement by removing the statement that
59 calls for a clear path to cost recovery and a strong and healthy financial position. The modified
60 vision statement now reads as follows: “Ameren Illinois’ vision is to have the capability to serve
61 all of its customers with a cost-beneficial Advanced Metering Infrastructure, serving 62% of
62 electric customers by 2022.” We have removed the cost recovery statement because it is
63 superfluous. We recognize the legislative tie of formula rates to the AMI Plan.

64 **Q. Please describe the modifications to the Strategy section of the Plan as it relates to**
65 **the deployment of gas AMI and the deployment of electric AMI beyond the 62% threshold**
66 **required in the law.**

67 A. AIC has removed from the Plan the deployment of gas AMI and the deployment of
68 electric AMI beyond the 62% value required under the law. We have done so in order that the

69 revised AMI Plan focuses on electric costs and benefits only, and to address the deployment
70 parameters in the law.

71 **Q. Please describe the modifications to the Strategy section of the Plan as it relates to**
72 **the cost estimate for the MDMS and the AMI system.**

73 A. Since the time when the record was closed in the original AMI Plan docket, AIC has
74 received the detailed bids in both the Request for Proposals (RFPs) issued for the MDMS and
75 AMI system. Please note the timing of the receipt of these bids is consistent with what we told
76 the Commission in the original Plan. While the evaluation of those bids are not yet complete,
77 AIC has reviewed the bids and adjusted the cost estimates in the cost/benefit analysis based on
78 an average of the vendor pricing AIC received in the RFPs.

79 **Q. Please describe the changes to the action items in the Strategy section of the Plan as**
80 **it relates to the Program Management process.**

81 A. In addition to the what was outlined in the original AMI Plan, Ameren Illinois has
82 received and will continue to receive assistance to its PMO from leading industry consultants for
83 AMI Information Technology/Operations Technology (IT/OT) system architecture and system
84 integration planning, identification of societal benefits that apply to Ameren Illinois customers,
85 AMI scope management planning, risk analyses, and consumer education strategies.

86 **Q. Please describe the changes to the Plan for deployment to customers.**

87 A. The changes to the deployment plan fall into three categories. First, as previously
88 discussed, the Plan no longer includes deployment of gas AMI or deployment of electric AMI
89 beyond the 62% value required under the law. Second, the deployment plan now accelerates the

90 deployment such that 62% deployment is reached in year- 8 of the plan rather than year- 10.

91 And finally, the Plan now includes a detailed year-by-year, operating center by operating center
92 schedule which clearly identifies when and where the deployment will take place. The revised
93 Plan continues to initially deploy AMI meters to areas of Ameren Illinois' service territory that
94 do not have AMR, which is consistent with the original AMI Plan.

95 **Q. How was this detailed deployment plan developed?**

96 A. The deployment plan follows a sequence of rolling out AMI meters to areas contiguous to
97 those previously deployed, simplifying logistics and taking advantage of communication
98 network efficiencies. The revised AMI Plan has a "base" case deployment scenario of AMI to
99 62% of Ameren Illinois' *electric* customers in eight years as opposed to an original "base" case
100 deployment to 100% of Ameren Illinois' *electric and gas* in 15 years. The detailed deployment
101 plan we now show represents what we believe is the most efficient plan for deployment based on
102 the information we have today. As we gather additional information through the detailed
103 evaluation of the AMI vendor bids, we will continue to refine this deployment plan to minimize
104 cost and maximize benefits for our customers.

105 **Q. How many meters must AIC deploy to reach the 62% target?**

106 A. To ensure that 62% of Ameren Illinois electric customers are served via AMI by year
107 2022, Ameren Illinois must install an estimated total of 780,000, 2-way electric meters, based on
108 the 2011 meter count. This is a change from the original Plan which showed the deployment of
109 1,252,000 electric meters and 850,000 gas meters over a 15 year period. The detailed
110 deployment plan is shown in Section 5.3.1 of the Plan.

111 **Q. Please explain the basis for accelerating the deployment to achieve 62% in eight**
112 **years rather than 10 years.**

113 A. As stated previously, Ameren Illinois has carefully reviewed the ICC's May 29, 2012
114 order on its original AMI Plan and developed a revised deployment plan. As part of that process
115 the eight year deployment plan was considered. The eight year deployment plan allows Ameren
116 Illinois customers to achieve the benefits of AMI sooner than Ameren Illinois' original plan. In
117 addition, accelerated deployment is one of the specific recommendations in the guidance
118 document created by the Smart Grid Advisory Council.

119 **Q. Did AIC consider any other deployment schedules?**

120 A. Yes. Ameren Illinois also considered two additional scenarios: 1) deployment of 62%
121 over 10 years, and 2) deployment of 62% over eight years with continued deployment to 100%
122 by year 15. Ultimately the Company chose to include the 62% deployment in eight years into
123 the Plan. As discussed in the testimony of AIC witness Mr. Michael Abba, the two additional
124 deployment scenarios identified above were modeled as sensitivities as part of the cost/benefit
125 analysis completed to support the revised Plan.

126 **Q. What other changes were made to the deployment plan section of the Plan?**

127 A. In addition to the addition of the detailed deployment schedule, the functionality schedule
128 was also updated. AIC anticipates that each of the stages of functionality will extend an
129 additional six months from the original AMI Plan.

130 **Q. Why was it necessary to change the dates when AMI functionality will be rolled**
131 **out?**

132 A. The changes were necessary for two reasons. First, AIC has reviewed the responses to
133 the RFPs and determined that the original schedule for functionality deployment was aggressive.
134 Second, the rehearing process has delayed AIC from completing the procurement process for the
135 AMI and MDMS technology vendors, extending the schedule for functionality deployment.

136 **Q. Were there other changes made to the deployment plan section?**

137 A. In addition to the items previously discussed, the updated Plan also identifies the AMI
138 communication technology AIC intends to utilize as part of its deployment.

139 **Q. Was the nature and extent of the AMI communication technology at issue with the**
140 **Commission? Please explain.**

141 A. In the ICC's May 29, 2012 order, the Commission specifically noted AIC had not
142 identified its technology for delivering AMI.

143 **Q. What AMI technology will AIC be utilizing?**

144 A. Ameren Illinois has selected as the core AMI technology a Radio Frequency (RF)
145 communication network. Ameren Illinois has received and is evaluating RFPs and should
146 finalize vendor selection for the AMI system and MDMS in the 3rd quarter of this year. For the
147 Home Area Network, all vendors will be compliant with the Smart Energy Profile (SEP) 1.0 or
148 1.1 standard and have included road maps to be SEP 2.0 compliant upon formal adoption of SEP
149 2.0 standard.

150 **Q. Is there a reason why AIC is now in a position to identify the AMI technology today**
151 **when it could not as part of its original AMI filing?**

152 A. Yes, as discussed previously since the time when the record was closed in the original
153 proceeding on AIC's AMI Plan, AIC has received the bids from the AMI vendors being
154 considered. In our initial review of those bids we have identified that each vendor is proposing
155 the RF network as the core technology.

156 **Q. Are there other changes to the deployment plan section?**

157 A. No.

158 **Q. What changes were made to the Cost/Benefit Analysis section?**

159 A. The changes to the Cost/Benefit Analysis section update the current results based on all
160 the changes made to the analysis since the original filing. These changes are discussed in detail
161 in the testimony of Mr. Michael Abba.

162 **Q. Please describe the changes to the Measuring AMI Plan Success section of the**
163 **revised Plan.**

164 A. Consistent with the Commission's final order on the original AMI Plan, AIC has now
165 included in the Plan the "manual methods" that will be used to achieve the portion of the annual
166 performance goal associated with the AMI-related performance metrics that are not being
167 achieved as a result of AMI deployment. Details associated with these "manual methods" are
168 also discussed in the testimony on rehearing of Mr. Abba.

169 **Q. Does the revised Plan change the utility's plan to educate the consumers on the**
170 **Smart Grid AMI deployment?**

171 A. Yes. AIC has provided an expanded communication and consumer education strategy.

172 **Q. Was this an issue for the Commission in the underlying proceeding?**

173 A. The Commission did not specifically take issue with the consumer education portion of
174 the AMI Plan. CUB/ELPC and the AG noted in their opinion the Consumer Education plan was
175 vague. During the interim since filing its original Plan, AIC has further detailed its consumer
176 education strategy and included those details in the update to the AMI Plan.

177 **Q. Please continue.**

178 A. Ameren Illinois has added the following to the AMI Plan's Consumer Education and
179 Communication section:

- 180 • Results of research on AMI deployments at other utilities and (along with its AMR
181 deployment) details on lessons learned to engage and educate our consumers on the
182 use and benefits of AMI
- 183 • A timeline prior to an operating center's AMI deployment for customer education
184 activities
- 185 • Expansion of the Consumer Education goals and objectives, including specifics on
186 how Ameren Illinois will measure progress against the objectives
- 187 • Further delineation of Key Stakeholders/Customer Segments and Ameren Illinois'
188 approach to engaging and educating those groups
- 189 • Details on Communication Vehicles and Channels
- 190 • Low Income and Assistance programs

191 **Q. Are there any other changes that were made to the revised Plan?**

192 A. Yes. In addition to the changes described above, there are edits minor in nature that were
193 made. They appear in the redline version of the revised Plan.

194 **IV. CONCLUSION**

195 **Q. Does this conclude your direct testimony on rehearing?**

196 A. Yes, it does.

APPENDIX

Statement of Qualifications Ryan W. Ellen, PE

EDUCATION

Master of Business Administration, Washington University in St. Louis
Bachelor of Science, Civil Engineering, Washington University in St. Louis

CERTIFICATION

Professional Engineer, State of Missouri, License Number: PE-2002016649

EXPERIENCE

3/12 – Present, Manager, AMI Strategy and Implementation, Ameren Corporation:
Program Manager tasked with leading and coordinating the implementation of investment programs for Advanced Metering Infrastructure. Duties include:

- Supervise the AMI program management office, which is responsible for developing, monitoring, and controlling the AMI program
- Manage AMI program scope, cost, schedule, quality, and risk to meet the requirements stated in the Modernization Action Plan
- Create change management processes to communicate program modifications, control scope creep, mitigate cost increases, and reduce schedule extensions
- Identify, review, and rebuild Ameren Illinois business process architecture to support the AMI rollout
- Coordinate information technology integration for AMI
- Develop management processes, decision paths, and project controls for the successful implementation of the AMI program
- Create and administer risk based program contingency

10/08 – 3/12, Manager, Project Management, Ameren Corporation: Responsible for establishing and supervising a project governance and risk management framework for Ameren's five year, \$11 billion capital expenditure portfolio. Duties include:

- Serve as a key member of the Corporate Project Oversight Committee, which is tasked with evaluating business cases, risk analyses, and project plans for major projects
- Ensure Ameren project management teams comply with project management policies, procedures, and company standards.
- Provide guidance to Project Management functions that reside in Ameren's business segments
- Facilitate project management best practices across the organization
- Perform project assessments and post project reviews on major projects to evaluate if operational, financial, and strategic objectives were met.

6/03 – 10/08 Senior Project Manager, BJC HealthCare: Responsible for over \$240 million in health care design and construction projects. Job duties include hospital capital budget management; initial planning studies; consultant and contractor management; construction coordination with hospital operations; project budget generation and administration; clinical equipment implementation; clinical user move management and furniture installation; project voice/data execution in the academic medical center environment for the health care system's largest hospital, the top ten nationally ranked Barnes-Jewish Hospital.

- Senior Project Manager for the \$40 million Barnes-Jewish College of Nursing. The project entailed construction of a new 105,000 square foot, five-story academic facility on a tight urban site in St. Louis city.
- Project Manager for the mechanical, electrical, and plumbing portion of the \$61 million Phase 1 renovation and expansion of Barnes-Jewish Hospital's 48 Operating Room suites, 21 bed Cardio Thoracic Intensive Care Unit, and 86 bed prep/recovery suite. Project received the Construction Management Association of America's 2006 award as the best renovation project over \$20 million.
- Project Manager for the \$16 million CardioVascular Procedure Center. Project includes the construction of six new Cardiac Catheterization Labs, three new Electrophysiology Labs, one Vascular Surgery lab, twenty prep/recovery beds, and the installation of the associated radiology equipment.
- Supervisor for Barnes-Jewish Hospital's four Planning, Design, and Construction Project Managers/Coordinators and the In House Construction Crew. Crew consists of eight construction personnel responsible for performing more than \$400,000 in self-perform construction per year.

6/01 – 5/03 Project Manager, SM Wilson & Company: Accountable for directly managing \$12 million in retail and health care construction. Responsibilities included pre-construction analyses, subcontract negotiation, generation, and management; budget preparation and administration; project schedule creation; owner relations; sales support; and field personnel management.

- Project Manager for the \$3.6 million Marshalls and HomeGoods stores in Ballwin, Missouri. The project entailed out-of-the-ground construction of 70,000 square feet of retail space in seven months.
- Project Manager for the \$5.5 million relocation of the Mental Health Unit from Christian Hospital NW to Christian Hospital NE. This project entailed moving the Skilled Nursing Facility at Christian Hospital NE from the third floor to the fourth floor, moving the Mental Health Unit from Christian NW to the third floor of Christian NE and renovating the Comprehensive Medical Rehabilitation unit on the second floor.

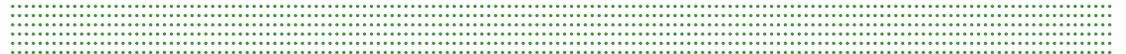
3/99-5/01 Project Engineer, Paric Corporation:

- Project Engineer for the \$31 million Enterprise Rent-A-Car Technology Center, responsible for Core/Shell and Interior Finish project management.
- Project Engineer/Estimator for the \$83 million technology operations center for MasterCard International. Directly managed \$6 million budget for project controls. Assisted Senior

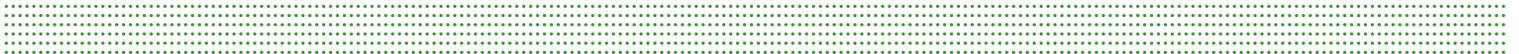
Estimator by performing quantity takeoff, pricing, schedule preparation, subcontractor budgeting, bid solicitation, and bid analysis.

2/95-2/99 Lieutenant, United States Air Force: Responsible for evaluating logistic suitability of \$5 billion worth of upgrades to the Minuteman III Intercontinental Ballistic Missile. Led 40 personnel who administered initial, recurring, and special technical training; managed over \$100 million in sophisticated training facilities. Directed maintenance efforts for 85 personnel and \$71 million in equipment required to keep 50 Peacekeeper ICBMs on strategic alert within 3,000 square miles

- Operational Test Manager for the \$2.5 billion Propulsion Replacement Program upgrade.
- Chosen to lead maintenance task force for Glory Trip 22PA, an \$89 million Follow-on Test and Evaluation launch of the Peacekeeper ICBM, the first second lieutenant selected to lead this maintenance task force.



Ameren Illinois Advanced Metering Infrastructure (AMI) Plan



June 28, 2012

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1. Introduction

In accordance with the requirements of the Illinois Public Acts 97-616 and 97-646, Ameren Illinois Company (Ameren Illinois) has prepared this Advanced Metering Infrastructure Plan (the “Plan”).

The Plan describes how Ameren Illinois intends to install an Advanced Metering Infrastructure and institute operational changes in order to: 1) serve no less than 62% of its electric customers; 2) reduce its state-wide meter reading estimates by at least 56%; 3) reduce its state-wide kWh consumption on inactive meters by at least 56%; and 4) reduce its uncollectible expense by at least \$3.5 million; all by end of year 2022.

The Plan was assembled by a cross-functional team of Ameren co-workers and with the assistance of representatives of Accenture.

This Plan includes the elements required by the Illinois Electric Grid Modernization Act:

1. A Smart Grid **AMI Vision Statement** that is consistent with goal of developing a cost-beneficial Smart Grid;
2. A statement of Smart Grid **AMI Strategy** that includes a description of how Ameren Illinois evaluates and prioritizes technology choices to create customer value;
3. A **Deployment Schedule and Plan** that includes deployment of AMI to no less than 62% of all Ameren Illinois electric customers;
4. A **Cost / Benefit Analysis** that proves the implementation of the AMI Plan is cost beneficial for Ameren Illinois’ electric customers.
5. Annual Milestones and **Metrics** for the purposes of measuring the success of the AMI Plan in enabling Smart Grid functions; and enhancing consumer benefits from Smart Grid AMI;
6. A **Consumer Education Plan** to be implemented by Ameren Illinois;
7. A **Cyber Security Plan** that is consistent with guidelines and standards of the National Institute of Standards and Technology;
8. An **Interoperability Plan** that is consistent with guidelines and standards of the National Institute of Standards and Technology, and includes open standards and internet protocol to the maximum extent possible;
9. A description of how Ameren Illinois will secure the **Privacy** of personal information and establish the right of consumers to consent to the disclosure of personal energy information to third parties through electronic, web-based, and other means in accordance with laws and regulations protecting privacy; and;
10. A description of Ameren Illinois’ plan for filing a **Peak Time Rebate Program** available to all residential customers with smart meters.

2. Background/Current Situation

History of Meter Automation at Ameren

Ameren Corporation has been an industry leader since the advent of automated metering, having been among the first utility companies in the nation to install these devices on a large scale. Today, automated electric and gas meters exist across most of Ameren’s 64,000-square-mile service territory. Full-scale automated meter reading was introduced across Ameren Missouri’s service territory in the 1990’s, including Alton and East St.

Louis (electric) in Illinois. At the time, the million-meter project was the largest implementation of network meter reading in the U.S. The Alton and East St. Louis service territories in that project are now part of Ameren Illinois.

An aggressive expansion of automated meter reading in Ameren Illinois' service territory began in the spring of 2006 and concluded in early 2010. Now, more than half of Ameren Illinois' gas and electric customers have automated, 1-way, transmit-only meters. This includes 678,000 electric meters and 476,000 gas meters.

During the Ameren Illinois automation project, an advanced radio frequency (RF) network, capable of 1-way and 2-way communications, was installed by Ameren Illinois' service provider, Landis + Gyr, to interface with these meters. The 2-way communications capability has not been leveraged all the way to the meters since at the time of deployment the meters (endpoints) were 1-way. Meter technology, features, and costs have changed dramatically in the last few years, making 2-way automated metering systems the standard for new "greenfield" deployments in the industry.

Due to early automation, Ameren Illinois' customers have been receiving the benefits of automated metering, and with it, a large portion of Ameren Illinois' service territory is ready to move to the next level of metering infrastructure with its additional benefits.

3. Vision

Ameren Illinois' vision is to have the capability to serve all of its customers with a cost-beneficial Advanced Metering Infrastructure, serving 62% of electric customers by 2022.

Ameren Illinois' vision includes an AMI infrastructure that will deliver the following enhanced benefits to Ameren Illinois customers in a safe and secure manner:

- Improved efficiency and reduced operating costs from automated meter reading and remote connect/disconnect features;
- Reduction in estimated bills;
- Reduction in uncollectible costs;
- Reduction in consumption on inactive meters and energy theft;
- Service activation/deactivation on date requested;
- Customer access to usage and other information to aid in their energy and cost management;
- Improved reliability through faster response to restoring power;
- Improve reliability by monitoring the system to proactively address issues that might lead to service problems, and
- A foundation for future "beyond the meter" capabilities for Ameren Illinois customers – including smart appliances, net metering, plug-in electric vehicles, and integration of renewable energy resources.

Wherever Advanced Metering Infrastructure is deployed it will include the following functionalities:

- Equipment that is safe to customers, the public, and Ameren Illinois employees and contractors;
- Increased information available to the customer (i.e. daily usage, interval usage, energy pricing, \$s spent on energy to-date, etc.);
- Remote programming for rate changes (i.e. Real Time Pricing (RTP), Power Smart Pricing (PSP), Peak Time Rebate (PTR) and Critical Peak Pricing (CPP));
- Remote disconnect/connect to meet consumption on inactive meters and bad debt metrics;
- Remote diagnostics of the meter;
- Remote detection of service and grid conditions (voltage, power outage, power restoration);
- Remote firmware upgradeability within the meter and the network;
- Secure data and controls to ensure privacy and prevent unauthorized access;
- In/out metering capability to adapt to distributed generation and developing smart grid technologies; and
- Interoperable to the extent possible and practical (e.g. common communications protocols).

4. Strategy

4.1 Introduction of AMI

Ameren Illinois' AMI strategy is to leverage its automated metering deployment and operating experience to move to the next level of Advanced Metering Infrastructure. As Ameren Illinois deploys AMI it will ensure that all systems and equipment are performing as designed to provide for accurate and timely billing. This step will be followed by implementation of advanced metering functionality such as remote connect/disconnect and customer access to usage information. Functionality will be rolled out in stages as shown below.

Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Install foundational meter data management system and AMI system	Process and Bill Residential Simple Rates and customers from RTP program via legacy interface	Provide Web portal for presentment of customer usage	Upgrade processes and system to support remote connect/disconnect	Support Peak time rebate pricing and critical peak pricing
Prepare systems and processes for installation of 2-way communication network	Integrate AMI and MDM systems and prepare for billing	Provide Operational Analytics		Prepare systems & processing for Commercial and Industrial (C&I) billing
Manage Asset Information	Deployment analytics			Event processing such as outage notification and restoration

4.2 Data Communication with Customers

Ameren Illinois expects to purchase smart meters equipped to transmit information from the meter and/or Ameren Illinois' network to the Customer's Home Area Network (HAN) or other premise network for non-residential customers. This will lay the foundation for future meter to HAN communication. However, Ameren Illinois does not plan to utilize this path to communicate with customers initially. Instead, Ameren Illinois intends to make available a web-portal for customers to access their data. This will allow customers with web access to observe their usage without purchasing or installing additional equipment to receive signals from Ameren Illinois. Presently Ameren Illinois is concerned that the current HAN technology isn't fully mature as there are currently several standards that are still emerging. Ameren Illinois' goal is to provide excellent service to its Customers. A concern is that customers may be dissatisfied with the current tools' performance/functionality and withdraw from managing their energy via HAN, if deployed too early. Ameren Illinois will monitor HAN technology as it continues to mature and to improve. Then, with input from stakeholders, Ameren Illinois will determine the most appropriate approach for enhancing its customers' interface choices. Ameren Illinois will also monitor and consider third party vendors to administer customer interface programs and support just as it has done with its Power Smart Pricing program.

4.3 Ownership/Maintenance of the AMI Components

Ameren Illinois will own and maintain all electric meters on its system and will manage all testing, inventory, records in compliance with II Administrative Code, Title 83, Parts 410 and 500. Ameren Illinois expects to own and operate the AMI network. Ameren Illinois has deployed Automated Meter Reading (AMR) to 54% of its 1.25 million electric customers. To achieve 62% coverage of its electric customer base, Ameren Illinois will convert 16% or approximately 200,000 of its electric customers from AMR to AMI.

4.4 Program Management

In addition to its internal Ameren Illinois Project Team(s), Ameren Illinois has engaged leading consultants with broad experience in AMI projects to assist in project oversight and will continue to engage well-qualified consultants to assist. Examples of this assistance include:

- Creating and evaluating the Request for Proposals (RFPs) for the AMI Network, Meters and the Meter Data Management System (MDMS)
- Information Technology/Operation Technology (IT/OT) Architecture and System Integration (SI) options
- Business Process Review and Design
- Cost / Benefit Analysis, including Societal Benefits of AMI
- Program Scoping
- AMI Risk Analyses
- Consumer Communication Strategies
- Consultation on IT issues
- Consultation on technology

4.5 Number of Meters to be Deployed for 62% Target

To ensure that 62% of Ameren Illinois electric customers are served via AMI by year 2022, Ameren Illinois must install an estimated total of 780,000, 2-way electric meters. The preliminary plan for deployment is shown in section 5.3. Once vendors are selected, the plan may change to enhance deployment efficiencies and timing of customer benefits.

4.6 Information Technology and Business Processes

In planning for a new Advanced Metering Infrastructure (AMI) System, in July of 2011, Ameren Illinois teams began assessing the impacts, requirements, and cost of a new AMI system and a new or upgraded Meter Data Management System (MDMS). To enable the new functionality of the AMI system, Ameren anticipates significant impacts on business processes and information technology infrastructure, including data storage requirements due to the large quantities of AMI interval data.

Initial Business Process Requirements Assessment

The teams performed an assessment of the Information Technology (IT) and Business Process Requirements. This assessment was driven by a list of over one hundred processes. The assessment allowed an opportunity, at a very high level, for the business experts and IT to identify potential impacts and requirements to help satisfy the AMI Metrics and Deployment Targets as described in this Plan. This involved the consideration of the following: 1) Installing and Interfacing with a new AMI system, 2) Upgrading the existing or installing a new MDMS, 3) Interface/System Integration work associated with the AMI and MDMS, 4) Customer Information System changes; 5) Internet/Web Development.

MDMS and AMI (network and meters) Estimate

In September of 2011, a Request for Information (RFI) document was prepared and offered to 12 different MDMS vendors. Information gained through the RFI process was utilized to obtain implementation and list pricing estimates for an MDMS, as well as for developing server, storage, and software cost estimates used in the Cost / Benefit Analysis. Similarly, a RFI was prepared for the AMI system. For integration purposes, estimates developed for interfacing with the new system were arrived at based on the understanding of our existing AMR interfaces in place today.

In March 2012, Ameren Illinois issued RFPs to a shortlisted group of AMI and MDMS vendors. The results of the RFP process are still being analyzed to select the best value vendor for deployment in Ameren Illinois' service territory. The updated estimates in the Cost/Benefit Analysis represents Ameren Illinois' best understanding of projected pricing for AMI and MDMS deployment. It is anticipated the review of the RFPs will be completed and final contracts negotiated by the fourth quarter of 2012.

Business Process Review

Following the evaluation of the RFPs and selection of the MDMS and AMI system vendors, a Planning Phase will begin and will include a Business Process Review and Design and System Architecture Review for both the MDMS and AMI systems. The business process reviews will match the phased rollout of functionality described above in section 4.1. Concurrently with the Business Process Review, it is expected that an Organizational Impact Team be utilized to review the Business Process Review assessment documents as they are completed. This team will be responsible for addressing any business/user impacts, identifying training needs, and arranging for training as required. This effort will continue through the Application Development Phase and continue as necessary through implementation.

A Business Process Review (BPR) and Business Process Design (BPD) will be performed once authorization has been received to proceed with the AMI implementation and vendors/systems for AMI and MDMS are selected. Ameren Illinois has completed the BPR/BPD Request for Proposal (RFP) and will issue it upon receiving an approved plan. The BPD is anticipated to begin in early 2013.

Information Technology Development and Integration

The Information Technology Application Development phase of the project, which includes the analysis, design, coding, integration and unit testing of the new functionality required to support AMI deployment within Ameren Illinois, is expected to begin following the Planning Phase for each Stage. Application Development will continue for approximately 30 months.

Ameren Illinois will use a combination of internal and external resources to complete application development and system integration effort. An RFP will be issued for development and integration as BPD begins.

Product Test Phase and Production Readiness Phase

During the Product Test Phase, project resources will identify, write, and execute test scripts to validate the accuracy of the new or modified functionality. Product test scripts are executed by analysts and business resources and are utilized to validate that the programming logic meets the business and process requirements. The timeframe for this testing phase is to be determined but will most likely begin several months after coding begins and will continue through pre-implementation development as the MDMS and AMI software is prepared for implementation.

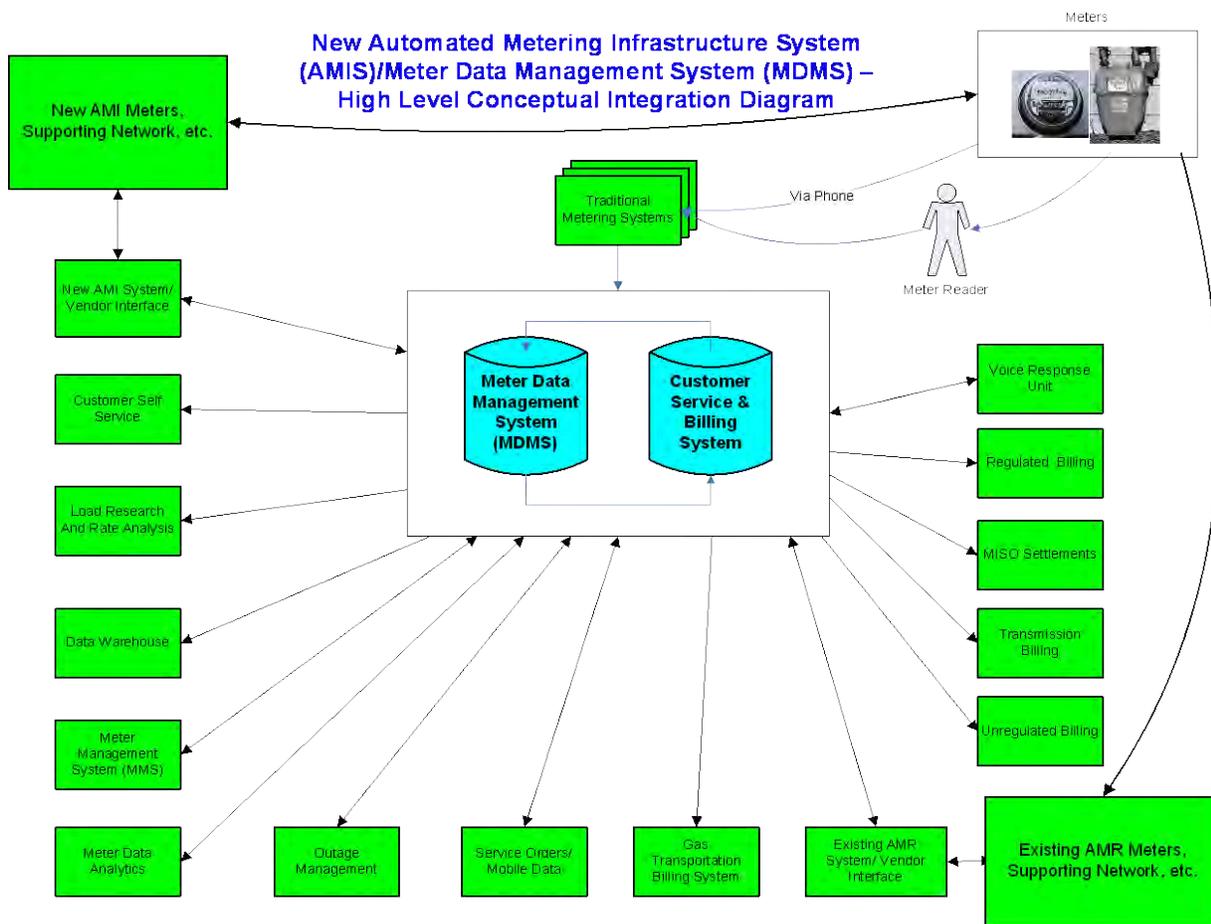
The Production Readiness Phase includes “day-in-the-life” scenario testing. The goal of this phase is to ensure that all of the components of the impacted applications are functioning as designed and will support the day-to-day operations of Ameren Illinois and customer facing applications. This phase includes testing of the new AMI and MDMS systems, interfaces between the AMI System, the service bus and business process management as well as other internal interfaces, to ensure that all are functioning properly and efficiently. This phase is expected to occur following the Product Test Phase but prior to implementation and is meant to test each interface and component of software.

Implementations

Production implementation of the AMI and MDMS systems, and related interface changes, are likely to occur in “phases”. The exact timing of each phase’s implementation will be established during the planning phase of each planned functionality Stage. Functionality necessary to meet deployment plans and core objectives of the bill are planned to be in place by 4th Quarter 2015.

The various items discussed above, including the various phases are conceptual in nature and subject to change as the project more fully develops and vendors are determined, and the planning process continues.

The following diagram demonstrates the extensive interfaces and interaction of the system and information with the implementation of AMI and MDMS systems.



4.7 Data Analytics

Ameren Illinois intends to incorporate data analytics solutions in its Advanced Meter Infrastructure program. Ameren piloted some of these features with its AMR system in Illinois and Missouri and found them to be valuable tools in managing and operating the automated meters/network.

Data analytics utilizes daily readings, meter flags, and usage patterns to increase the scope, speed, and accuracy of meter problem identification.

Benefits include the ability to:

- Check on the health of the meter/module
- Identify/initiate predictive inspections and maintenance
- Recognize anomalies that might suggest reading errors, equipment malfunction, tampering, and service or system issues
- Recognize meters that have been incorrectly configured
- Improve Customer Service as problems are identified without estimates or bill correction
- Check on network health
- Check on interval read performance and other performance statistics such as disconnect/reconnects executed

Data Analytics also provide:

- The ability to verify AMI vendor performance/contract metrics
- Information and analysis that can be leveraged in other utility functions (such as load research and energy efficiency) data per customer
- Ability to filter outage information from AMI last gasp messages due to planned work or recloser activity

The increased amount of data, and the introduction of 2-way communications and controls (e.g. remote disconnect) will likely justify the need for data analytics solutions.

4.8 Technology Evaluation and Customer Value

Ameren Illinois evaluates technology solutions in a thorough and conservative way, considering the life cycle of the technology, its integration with systems and processes, and its economic and customer benefits. Ameren Illinois is taking this same approach as it evaluates AMI related technology.

As explained throughout this plan, Ameren Illinois is implementing a phased approach to AMI to ensure system operation and to enhance customer ability to take advantage of AMI features. Once Ameren Illinois has ensured accurate and timely billing of an account on the AMI network, the implementation of advanced features such as remote connect /disconnect and customer access to usage and rate evaluation information on a web-portal will follow. These features will be accompanied by targeted customer education as explained in the customer education section below. Using the AMI as a foundation, Ameren Illinois will then continue to leverage information from other successful AMI deployments, research agencies such as EPRI, and the newly created Ameren Illinois Technology Applications Center (also known as the Smart Grid Test Bed) to further evaluate and deploy features and programs that are economic and enhance customer benefits.

4.9 Positioning for the Future

In many respects Ameren Illinois sees the installation of AMI as a journey. The Company expects to explore the full capability of the system, and as it sees value with a sustained valid business case, integrate those features and benefits into the business systems and operations.

Examples of potential enhancements that will be evaluated:

- **Volt/Var Optimization:** Integrating the voltage sensing capabilities of the advance meters to enhance the voltage optimization functionality.
- **Distributed Generation:** Using the in and out metering capability of the advanced meters to facilitate net metering, including enhanced integration of distributed renewables and the eventual integration of electric vehicle-to-grid storage.
- **HAN and Smart Appliance Communication:** Implementing direct meter to in-home device communication capability as customers desire these features, as home communication standards are finalized, and as in-home device technology improves in functionality and becomes even more economical.
- **Enhanced Rate Options and Services:** Providing increased rate choices and other retail services, through Retail Electric Suppliers, other third party service providers, or Ameren Illinois directly as appropriate.

4.10 Program Management Office

Ameren Illinois has a significant amount of experience with automated meter deployment. Deployments must be well-planned with firm milestones and clear vendor performance metrics that will be clearly tracked. AMI introduces additional considerations associated with: 2-way communications, new meter and system functionality, cyber security and privacy issues, MDMS and business process changes, IT process changes, AMI Vendor interfaces and processes, a service-oriented architecture implementation and a customer web portal.

In order to track and take action with regard to project scope, schedule and cost, Ameren Illinois has created a Program Management Office (PMO). The PMO key roles are:

- **Program/Project Governance** – Ameren Illinois has a rigorous capital program management process that requires large investments to go through reviews at numerous phases to ensure that the project/program is achieving its financial, strategic, operational, and customer benefit objectives.
- **Cost / Benefit Analysis /Financial Tracking**–Ameren Illinois requires large capital investments to be analyzed using discounted cash flow to ensure projects/programs provide net customer benefits. The PMO will continue to review, update, and communicate net customer benefits if the AMI program scope, cost, or schedule changes. A key tenet of Ameren Illinois' capital program management process is

robust cost tracking and financial management. Corporate policy requires monthly forecast updates of project costs and cash flows.

- Scope, Quality, and Business Process Integration Management– The AMI PMO will have a dedicated workgroup that will focus on developing and integrating AMI into its business framework. Key to successful implementation of AMI will be a thorough review of more than 200 processes and how each of these business processes at Ameren Illinois is affected by AMI. Another critical effort of AMI deployment will be ensuring that the cost of quality is minimized by employing deep dive quality analyses during planning and design that prevent defects during the AMI implementation, as cost of prevention is cheaper than cost of repair.
- Scheduling – The AMI PMO will have a dedicated scheduler that in conjunction with the cost management group, will develop and implement an Earned Value Management System (EVMS) that tracks performance against cost and schedule baselines. For large capital investments at Ameren Illinois, EVMS is the required methodology for identifying leading indicators on project and program health.
- Issues and Risk Management – The Ameren Illinois PMO will have resources responsible for risk and issue management. Ameren Illinois policy requires a minimum monthly update of risks and issues, with assigned impacts and probabilities. Ameren Illinois capital program management standard practice uses the collective probability weighted impact of program risk as the program's contingency. Ameren Illinois' leadership will hold management reserve to address unidentified risks.
- Technology and Vendor Selection – The AMI PMO will use a robust procurement and sourcing process to identify the AMI technology and associated vendor that provides Ameren Illinois customers with the lowest Total Cost of Ownership (TCO).
- Field Deployment – The Ameren Illinois PMO will be staffed with internal project management personnel that have significant experience with deploying automated meters.
- Information Technology Management–The AMI PMO will use Ameren's Information Technology Project Management process and Ameren Illinois project management policy to guide the development of the AMI network infrastructure and the Meter Data Management system.
- Testing/Commissioning – As part of the quality management process, the AMI PMO will develop a testing/commissioning plan for all elements of the AMI deployment. Examples of testing/commissioning will include Factory Acceptance Testing (FAT) for meters and hardware, Performance Testing to ensure scalability, User Acceptance Testing (UAT) for software, Ameren Illinois meter shop bench testing, software design reviews, etc.
- Change Management- An Advanced Metering Infrastructure will touch nearly every aspect of the Ameren Illinois business as new equipment is installed, and many processes are revised or replaced. A thorough and effective Change Management program will be essential to ensure that everyone within the organization understands the purpose, scope and reasons for the change, and their individual roles in the success of the project. Communications, training, feedback, alignment, and constant improvement will be keys to success. Change management will occur in many forms: Company-wide communications; imbedded changes and training within IT and business process changes, specific training programs for field, shop, and call center personnel; new policies; etc.

5. Deployment Plan

5.1 Vendor Evaluation Process

In September 2011, Ameren Illinois conducted a Request for Information (RFI) process with multiple AMI vendors to identify viable AMI solutions and to estimate the cost and timeframe to deploy equipment. This information was used in the Cost / Benefit Analysis.

Ameren Illinois' evaluation was focused to determine if the proposed solutions, at a high level, would:

- Meet cyber security standards/requirements
- Meet interoperability standards
- Meet electric and gas meter functionality requirements
- Meet communication bandwidth and latency requirements
- Meet training needs

- Meet deployment schedule
- Provide pricing options

The AMI system and MDMS Request for Proposals (RFPs) were released to potential vendors on March 29, 2012. The evaluation of responses and selection of vendors is expected by the 4th Quarter of 2012. The initial review of the RFPs refines the pricing originally estimated using the RFIs.

5.2 Technology

5.2.1 AMI Communication Network

Ameren Illinois has selected Radio Frequency (RF) technology for its base AMI network system, both in the Field Area Network (FAN) and the Wide Area Network (WAN). However, other communications technology may be incorporated to address unique situations where distance, topography, RF interference, etc., make other technology a better choice.

5.2.2 Meters

Ameren Illinois plans to purchase all AMI meters equipped as currently defined 'smart' meters, which means that they will include:

For Residential, Commercial and Industrial Meters:

- Load profile (ability to record and store usage in intervals that are appropriate to the application)
- Time of Use (TOU) features (measure of usage during specific hours of on and off-peak periods)
- Power Outage reporting and verification
- Remote voltage (and current for some C&I applications) monitoring capability for indication of the status of the service
- Remote diagnostic capability to help identify and resolve issues with equipment and system operations;
- Remote programming capability, eliminating the need for a physical visit to the meter. These remote capabilities will include:
 - Firmware upgrades;
 - Full meter program load to configure the meter's options;
 - Software "bug" fixes;
 - Security patches;
 - Time synchronization to ensure all demand, TOU, and interval time periods are accurate;
 - Load profile and channel configuration; and
 - Ability to change TOU schedules, and DST/ST switch points (i.e. the on and off-peak time periods, Daylight Savings Time/Standard Time dates, etc.).
- Manual probing capability via the optical meter port or a local wireless field read using a handheld wireless tool in the event the network is inoperable or unavailable and a physical visit to the meter is required to download data or perform diagnostic or programming functions; and
- Capability to be programmed to measure bi-direction power flow (to and from the customer) to address distributed generation or alternative energy sources and related tariffs.

For Single Phase, Residential and Small Commercial Meters Only

- Radios capable of communicating with Home Area Networks (all vendors that proposed an AMI solution are capable of meeting the Zigbee Smart Energy Profile (SEP) 1.0 or 1.1 standard and have included road maps to be SEP 2.0 compliant upon adoption of the 2.0 standard); and
- 200Amp internal switch for remote disconnect and connect.

5.3 Deployment

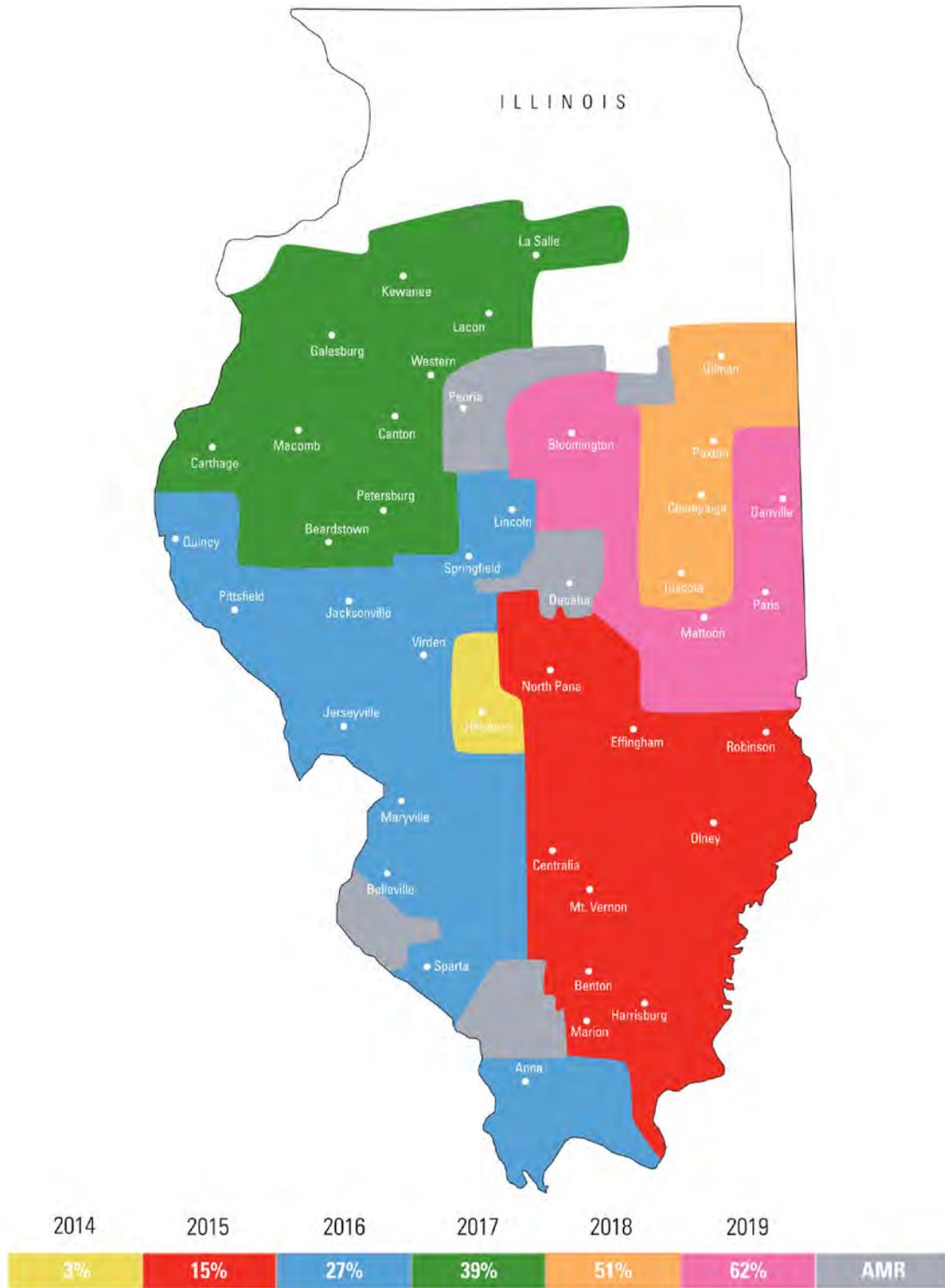
5.3.1 Deployment Approach

As noted earlier in this Plan, to ensure that Ameren Illinois meets the statutory requirement to deliver AMI to 62% of electric customers by the end of 2022, Ameren Illinois must install an estimated total of 780,000, AMI-equipped electric meters assuming 2011 meter count.

Initial deployment of AMI meters is expected to begin in Q2 2014, and completed by the end of 2019. Per previous AMR deployment lessons learned, the measured start is intended to provide an opportunity to verify that the logistics, warehousing operation, module and network performance, training, installation quality, vendor processes and head-end system all meet expectations before moving forward with full deployment. Automated reads will not be used for billing or billing inquiries during the initial Stage.

Ameren Illinois has developed a deployment plan that will initially provide AMI meters to areas of Ameren Illinois' service territory that do not have AMR. The deployment plan follows a sequence of rolling out AMI meters to areas contiguous to those previously deployed, simplifying logistics, taking advantage of communication network efficiencies, and realizing greater benefits for Ameren Illinois' customers.

The figure and tables below illustrate the annual deployment plan based on 2011 meter count to provide AMI capability to serve 62% of electric customers by the end of 2019.



Percent of Total Ameren Illinois Electric AMI Meters by Year

Operating Center	Division	Deployment Sequence	# of Electric Meters
2014			
Hillsboro	5	1	40,419
2014 Total			40,419
2015			
Hillsboro	5		473
North Pana	4	2	20,205
Effingham	4	3	14,068
Robinson	4	4	13,630
Olney	4	5	13,428
Centralia	6	6	17,203
Mount Vernon	6	7	22,541
Benton	6	8	18,160
Harrisburg	6	9	9,599
Marion	6	10	18,693
2015 Total			148,000
2016			
Marion	6		8,626
Anna	6	11	10,930
Sparta	6	12	25,516
Jerseyville	2	13	15,897
Virden	2	14	11,643
Pittsfield	2	15	6,013
Quincy	2	16	26,747
Jacksonville	2	17	13,535
Springfld	3	18	13,402
Lincoln	3	19	15,691
2016 Total			148,000

Operating Center	Division	Deployment Sequence	# of Electric Meters
2017			
Lincoln	3		1,531
Petersburg	2	20	10,931
Beardstown	2	21	13,847
Carthage	2	22	8,312
Macomb	2	23	11,398
Canton	2	24	11,669
Western	1	25	12,647
Lacon	1	26	16,600
Galesburg	1	27	44,547
Kewanee	1	28	15,473
LaSalle	1	29	1,045
2017 Total			148,000
2018			
LaSalle	1	29	36,919
Gilman	4	30	14,266
Paxton	4	31	15,749
Tuscola	4	32	22,865
Tuscola	4	33	-
Champaign	4	34	58,201
2018 Total			148,000
2019			
Champaign	4		23,085
Danville	4	35	33,166
Bloomington	3	36	61,604
Mattoon	4	37	21,385
Paris	4	38	8,760
2019 Total			148,000
6 Year Total (2014-2019)			780,419

Operating Center Deployment Plan

5.3.3 Meter and Network Deployment Phases

Deployment will be performed in a phased approach. The following information defines the significant milestone and timelines (known at this point) for phases of deployment.

Phase 1 – Pre-Deployment Preparation

- Electric Meter Preparation
 - Prepare Electric Meter Shops for AMI processing
 - Medical Tag Survey completed by meter readers/subcontractors to improve mass deployment efficiencies and safety.
 - Identify electric facilities to be excluded from mass deployment and addressed one-by-one due to complexity, safety, and reliability issues.
 - Begin purchasing AMI equipment.
 - Exchange a limited number of meters in advance of mass deployment in each area as service personnel work orders in the normal course of business.
 - Initiate advanced electric meter installations by Ameren Illinois' meter technicians in the first deployment area.
- Network Preparation
 - Identify coops, municipalities, and other such areas that Ameren does not currently own the poles or have pole-attachment agreements and obtain pole use agreements prior to network deployment in those given areas.
 - Identify Wi-Fi areas that may cause interference and reduce network performance. Then, identify actions needed to mitigate these issues.
- Meter Reading Preparation
 - Complete meter location surveys to improve installer efficiencies in locating meters during deployment.
 - Attain meter reading route maps.
 - Verify that premise access keys are available at each operating center to be deployed.

Phase 2 – Network Deployment

- Network Deployment is anticipated to begin near the end of Q3 2013, subject to vendor selection and contract negotiations.
- Network equipment installation / turn on process
 - Site Surveys (as required and as needed) will be completed and documented.
 - A list of meter locations to be automated will be evaluated using meter density of the residential/commercial area. Surveys of the areas (as required and as needed) will be performed to establish the sites needed for network equipment installation.
 - The proposed network device locations will be evaluated by Ameren Illinois to determine if they are acceptable based on established installation standards, availability of power, etc.
 - Equipment installation
 - An approved electrical utility service will be provided to the network equipment based on the standards described by the customer standard electrical code.
 - Network equipment performance criteria will be established and performance against these criteria will be evaluated.
 - Additional equipment or testing is verified by the installation vendor to determine if established locations of the network equipment are adequate.

Phase 3 – Mass Deployment Process

Phases 1 and 2 outline the activities to be completed in preparation for the meter mass deployment. Phase 3 continues the preparation by establishing a warehouse/deployment logistics facility, staffing, securing meters and modules, establishing vendor deployment processes, and training.

As stated previously in the Deployment Approach section, the initial deployment of meters will begin in Q2 2014 to verify the functionality of the AMI vendor technology, and associated deployment activities.

The AMI Support Systems, including the Meter Data Management System and the Ameren Illinois Business Process changes will be underway during the beginning of mass deployment and will be completed in

phases. Network and some meters will be in place when the support systems are in place and testing of the AMI can begin.

Key activities associated with Mass Deployment include:

- Warehouse/deployment logistics Facility
 - A warehouse/logistics facility will be secured in a strategic location to serve the mass deployment activities. This facility will be the logistics hub for electric meters, gas modules, and network equipment. The facility will house equipment for electric meter read imaging (a digital photograph of the removed meter face to capture the reading and nameplate data) and will serve as the hub for the installer workforce. As the mass deployment progresses, there may be a need to add a satellite facility closer to the deployment locations for all but imaging activities.
- Staffing
 - A workforce will be secured to support the warehouse/logistics facility, installation of residential electric meters, gas modules, and network devices adhering to current labor agreements and meeting Ameren Illinois diversity requirements.
- Performance Check of Meters
 - New AMI meters will be delivered to the warehouse/logistics facility and quarantined there until samples of each lot are tested at an Ameren Illinois Meter Shop. In addition to accuracy testing, Ameren Illinois expects to test other functions such as the RF communications functions and remote disconnect/connect functions on these samples.
 - All meter testing, installation, record keeping, etc. will be performed in accordance with the Illinois Administrative Code, Title 83, Parts 410 and 500.
- Scheduling/Installation
 - Mass deployment is structured around route plans. Installers are assigned daily work according to the meter reading route schedule. Electric meter exchanges are not to be performed during the read window.
 - If the meter is not accessible, unsafe to install, damaged, non-compatible, obstructed, etc..., the meter will be skipped by the installer and will become the responsibility of Ameren Illinois to automate.
 - As meters are exchanged or gas modules installed, Ameren's database which matches the meter to the customer account, must be updated. Pending the Vendor RFP, it is expected that a vendor-provided software package will provide the tool to manage this activity.
 - Ameren Operating Centers will be prepared to support the deployment, including response to unsafe conditions (i.e. damaged meter, gas leaks, etc.), access issues, and skipped meter investigations.
- Cyber Security and Installation
 - At the time of meter installation, cyber security features will be enabled as described in the Cyber Security Plan, Section 10. The specific cyber security features and steps will be product/vendor specific and cannot be described until AMI equipment selection has been made.
- Training
 - Topics will include: OSHA requirements, gas safety, vehicle safety, electric meter and gas module installation, and customer service to include specific instruction regarding Ameren Illinois Smart Meter Medical / Privacy Policies.
- Customer Contact
 - Deployment activities will follow the process as described in the Customer Education Plan, Section 9.
- Performance, Quality, Safety, and Customer Service
 - Daily "Live" and "Post" installation audits will be completed by supervision. Daily tailgate sessions will be conducted to review weekly/monthly team performance goals, safety concerns, audit results, risks to the project.
- Customer-owned Facilities
 - During mass deployment of residential meters, if unsafe conditions are identified (e.g. damaged, customer-owned meter socket) Ameren Illinois will assist the customer so that facilities can be left in a safe and operable situation.

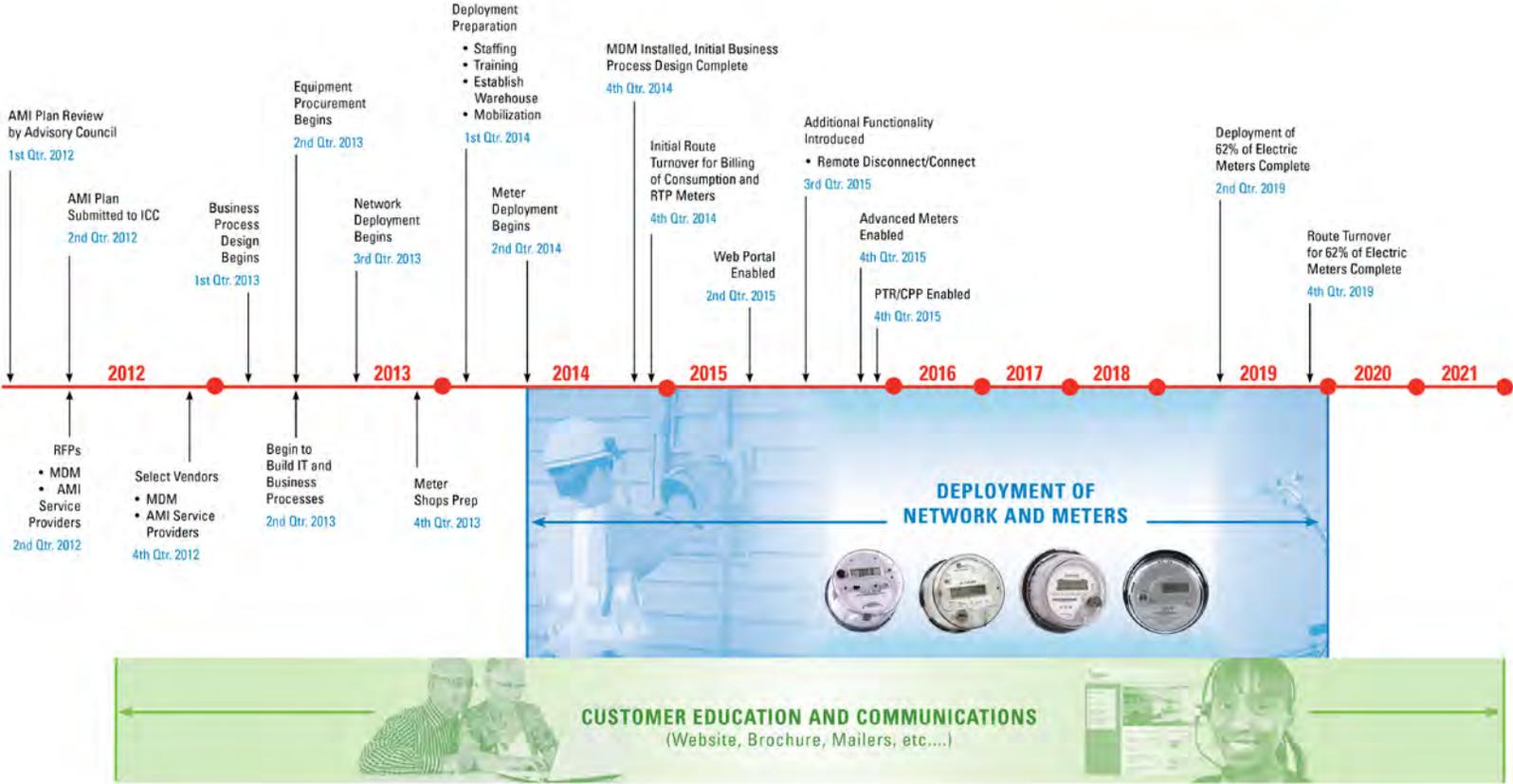
- Route Turnover
 - ‘Basic’ residential and small commercial cumulative electric meters will be converted (during a route turnover) to AMI-read when the IT systems and initial business process changes are complete and tested (anticipated to be early 2015).
 - Advanced Meters will be converted to AMI-read late 2015. This will allow time to test out the new systems and process and perform the ‘coding’ necessary to accept advanced meters.
 - Advanced meters are defined as meters where more than one read is required for billing: Interval, Time of Use, Demand and kWh, etc. Although interval usage may be measured and collected, if it is not used for billing, the meter is not considered Advanced.
 - Manual and automated reads will be compared prior to conversion of the route to AMI-read to ensure that the automated reads are accurate.
 - A specified % of a route (to be determined) must include AMI meters before the route may be converted to AMI-read.
 - Automated residential meter read performance will be required to meet a specified daily performance metric for one complete billing cycle before being converted to AMI-read.
 - Advanced electric meter read performance will need to meet a specified daily performance metric for one complete billing cycle before the meter may be converted to AMI-read.
- Test electric meter remote functionality, but not implement until the performance of the equipment/systems are proven in each Operating Center. Criteria will be established.

Phase 4 - Stabilization

- Address remaining non-automated skipped and non-compatible meters.
- Install Advanced Electric Meter external antennae’s or other equipment to improve performance as needed.
- Monitor network/meter performance and ensure necessary network enhancements are completed.



Advanced Metering Infrastructure (AMI)
 Preliminary Project Schedule



Ameren Illinois Advanced Metering Infrastructure Plan

Prepared by Ameren Illinois rev 6/12

6. Cost/Benefit Analysis

6.1 Cost / Benefit Analysis Results

As support for the AMI Plan, Ameren Illinois has developed a Cost/Benefit Analysis of implementing AMI within the Ameren Illinois service territory. A detailed explanation of the costs, benefits, and net present value analysis is provided in Attachment 1 to this AMI Plan. This analysis demonstrates that the present value of benefits exceeds the present value of costs by **\$406 million** over the 20 year analysis period (2013-2032). Therefore, the implementation of this Plan is cost beneficial for Ameren Illinois electric customers.

6.2 Benefits

The Ameren Illinois AMI Cost / Benefit Analysis includes the identification of benefits associated with the AMI implementation. Installation of AMI will provide a number of benefits that will reduce cost to our customers and improve customer service. These benefits include: reduction in meter reading costs, reduction in field & meter services costs, reduction in unaccounted for energy, efficiency improvement in billing and customer management, IT cost savings, reduced consumption on inactive meters, reduced uncollectibles, reliability improvement and outage management, and demand response, energy efficiency, and other societal benefits. There are also many additional benefits such as enablement of distributed generation, new home services, increased customer convenience, increased employee and public safety, job creation, and environmental benefits from reduced emissions. The timing of the benefits is based on the deployment plan discussed above. A summary of the 20-year cumulative values is listed in Table 17 of the AMI Cost/Benefit Analysis. These benefits total \$1,277 million over the 20-year analysis period.

6.3 Costs

The Cost / Benefit Analysis also includes the descriptions and estimates of the major cost elements associated with the AMI implementation. Costs are separated by general area (AMI Meters, Information Technology and Management / Other) and by cost category (Capital and O&M). The timing of the costs is based on the deployment plan discussed above. A summary of the 20-year cumulative values is listed in Table 2 of the AMI Cost/Benefit Analysis. These costs total \$566 million over the 20-year analysis period.

7. Measuring AMI Plan Success

Ameren Illinois will measure the AMI Plan success in enabling Smart Grid functions and enhancing consumer benefits from smart grid AMI based on the following milestones and metrics.

7.1 Legislative Defined Metrics

The following AMI related metrics were defined in the Illinois Public Acts 97-616 and 97-646. Baseline calculations, yearly incremental metric goals, and reporting schedule were explained in detail in Ameren Illinois MAP-M filing.

1. Ameren Illinois will achieve a 56% reduction in the number of estimated bills as compared to Baseline (the average of the actual number of estimated bills in years 2008, 2009, and 2010) by the end of year 2022.
2. Ameren Illinois will achieve a 56% reduction in the kWh consumption on inactive meters compared to Baseline (the average of the actual kWh of consumption on inactive meters in years 2009 and 2010) by the end of year 2022.
3. Ameren Illinois will achieve a \$3.5 million reduction in uncollectible expense as compared to Baseline (the average of the actual uncollectible expense in years 2008, 2009, and 2010) by the end of year 2022.

Until the AMI infrastructure is deployed and commissioned, and processes are implemented, existing manual methods will be used as needed to achieve the yearly incremental metric goals. Although these methods may be needed to achieve the goals, they are not as efficient or cost effective as AMI in the long term, and do not provide the additional benefits of AMI. The manual methods that are planned are:

1. Estimated Bills Metric – additional on-cycle manual meter reading.
2. Consumption on Inactive Meter Metric – completion of additional manual disconnects for locked-hot meters with consumption.
3. Uncollectibles Metric – completion of additional manual disconnects for non-pay.

7.2 Milestones

Ameren Illinois will use milestones to track the success of the AMI implementation. These milestones include, but are not limited to, the following:

- Percent of support system installed
- Percent of 2-way network installed
- Number and percent of AMI meters installed
- Number of customers able to access the Web Portal and Web Portal usage statistics
- Number of customers eligible for peak time rebate tariff
- Number of customers signed up for peak time rebate tariff
- Number of customers on PSP, RTP, or other real time rates

8. Consumer Education and Communication Plan

8.1 Introduction

As we begin the deployment of AMI meters, Ameren Illinois wants our customers to have a clear understanding of the implementation process, the current and future benefits of AMI, the available tools and information that will help them achieve full advantage of the program, and the changes in energy usage habits that may be required to realize the benefits.

The Consumer Education and Communication Plan has been developed to take customers through four distinct phases, beginning with education about AMI and its current and future benefits and culminating in the acceptance and engagement in smart energy pricing programs. We recognize that not all customers will elect to fully participate in all four phases, but we are committed to attracting as many as possible and helping them to realize the entirety of the benefits available to them.

In addition to completing quantitative research to establish a baseline level of Ameren Illinois customer awareness about AMI, we have and will continue to leverage other customer research, as well as best practices and lessons learned through AMI implementations conducted by other utilities. Our primary customer audiences are residential and small businesses. We will use our own customer segmentation data as well as segmentation research recently completed by the Smart Grid Customer Collaborative (SGCC) to develop and maintain strategies and messaging to meet the needs of our audiences.

Throughout the phases of the AMI implementation, we will use familiar and established communication channels such as bill messages and inserts, newsletters and direct mail to educate and inform our customers. We will leverage partnerships with local media outlets, local officials, civic and business leaders and organizations, emergency responders, as well as local and state agencies to help reach our customers. We also plan to coordinate with and leverage the resources of the Illinois Science and Energy Innovation Trust.

Our overall intent is to provide information in a timely and transparent manner, educating customers about the complete benefits of AMI and their future options of pricing plans and technologies that will help them better manage their energy use.

8.2 Research and Lessons Learned

This section summarizes the key lessons learned from our past AMR deployment, consigned research and information about other advanced meter deployments.

8.2a Ameren Illinois AMR Deployment

Ameren Illinois embarked upon an aggressive expansion of automated meter reading in its service territory in the spring of 2006. Upon the completion of this work in early 2010, approximately 678,000 (more than half) of the Ameren Illinois' electric customers had automated, one-way, transmit-only (AMR) meters.

While the AMI deployment will be significantly larger in terms of customer benefits and future available technologies, Ameren Illinois learned many lessons through the AMR deployment and will incorporate many of the successful communications strategies in the upcoming AMI deployment. Our key goals for the AMR communications were:

1. Customers would be aware of the initiative, understand when and how the upgraded meters would be deployed in their community, and understand how AMR would benefit them.
2. Ameren co-workers would be actively informed throughout the deployment and adequately prepared to respond to customer questions.
3. Stakeholders would be proactively briefed and updated throughout the implementation to help inform and field questions from their respective audiences and constituents.

Various types of communications and communications channels were used to help meet our goals. The project was announced with a statewide news release and supporting documentation provided to the ICC and state legislators. Prior to the first installation in the Champaign area, a Customer Service manager made a Champaign morning TV news show appearance. AMR information also was provided on Ameren.com.

As communities were identified for installation, the communications plan rolled out in a systematic and consistent manner.

Time before deployment	Description
6 weeks	Personal contact is made with local mayors, police and other community leaders. Additional information is provided to address any local community needs.
4 weeks	Localized news release is conducted and a media event arranged to demonstrate the installation of the AMR technology in the local community.
2-4 weeks	Direct mail piece is sent to customers announcing the timeline of the installation of their meter and highlighting specific benefits.
Day of	Installer attempts a courtesy contact with the customer to inform them of brief interruption of power. After the install is complete, a door hanger is left that provides information about the installation, general benefits and whether or not a return visit is required.

As a result of this successful implementation, Ameren Illinois will build off these core communication elements in the deployment of AMI. These elements include, but may not be limited to:

1. Contact with local mayors, emergency responders, community leaders, stakeholders and organizations.
2. Advanced notice to customers announcing the timeline of the installation and highlighting current and future benefits.
3. Localized news release and media briefing.
4. Courtesy contact prior to installation and door hangers left after installation.

8.2b Ameren Illinois Commissioned AMI Research

In early 2012, Ameren Illinois commissioned Market Strategies International (MSI) to develop and conduct a quantitative study to measure the baseline awareness about AMI among Ameren Illinois customers. This study was intended to help guide the development of our stakeholder and customer education plan. Ongoing research will be conducted to track progress and to strategically guide the sustained communications.

Key Findings from the MSI research:

- 63% of customers have heard the term “smart grid.” Among the 63% hearing the term:
 - 40% don’t know much about what it means
 - 34% have a favorable impression, 29% are neutral, 16% have an unfavorable impression, and 21% don’t know.

- 45% of customers have heard the term “smart meter.” Among the 45% hearing the term:
 - 25% of those who have heard the term don’t know much about what it means
 - 35% have a favorable impression, 28% are neutral, 23% have an unfavorable impression and 14% don’t know.
- 46% of all customers feel that smart meters would be “mostly an advantage”, 40% seeing the meters as “having no impact” and 8% as “mostly a disadvantage”.
- Customers indicated that improving reliability, bill accuracy, customer service, and giving customers more control of home energy usage as the top smart meter benefits.

8.2c Other research and professional networking

Benchmarking research was conducted with nearly a dozen U.S. utilities that have or are undergoing grid modernization and AMI deployment. Additionally, AIC representatives attended an AMI Customer Education and Outreach Workshop that included representation from CenterPoint Energy, Baltimore Gas & Electric (BGE), Kansas City Power & Light (KCP&L), Oklahoma Gas & Electric (OGE), Commonwealth Edison, HydroOttawa and Sacramento Municipal Utility District (SMUD) to learn from their AMI deployment experiences.

These are the major takeaways of these engagements:

External Stakeholders

- All utilities interviewed stressed the effectiveness of one-on-one and small group meetings/presentations. These intimate discussions were used as the primary vehicle to prepare local leaders for grid modernization and AMI deployment.
- All utilities attended city council/local government meetings to create awareness among large audiences in deployment territories.
- The majority of utilities performed staged messaging leading up to and through deployment.
- A few utilities demonstrated advanced meter technology and the meter exchange process for local officials.
- Several utilities equipped local officials/stakeholders with presentations to share with constituents upon request.
- Utilities found that external stakeholders appreciated receiving fact sheets and research findings as well as details regarding utility and consumer benefits.
- A few built new partnerships using teachers and young student ambassadors to help with events and one-on-one outreach efforts.

Customers

- Overall, customers responded most positively to messages regarding cost savings and control over energy usage.
- Messaging was found to be most effective when it was focused to specific demographics with tailored approaches.
- The majority of utilities performed staged messaging leading up to and through deployment.
- Utilities leveraged existing, familiar channels and communications vehicles to reach customers.
- Messaging should be consistent, and concise and easy to understand.

Internal Stakeholders

- Utilities formed employee ambassador programs to educate employees to communicate intelligently with customers and other stakeholders.
- Utilities made grid modernization and AMI program information readily available to employees via a company intranet site, periodic newsletters and emails.
- Some utilities equipped employees with messaging toolkits including FAQ pages, fact sheets, talking points, wallet cards, news stories, etc.

- Employee feedback mechanisms were found to be vital to enabling improvement of communications efforts throughout stages of deployment.

8.3 Goals

Based on the Ameren Illinois and other available research, we will build off the initial smart grid awareness to educate all stakeholders about the benefits of grid modernization and the fundamental role AMI will have as a part of building a more secure energy future. We have already:

- Developed a detailed briefing presentation, overview video, project fact sheets and other educational materials.
- Developed a centralized Internet site to serve as the source for information on grid modernization and AMI.
- Trained and engaged our Community Relations Coordinator (CRC) team to conduct outreach visits and presentations about AIC's Modernization Action Plan (MAP) and AMI to individual and organizational stakeholders.
- Provided an update to the members of the General Assembly.

As our communications, outreach and education progresses, consumer awareness and understanding about future AMI technologies and features will increase, eventually leading to customer action and choices resulting in improved energy efficiencies. We will help customers understand how these advancements will optimize the operation of appliances and consumer devices and the value of timely and detailed usage information for selecting the most appropriate pricing structures to fit individual lifestyles.

Our goals include helping our customers and stakeholders to:

- Understand AMI to be an integral component of the Modernization Action Plan (MAP).
- Understand and be able to communicate the benefits of AMI to their families, friends, neighbors, constituents and others.
- Understand the benefits of advanced meters and pricing programs (such as Peak Time Rebate <PTR>).
- Understand AMI is a "normal" course of doing business with Ameren Illinois.
- Use an effective "two-way" communication channel to provide feedback, ask questions and gather information.

8.4 Objectives

The objectives and intended measures of the Customer Education and Communication Plan are:

Objective	Measure
Customers are informed and educated about AMI and the deployment process	Research, number of calls/emails/letters, content of feedback, media monitoring
Customers accept AMI	Customer satisfaction scores and feedback
Little or no project delays due to communications	Number of delays attributed to communications
Negative perceptions and concerns are alleviated	Number of calls/emails/letters, content of feedback
Co-workers have the information they need to answer customer questions and provide on-going communications throughout the deployment period.	Internal co-worker meetings, regular internal communications, surveys
Public officials, the news media, opinion leaders and others are educated about the deployment of the new metering system.	Tracking of informational sessions, individual meetings, news coverage and presentations

8.5 Key Message Components

To help our customers accept and engage in AMI capabilities, we have begun to develop concise, consistent messages regarding the benefits of grid modernization as part of MAP.

Customer point of view: Building a smart grid is going to enhance my lifestyle, my community, my environment and future generations.

Proposed Key Message Components:

1. How advanced meters and AMI work: Advanced meters are sometimes called “smart” because they allow for two-way communication. This means meters can talk to the utility and the utility can talk back so that operational, reliability and billing efficiencies can be realized. Eventually, these meters will allow customers to obtain timely information about their energy usage.
2. Information collected by advanced meters: AMI is designed to effectively and securely capture and transmit data. Information collected is used for power quality, outages and tampering and safety alerts, like overheating. This information will allow Ameren Illinois to troubleshoot and resolve problems with equipment or services, analyze rates and rate structures and suggest rate options that better match customer needs and energy use, and when requested, assist customers in managing their energy use. AMI meters collect information that is used in the daily operations of the utility and interval usage data is used to generate bills and assist with reducing, restoring and communicating outages.
3. Privacy of customer information – extensive security controls: Ameren Illinois is, and always has been, committed to safeguarding customer privacy. Advanced meters do not transmit customer account numbers, names or other personal identifying information. Data transmitted from advanced meters will be covered by the same rigorous privacy and security protections that are in place for other account information. Ameren Illinois treats personal information and other data about our customers as confidential, consistent with all legal and regulatory requirements. In addition, customers no longer will need to provide access to their property for meter reading since the meters will be read remotely.
4. Identify key features and benefits of AMI: An advanced meter can alert Ameren Illinois when there is an outage, meaning the customer will no longer need to report the outage. For customers who depend on life-saving medical equipment, this means added peace of mind. Customers who are moving to a new home and want to establish electric service will no longer need to wait for a utility worker to physically turn on the service. An advanced meter reduces the incidences of estimated billing, ensuring the most accurate bill is delivered each month. In time, customers also will be able to access their usage

information for greater awareness, billing inquiries and to take advantage of special pricing structures that could help them save money.

5. Energy efficiency advantages: In time, the meters will enable customers to learn how they are currently using energy and how they can use less to spend less.
6. Health and safety impacts/concerns: Like all commercially available telecommunication equipment, advanced meters are required to meet Federal Communications Commission (FCC) limits. Ameren Illinois has reviewed independent lab results demonstrating that advanced meters meet or exceed FCC limits. Common household items like cell phones, microwave ovens, baby monitors, cordless telephones and Wi-Fi routers emit much more radio frequency (RF) than advanced meters which only transmit for a few seconds every hour for a total of no more than two minutes per day.
7. Power quality and reliability benefits of AMI: AMI will help pinpoint and resolve potential and current problem areas in the grid without having to send crews to a location to investigate. This provides more efficient use of resources and reduces the amount of fuel used and carbon emissions emitted from trucks. If crews are necessary, AMI provides information regarding the tools, equipment and resources needed to fix the problem. AMI will enable the ability to identify equipment that may not be operating at its full potential for repair or replacement before it fails. In the event of an outage, power can potentially be rerouted around the problem area, allowing for faster restoration times during outages. AMI helps measure power quality at the point of use so that too much or too little voltage is not delivered to businesses and residences which could damage electric equipment or appliances in the home or business. This will also reduce the amount of “line loss” that is experienced ... energy waste resulting when electrical energy is transmitted across power lines.
8. How Ameren Illinois uses data collected from AMI: Ameren Illinois will use the data collected through AMI to bill customers for energy services, troubleshoot and resolve problems with equipment or services, analyze rates and rate structures and suggest rate options that better match customer needs and energy use and, when requested, assist customers in managing their energy use.
9. Cyber-security concerns: Ensure AMI is secure. As the technology is deployed, Ameren Illinois will closely adhere to our own stringent standards regarding cyber security. We will also reference the standards set forth by the US Department of Energy (DOE) and National Institute of Technology and Standards (NIST). The radio signals and data that pass through the smart grid system will be protected and secured through the implementation of the most current and stringent cyber security standards. The network data security, in addition to strict Ameren Illinois customer privacy policies, will ensure customer privacy.
10. What will happen during the installation of the AMI meter: The customer will receive a letter or other direct information from Ameren Illinois approximately 4 weeks prior to the install. This information will announce the timeline and provide an overview of the current and future benefits of AMI. On the day of the meter switch, the installer will do a courtesy knock on the door; explain the work to be performed and inform the homeowner that a brief power outage will occur that may result in the need to reset clocks and electronic equipment. When the work is complete, the installer will leave a door hanger at the home explaining the procedure that took place, iterating the benefits of the meter and communicating any further action needed by the homeowner.

8.5 Stakeholders

Ameren Illinois AMI deployment will require communication and engagement with a variety of stakeholders, and those stakeholders often have different reasons for the type and degree of information they require based on what matters to them.

We categorize these stakeholders in the groups below and aim to articulate what information they would find valuable as well as a level of engagement that we would expect this group to have with Ameren Illinois. We

base this on the benchmarking study as well as our own experience with these stakeholder groups through the AMR deployment. We split these stakeholders into three groups (Customers, External Stakeholders and Internal Stakeholders).

Stakeholder Type	Rationale/Approach	Level of Expected Engagement
CUSTOMERS		
Consumers of energy	Includes not only residential and non-residential customers of record, but families, co-workers and others who use energy.	Medium
AMI customers	Residential and non-residential customers who have been identified to receive the new meter and whom we will engage directly before, during and after the meter installation.	Medium
EXTERNAL STAKEHOLDERS		
Regulators	Regulatory stakeholders will be monitoring our project closely and will want scheduled and ad-hoc status and progress reports on the deployment.	Medium/High
Local government officials/staff	Stakeholders in a variety of roles within townships and municipalities where we will be installing AMI, RF equipment and meters. They need to know the particulars of the project for safety, security and constituent communications.	Medium/High
Educational institutions (UIUC, UIS, Bradley, SIU, WIU, EIU, ISU, Millikin, Illinois Wesleyan, Augustana, the Junior College network, etc.)	Stakeholders who have (or could have) research and/or educational stake in energy projects, particularly in smart grid areas. Would act as both a communication/education conduit but also as a supporter of the effort to upgrade the electric grid and emerging customer-facing technologies.	Low/Medium
Economic Development organizations and Chambers of Commerce	Stakeholders who have responsibility to promote areas within the Ameren Illinois service territory as opportunities for economic development initiatives. Their interests lie in enhancing the infrastructure in these areas to attract and retain businesses and economic activity.	Low/Medium
Business/corporate communities	Like the economic development stakeholders, business communities are interested in attracting and retaining commerce, resources and talent in their	Low/Medium

	communities.	
Third Party Service Providers (ARES, aggregators, technology providers, energy service providers, etc.)	Since third parties will provide customers with much of the new services and technologies made possible by AMI, it is very important that these entities be kept informed and involved.	Medium
Consumer Organizations (CUB, ELPC, AARP, Sierra Club, etc.)	Consumer organizations are important stakeholders which have been actively engaged in the AMI discussion. Maintaining open lines of communication is key.	Medium
Civic and Opinion leaders and advocates (Rotary, Kiwanis, VFW, etc.)	Civic and opinion leaders have an opportunity to share and communicate information about AMI with their members/constituents.	Low
Legislators	Legislators will be monitoring the project to ensure that the commitments of SB1652 are met and constituent questions answered.	Medium/High
Religious Affiliations/Clergy	We will engage these organizations and individuals as appropriate throughout the deployment.	Medium/Low
Metro and Community News Media (Broadcast, Cable, Print and Internet)	The various news media stakeholders from all channels will need to be engaged in communication and educated on project impacts, benefits, status, progress, etc.	Medium/High
INTERNAL STAKEHOLDERS		
Ameren Illinois co-workers, retirees, vendors, etc.	Ameren Illinois co-workers present an opportunity to educate and engage on the overall benefits, timeline and available tools resulting from the project. While they will be effectively communicated to regarding how this project might change their roles and responsibilities with the company, they have the opportunity to share the resulting benefits, tools and impacts of the project with their friends, family, neighbors and fellow parishioners, volunteers and communities.	Medium/High

8.6 Customer Segmentation

While Ameren Illinois has a foundation of robust customer segmentation data that can be leveraged to model AMI adoption and customer behaviors, we will couple this baseline information from our service territory with research that has been recently completed by the Smart Grid Customer Collaborative (SGCC). The SGCC is a multidisciplinary organization made up of utilities, vendors, consultants, researchers and other interested stakeholders created so these groups could share research, best practices and resources to provide value to its members and other interested parties.

The specific research that we reference below is from the document titled “CONSUMER PULSE RESEARCH PROGRAM–WAVE 1”, dated September, 2011. It is important to note that these are aggregated segments from research performed nationwide and not attributable directly to Ameren’s service territory.

This behavioral segmentation will enable more targeted messaging when and where appropriate. These segments represent “five distinct population groups that are defined holistically: they are different in terms of their lifestyles, attitudes, values, behaviors, motivations, technology adoption, communications preferences, etc.” The opportunities to educate and engage these customers are described below:

Segment	Defining Statement	Demographics	Opportunities to Engage
Easy Street	“We can afford to pay for electricity. The cost isn’t that much, on our budget.”	<ul style="list-style-type: none"> • High levels of education • Highest income of any segment – 28% above \$100K • Middle aged, moderate–liberal politics • Fairly diverse: 15% Hispanic, 13% African American 	<ul style="list-style-type: none"> • Easy Street customers are unlikely to exhibit a high level of engagement with energy management. Simplicity and ease-of-use are keys to acceptance. • Messaging should emphasize environmental benefits and stewardship for future generations.
DIY & Save	“Energy efficiency and smart grid programs sound appealing, because they would help us save money.”	<ul style="list-style-type: none"> • Middle-income • Families; 20% have three or more children at home • Diverse range of ages from 25-65+ • Largely White, 12% Hispanic • Average levels of education • Conservative politics 	<ul style="list-style-type: none"> • Product, program design and messaging should emphasize saving money and de-emphasize environmental benefits. • There are opportunities to market products and programs that leverage their DIY interest and experience. • Consider outreach through faith-based affiliations and communities.
Concerned Greens	“Smart grid and smart meters will help protect	<ul style="list-style-type: none"> • Highest levels of education • High income –23% 	<ul style="list-style-type: none"> • Segment is receptive to environmental concerns and tries to protect the environment through their own actions.

	the environment.”	<ul style="list-style-type: none"> above \$100K Moderate/liberal politics Middle aged (65% are between 25-54) More women than men Largely White, 14% Hispanic 	<ul style="list-style-type: none"> This segment is the most naturally inclined toward participating in energy efficiency and smart grid programs. Like new technology and have the resources to make investments in better energy management.
Young America	“We wish someone would tell us how smart grid can help us save money and help the environment.”	<ul style="list-style-type: none"> Youngest and most ethnically diverse segment Lowest levels of education and income Least likely to have kids under 18 at home Likely to live in apartments/condos/ mobile homes 	<ul style="list-style-type: none"> The primary focus in communication with this segment should be education. They are concerned about environmental issues and face financial constraints - let them know how smart grid products and programs can help address both issues. May be considered a longer term developmental opportunity as they mature and become more likely to be homeowners.
Traditionals	“Frankly, we’re not at all sure smart grid is needed.”	<ul style="list-style-type: none"> Predominantly older (25% are age 65+) The most politically conservative and religious segment Relatively low levels of education Average income More men than women Mostly white 	<ul style="list-style-type: none"> Program/product design and promotion for this segment should emphasize immediate money savings. Messaging may also communicate that energy efficiency can contribute to having a comfortable home.

Understanding the needs of each customer segment will help focus and tailor messages and solutions to deliver the most effective education about AMI and efficient implementation of consumer awareness programs. In addition, segmentation will identify customers with a higher propensity to engage in energy use changes or technology that achieves energy saving goals.

Further research and/or customer segmentation may be engaged using customer analytics to identify the likelihood of specific residential customer segments or propensity to take a certain action.

8.7 Communication Vehicles and Channels

There are a variety of communication avenues available to help educate stakeholders about the benefits of AMI. As a part of this communication plan, Ameren Illinois will produce a range of messages delivered through a variety of available vehicles and channels for the purposes of general awareness and education, addressing issues and concerns, communicating timing, methods and impacts of the AMI deployment, and promoting available programs. The phases of the communication plan described in the next section drive which communication vehicles or channels are selected to inform and educate consumers as well as what messages are delivered. These communication vehicles and channels may include:

Customer Communications

Vehicles/Collateral	Description
Frequently Asked Questions (FAQ)	A document that outlines questions and associated answers stakeholders might ask once they become aware of the AMI program. Will be a living document that will improve over time as more is learned.
Scripting for Customer Service Representatives (CSRs)	CSR and Field teams will be equipped with scripts and message points to make customers aware and to provide details of the deployment and programs for inquiring customers. This vehicle could also be used as a prompting to ask customers if they are aware of the project should they call around the time of their installation (if information is available).
Leveraging earned media news releases and news media advisories	Through the traditional and established communications mix, news releases and news media advisories will allow Ameren Illinois to communicate benefits, associated milestones and status/progress of deployment.
Bill Messaging/Inserts	Information placed on bills to raise awareness on benefits and impacts and pointing customers to more information (website, newsletter, phone number, etc.)
Customer Newsletter (Facts On Energy)	The newsletter will be used to provide regular updates on the project, its benefits, impacts and to share customer testimonials, etc. The newsletter offers an opportunity to share what customers can expect during deployment as well specific scenarios of how they will benefit from AMI.
Advertising (print, radio, TV, digital, billboards, etc.)	Targeted advertising in areas may be considered to raise awareness of the deployment and to reach large customer segments.

<p>Dedicated web pages that include fact sheets, contact information, programs, FAQs</p>	<p>Web pages will be created and managed to supply specific information for customers around the benefits of AMI as well as the details of the project. These pages could also provide links to other information such as FAQ's, demonstration videos, external research, customer testimonials, and possibly an interactive map showing deployment timeframes. Once PTR rates and the customer portal are available, information regarding those will also be available.</p>
<p>Videos demonstrating:</p> <ul style="list-style-type: none"> • installation process • how the “AMI system” works/meter accuracy • how to access and use information available to the customer via a web portal • other “tools” available on the market to supplement customer energy management 	<p>Videos may be created to show customers what they can expect during installation as well as understand how the system works for greater awareness and education. Once it becomes available, more information can be displayed in this vehicle about the customer portal as well as the PTR rates and other tools that may exist in the future.</p>
<p>Deployment communications</p> <ul style="list-style-type: none"> • direct mail • automated calling in advance of exchange • door “knock” • door hangers • “Welcome Kit” 	<p>While we will determine the most effective way to communicate with customers during deployment, we may employ the use of direct mail pieces and, possibly, automated calling to customers to make them aware of the pending installation. On the day of installation we will use a door knock to directly engage the customer to let them know of the installation and a post-installation door hanger (multiple for multi-unit dwellings) informing them of the installation and its benefits, where to go for questions and more details around enabling programs. Finally, we may find that in some areas of high engagement/propensity to participate in programs a “Welcome Kit” would help convert a higher percentage to participate in the customer portal and/or adopt specific rates.</p>

Flyer/wallet card	A wallet card could be used by co-workers and deployment teams to hand out to friends, customers, family, neighbors, etc. These cards would be limited to information about the benefits, but would point the customer to a place for more information (website, phone number, etc.). Deployment teams could use this card as a hand-out in the field should they get questions that they cannot answer directly or immediately.
Educational brochure(s)	A multi-faceted brochure would have a variety of different topics on it and could change/differ depending on deployment stage (awareness/education, deployment, engagement). This brochure could be used to hand-out at grassroots events, for municipalities/townships to have on hand in their facilities and in other public places like libraries, grocery stores, etc.

The illustrations below are design concepts of the types of communications collateral Ameren Illinois may create to share the story of AMI with our customers:

Door hanger left after install



Website page



Mobile unit of hands-on, interactive displays



External Stakeholder Communication

While some external stakeholders will take information as consumers of energy or impacted customers, we wish to educate them in different ways and with different media. External stakeholders require more detail around how AMI will impact their constituents, as well as any safety or security dependencies that require mitigation.

PowerPoint presentations for Community Relations Coordinators (and others)	This extension of the Speakers Bureau would allow trained communicators to share details of the project and its benefits with stakeholders. This could also be shared with end customers through external stakeholders in forums such as City Council meetings, Community Action Agency meetings, Rotary Meetings, Chamber of Commerce meetings, etc.
Informational Binders	Notebooks containing informational and educational pieces about AMI to be distributed to elected and municipal leaders for the purpose of helping them speak intelligently about AMI to their community audiences.
Legislative Updates	Formal or informal updates may be conducted as needed or as requested by Legislative members and leaders.
Regulatory Filings	Regulatory findings will provide updates and status related to the AMI deployment.
Interactive Displays	Interactive displays may be considered that allow for interactive engagement with audiences on how AMI works, its benefits and resulting functionality to customers. These could also serve as a “call to action” for customers to engage with rates and usage information.
Mobile Demonstrations	A mobile demonstration may be considered to visit customer deployment areas and engage with communities and their leaders and provide education.

Internal Stakeholders

In addition to what is listed above, Internal Stakeholders have several vehicles available to them to get information regarding the program including but not limited to:

Vehicle	Description
Intranet pages	A section on Scholar could be created to post information about the program as well as updates on project progress, co-worker testimonials, job postings related to the project, updates on milestones and commitment metrics, etc.
Internal Town Hall Meetings	In addition to the videos, project information could be shared at Town Hall meetings to further educate co-workers on how they can make a difference in promoting the project and educating their family, friends, and neighbors.
"Actions Matter" Co-Worker Video Segment	A segment in the internal videos shown at "town hall" meetings may include information about the project as well as up-to-date information on its progress and ways in which it is changing how Ameren Illinois interacts with its customers.
Ameren Journal	A quarterly newsletter sent to employees and retirees discussing key company initiatives.
Internal memos	Employees receive regular, weekly memos from executive leadership who share information on timely issues and initiatives.
Ambassador Programs	We may explore the concept of a formal ambassador program where interested co-workers volunteer for in-depth training on the AMI deployment and are available to assist with grassroots efforts (i.e., Neighborhood Associations, community festivals, booths at sponsored events, etc.)

8.8 Channels

Many different communications channels will be leveraged to ensure the message reaches the intended audiences. Some of these proposed channels are listed and detailed below:

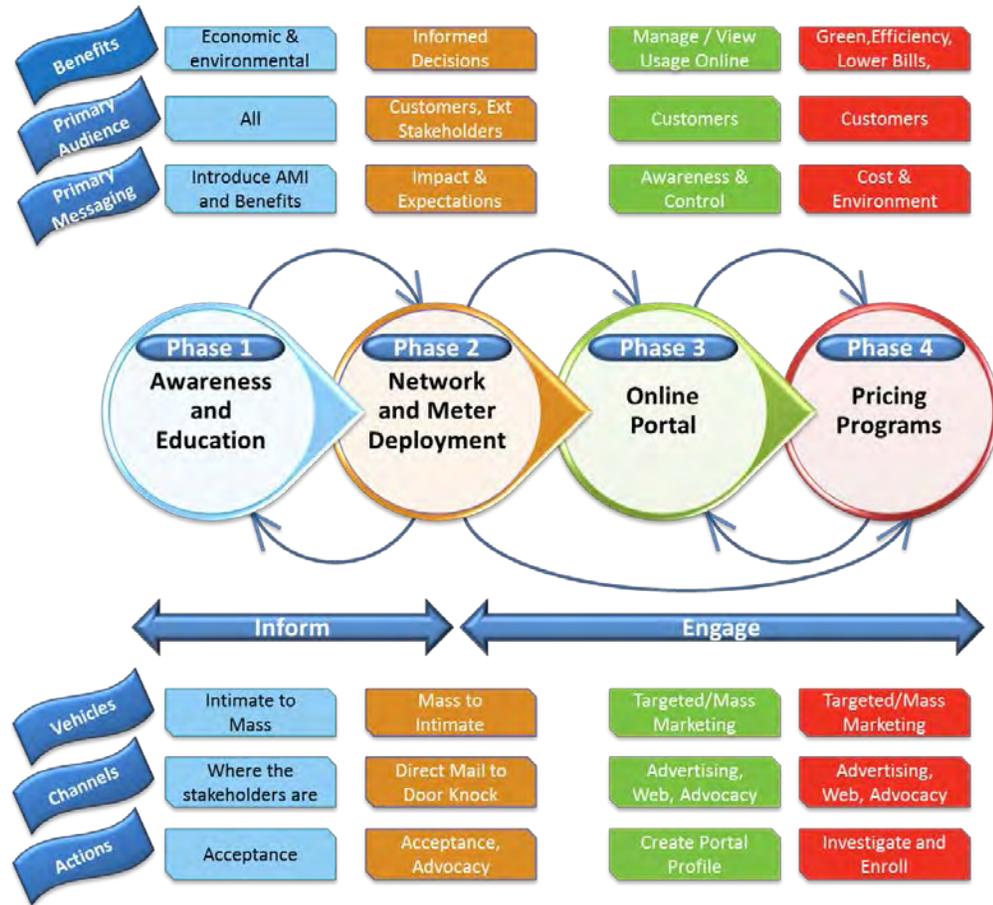
Channel	Description
AmerenIllinois.com or unique URL	Dedicated web pages providing complete information about the AMI project. Website will ultimately list planned MAP and AMI projects, a customer portal for accessing energy usage, etc.
Customer Service (Call Center)	Service representatives will be trained to respond to customer inquiries and concerns regarding the AMI project and will know where to refer customers for additional information.
Direct Mail	Personalized letters, postcards or other materials sent directly to impacted customers.
Email	Possible program that allows customers to sign up for email

	alerts regarding the AMI deployment.
Social Media (Twitter, YouTube, etc.)	Alerts and educational materials may be incorporated into an overall social media strategy for AMI.
Customer Portal	A website that may or may not be incorporated in AmerenIllinois.com that allows customers easy access to personal energy usage and signing on for future pricing programs that become available as a part of the AMI project.
Customer Forums	Customer forms could be employed in some areas to provide more detailed conversations with customers on the messaging, tactics and AMI deployment process. These forums would be professionally mediated and conducted in an organized, controlled and “roundtable” environment.
1:1 Meetings	1:1 Meetings will be held with stakeholders that wish to be briefed on the project separate from any public forum (i.e., City manager and staff, mayors, council, chamber of commerce meeting).
Public/private meetings	Meetings where information can be shared with constituents of an organization or in a public forum (Rotary meeting, University Board of Trustees meeting, city council meeting, etc.)
Community outreach to mayors, community action agencies, and senior citizen organizations	Proactive meetings to educate and engage these groups and address any special needs or concerns.
Community Events, Fairs, Festivals	In conjunction with regularly sponsored events, Ameren Illinois may feature the AMI deployment through educational and possible hands-on materials, displays and demonstrations.
Open Houses	Possible events sponsored by Ameren Illinois in communities scheduled for AMI deployment to provide overview of the project, education, information and possible hands-on activities.

8.9 Implementation Plan

The Consumer Education and Communication plan will consist of four phases. Throughout each phase, various degrees of emphasis will be placed on the eleven key components identified to achieve maximum benefit of grid modernization.

The graphic below depicts the stages and key themes of the benefits, audience, messaging, vehicles, channels and expected actions after each stage.



Phase 1 Customer Engagement: Global Early Awareness
Timing: Begins approximately 180 days prior to deployment in an area

Phase 1 will incorporate education of co-workers, local officials and consumers, educational institutions, civic leaders and opinion leaders of the benefits of grid modernization from a global perspective. It will encompass the many aspects of grid modernization and will include AMI as a part of the overall strategy to improve service to customers.

Engagement	Benefits	Conclusions	Actions
<ul style="list-style-type: none"> Connect the value of upgrading the grid Introduction to AMI and 	<ul style="list-style-type: none"> There are environmental and economic benefits of this project I will be able to make more informed decisions about: <ul style="list-style-type: none"> My impact on the environment 	<ul style="list-style-type: none"> I trust Ameren Illinois to make good decisions AMI is good for Illinois, 	<ul style="list-style-type: none"> Appreciate Ameren Illinois efforts Go to Ameren.com to get more information

<p>its benefits</p>	<ul style="list-style-type: none"> ○ Opportunities to save money/energy ○ Alternative power supply (renewables, etc.) ● My power will be more reliable (outages fewer and shorter in duration, improved power quality) 	<p>my community and my family</p> <ul style="list-style-type: none"> ● Due to a variety of factors, I will use energy differently in the future ● Improving the grid will help customers and Ameren manage this change ● Current meters don't have the functionality needed 	<p>and sign up for Customer/MAP Newsletter</p> <ul style="list-style-type: none"> ● Acceptance of improvements ● Support on-going grid modernization ● Take action in managing energy
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Messaging Components

<ul style="list-style-type: none"> ● How AMI works ● Information AMI collects and how it's used ● Customer Data Privacy 	<ul style="list-style-type: none"> ● Key features and current/future benefits of AMI ● AMI is safe and secure
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicle	Channels	Targeted Stakeholders
Co-worker presentations	Internal Town Hall Meetings	Internal (co-workers)
Informational Binders	1:1 Meetings	External (Municipalities, Business/corporate communities, Community Action Agencies, Civic and Opinion Leaders, Educational Institutions, Economic Development Communities)
PowerPoint Presentations	1:1 Meetings, Speakers Bureau's, Public/Private Meetings	External (Municipalities, Business/corporate communities, Community Action Agencies, Civic and Opinion Leaders, Educational Institutions, Economic Development Communities)

Ameren Exhibit. 2.1RH

Website Content	AmerenIllinois.com & Intranet (Scholar)	All
FAQ's	Ameren.com, Intranet, Community Outreach, Open Houses, etc.	All
"Actions Matter" Co-Worker Video Segment	Internal Town Hall Meetings, Intranet (Scholar)	Internal (co-workers)
Customer Service Scripting	Call Center/Customer Service	Affected Customers
News Releases & News Media Advisories	News Media	All
Customer Newsletter ("Facts on Energy")	Ameren.com, Intranet, Direct Mail, E-mail,	All
Educational Brochures	1:1 Meetings, Public/Private Meetings, Community Outreach,	Affected Customers and External
Bill Inserts/Messaging	Direct Mail (within bills)	Affected Customers
Legislative Briefings	Legislative Update Meetings (Scheduled and Ad Hoc)	External (Legislators)
Regulatory Filings (Scheduled)	Regulatory Process	External (Regulators)

Phase 2 Customer Engagement: Network and Meter Deployment
Timing: Begins 90 days prior to deployment in an area

Phase 2 will inform customers about the new AMI system in regions identified for deployment and will focus on the actual installation of new meters. This phase will be targeted to customers who will receive the new metering system and will inform them on what they can expect. Additional emphasis will be placed on the privacy of information and customer benefits.

Note: All vehicles, channels and stakeholder alignment activity continue from the Awareness and Education phase and are repeated through each specific deployment area for External Stakeholder and Customers.

Engagement	Benefits	Conclusion	Action
<ul style="list-style-type: none"> Localized rollout of communications to areas of AMI deployment 	<ul style="list-style-type: none"> I will be able to make more informed decisions about: <ul style="list-style-type: none"> My impact on the environment Opportunities to save money/energy Alternative power supply (renewables, etc.) 	<ul style="list-style-type: none"> AMI meters will help improve reliability AMI meters will improve customer service AMI meters are safe and secure AMI meters will eliminate estimated 	<ul style="list-style-type: none"> Acceptance of AMI Investigate products that allow me to take action in managing energy Support on-going grid modernization

Messaging Components

<ul style="list-style-type: none"> How AMI works What can I expect during deployment Information AMI collects and how it is used Customer Data Privacy 	<ul style="list-style-type: none"> Key Features and current/future benefits of AMI AMI is secure AMI is safe
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	Ameren.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
Deployment Collateral (Deployment)	Direct Mail, Automated calling, Door “Knock”	Affected Customers

Information, Door Hangers, "Welcome Kit")		
Flyer/wallet card	Face to face	Affected Customers
Brochures	Open Houses	All
Interactive Displays	Open Houses, Community Events, Other as identified	All
Mobile Demonstrations	Open Houses, Community Events, Other as identified	All

Phase 3 Customer Engagement: Online Energy Management

Timing: Once delivery of online capability is more clearly anticipated (projected Q4 2014)

Phase 3 will focus on those customers who have AMI installed to inform them about the energy web portal available to them online. With this tool, customers can become better educated about their energy usage and the information available to them which will allow them to make informed decisions regarding their energy usage and lifestyle changes they may choose to make to begin using energy differently.

Engagement	Benefits	Conclusions	Actions
<ul style="list-style-type: none"> Data generated by meters help customers to understand and modify their energy consumption 	<ul style="list-style-type: none"> I can make more informed decisions about: <ul style="list-style-type: none"> How to lower my bill Alternative power supply Appliances I use/buy Rate options 	<ul style="list-style-type: none"> Due to a variety of factors, I will use energy differently in the future AMI meters give me more information if I want it when I want it 	<ul style="list-style-type: none"> Regularly visit the online energy manager portal Investigate products that allow me to take action in managing energy Support on-going grid modernization

Messaging Components

<ul style="list-style-type: none"> How AMI works Customer Data Privacy Information AMI collects and how it is used Key Features and current/future benefits of AMI 	<ul style="list-style-type: none"> AMI is secure How consumers can use AMI information to become more energy efficient and lower their energy bills
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Possible Vehicles, Channel and Stakeholder Alignment		
Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	AmerenIllinois.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
News Media	Earned media around positive customer testimonials, social networking, etc.	All
Website Content	AmerenIllinois.com & Intranet (Scholar)	All
Newsletter content	Direct Mail, E-Mail, Social Media	All

Phase 4 Customer Engagement: Smart Energy Pricing Programs
Timing: Once delivery of Pricing Programs are more clearly anticipated (projected mid-2015)

Phase 4 will contain information specific to pricing programs developed and how customers can take advantage of them. This phase will be developed in cooperation with the Smart Grid Advisory Council, the body responsible for establishing an Illinois Science and Energy Trust for the purpose of providing consumer education regarding smart meters and related consumer-facing technologies and services and peak time programs. As recommended by the Smart Grid Advisory Council, this on-going phase will also be coordinated with other stakeholders and third party vendors and suppliers. This phase will continue throughout the lifespan of the AMI meters, evolving as new pricing programs and energy technologies and services are developed that benefit customers.

Engagement	Benefits	Conclusion	Action
<ul style="list-style-type: none"> New pricing structures (tariffs) that support behavior modification in energy use 	<ul style="list-style-type: none"> Lower electric bills More efficient utilization of the grid 	<ul style="list-style-type: none"> How people use energy is changing There are simple things I can do to manage how I use energy I like saving money on my energy bill I like teaching my family about how they can contribute 	<ul style="list-style-type: none"> Investigate pricing structures Support on-going grid modernization

Messaging Components

<ul style="list-style-type: none"> • How AMI works • Information AMI Collects • Customer Data Privacy • Key Features and Benefits of AMI 	<ul style="list-style-type: none"> • AMI is secure • How consumers can use AMI information to become more energy efficient and lower their energy bills • Future Benefits
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	AmerenIllinois.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
News Media	Earned media around positive customer testimonials, social networking, etc.	All
Website Content	AmerenIllinois.com & Intranet (Scholar)	All
Newsletter content	Direct Mail, E-Mail, Social Media	All

8.10 Customer and Stakeholder Issues Management Plan

Ameren Illinois intends to develop a comprehensive issue management plan that allows us to manage and appropriately respond to issues raised by customers or stakeholders. This function will cut across many organizations within Ameren Illinois (Customer Service, External Affairs, Regulatory, Technology, Executive and Senior Leadership Teams, etc.) and will require careful planning, coordination, enablement of technology and process changes within many of these teams.

Issues or concerns expressed by a stakeholder in a municipality or township would also be included and may necessitate a more rigorous process that might include executive intervention depending on the source and the issue.

A core focus will be ensuring a timely and appropriate response to the issue in a manner that is appropriate for the source of the issue as well as the issue. Tracking of issue types, location, source, response and accountable co-workers will be important to ensure that we leverage the data and help identify trends. Ameren Illinois may need to reallocate resources if trends indicate particular areas that need attention.

8.11 Low Income & Assistance Programs

Ameren Illinois regularly assists customers who are facing hardship or are economically disadvantaged. As the AMI deployment gets underway, we wish to take special care to make sure these customers are aware of the deployment, that any concerns regarding health and privacy issues are alleviated and that they are aware of the benefits AMI will bring to them.

Like other customer segments, low-income customers will benefit from bills that are based on actual usage rather than estimated billing. The fact that they will not experience the over- or under-inflation of an estimated monthly bill will allow better budgeting. Because the advanced meters can alert Ameren Illinois when there is an outage and shorten the duration of the outage, these customers depending on life-saving medical equipment will have peace of mind. In addition, the shortened outages may prevent loss of food stored in refrigerators and freezers.

Through the funds that we will provide to the Illinois Science & Energy Trust, Ameren Illinois would like to see educational efforts leveraged consistently across our service territory. We have found that working with communication action agencies, such as LIHEAP, has been extremely beneficial to the low-income population. It is possible that LIHEAP and other similar agencies could be provided communication tools, and perhaps, specialized training that would assist these customers in understanding their bills and learning how to modify behaviors to decrease their energy consumption.

Ameren Illinois plans to have several types of communications to all customers impacted by the AMI deployment. These communications will span from direct and personal letters or cards to grass roots events such as neighborhood association meetings, local festivals or municipal events. Because social agencies, and often faith-based organizations, are familiar to and trusted by the low-income audience, we may work specifically with these organizations to plan outreach events unique to these customers.

It is our intent to provide information in a timely and transparent manner, educating all customers about the complete benefits of AMI and their future options of pricing plans and technologies that will help them better manage their energy use.

8.12 Considerations

Throughout the course of the communication of grid modernization and AMI implementation various issues may arise which require additional communications. The communications team will remain in close contact with individuals responsible for information technology, labor, regulatory, organizational and others.

9. Smart Grid Interoperability and Cyber Security

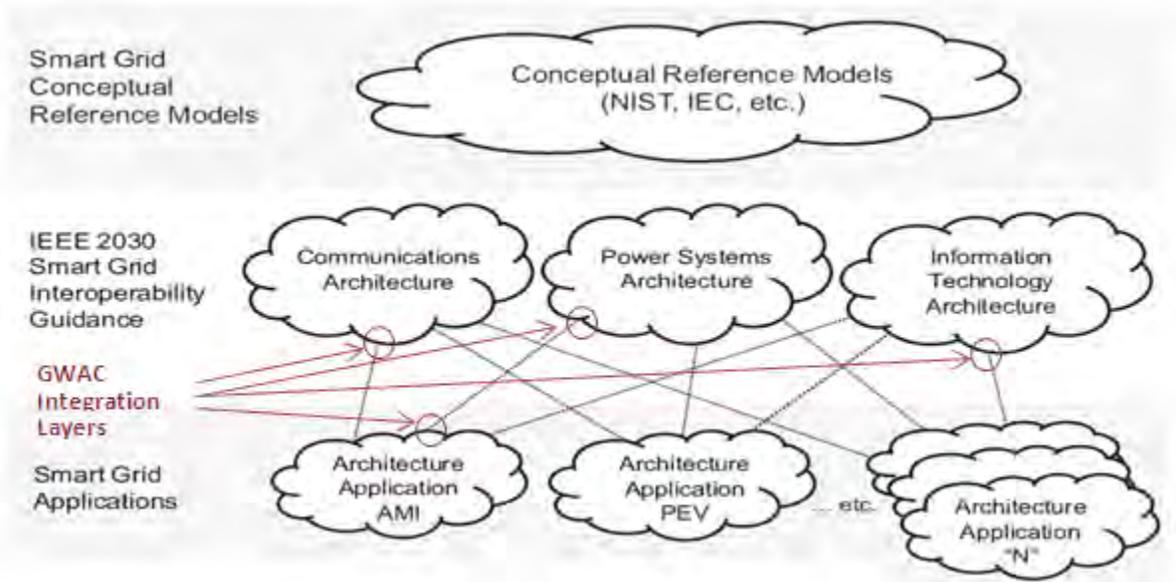
9.1 Interoperability

Ameren's approach to Smart Grid Interoperability shall follow the established frameworks defined by the National Institute of Standards and Technology (NIST) and further augmented by the work of the Institute of Electrical and Electronics Engineers (IEEE), the GridWise Architecture Council (GWAC) and of the Illinois Statewide Smart Grid Collaborative (ISSGC). These interoperability frameworks and guidelines together will provide Ameren the foundation to plan, design, build, test, deploy, maintain, and operate required Ameren Smart Grid systems and solutions across their asset lifecycle.

Frameworks describe conceptual reference models for discussing the characteristics, uses, behaviors, interfaces, and other elements of Smart Grid domains as well as the relationships among these elements both within and across these domains. The models are tools for identifying the standards and protocols needed to ensure interoperability and cyber security, and defining and developing architectures for systems and subsystems within the Smart Grid.

Because Smart Grid encompasses the integration of power, communications, and information technologies for an improved electric power infrastructure, Smart Grid interoperability must take into consideration the interconnected power system elements, overlaid with communications and information system technologies that together enable a modern and more intelligent power ecosystem. It is this integrated, automated approach that can allow productive options to both utility operators and customers to improve power system reliability, asset utilization, and efficiency, in a secure manner.

The figure below highlights the relationship of the above frameworks and guidelines used by Ameren to maximize interoperability across its Smart Grid investments.



Consistent with the NIST *Framework and Roadmap for Smart Grid Interoperability Standards* document, Interoperability is defined as the capability of two or more networks, systems, devices, applications, or components to externally exchange and readily use information securely and effectively. It is anticipated that Smart Grid will be a system of systems and network of networks. The systems and networks, to be interoperable, should share a common meaning of exchanged information that will elicit agreed-upon and expected responses. Smart Grid interoperability is usually associated with the following:

- Hardware/software components, systems, and platforms that enable communications to take place. This kind of interoperability is often centered on communication protocols and the infrastructure needed for those protocols to operate.
- Data formats, where messages transferred by communication protocols have a well-defined syntax and encoding schema.
- Interoperability on the content level so a common understanding of the meaning of the data can be exchanged.

Finally, these frameworks must not only provide the reliability, fidelity and security of the information exchanges between and among these Smart Grid systems, but must also achieve desired performance levels. To transition legacy systems and networks into more intelligent and secure electric power infrastructure, the standards-based smart grid approach will be used to promote and achieve interoperability.

9.1.1 Ameren Adopted Frameworks for Interoperability

As referenced above these frameworks help form a three-tiered approach to achieving interoperability. From the NIST conceptual model, appropriate Smart Grid domains are defined. From the IEEE 2030 standard, three interoperability perspectives are further captured from the views of the power system (and its components), the communications systems (and its components) and the information systems. Finally, the GWAC model or stack (similar to the Open Systems Interconnect – OSI model) defines the required layers of interaction of/between the domain actors, participants and their respective technology interfaces. These frameworks are described in more detail below.

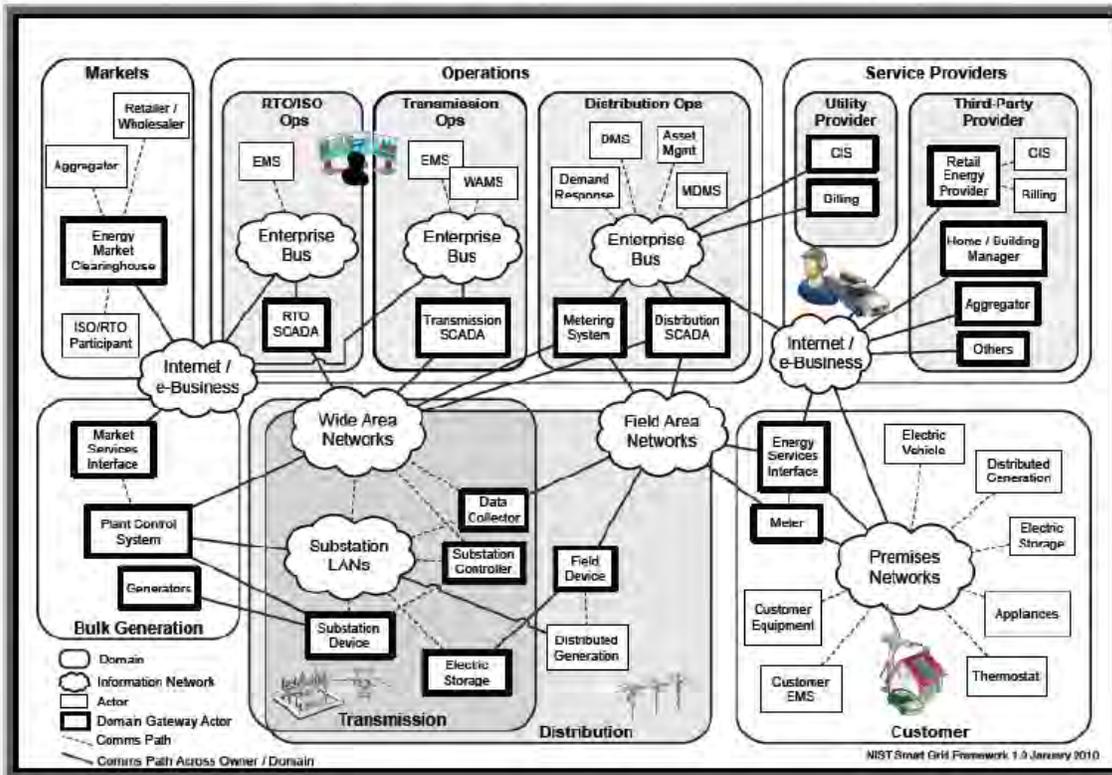
a. NIST Framework and Roadmap for Smart Grid Interoperability Standards

The NIST conceptual model provides a high-level, overarching perspective. It is not only a tool for identifying actors and possible communications paths in the Smart Grid, but also a useful way for identifying potential intra- and inter-domain interactions and potential applications and capabilities enabled by these interactions. The conceptual model is intended to aid in analysis and foster understanding of Smart Grid inter-operational intricacies of the Smart Grid implementation.

The conceptual model supports planning and organization of the diverse interconnected environments that will compose the Smart Grid. Seven Smart Grid domains are defined. Each domain (bulk generation, transmission, distribution, service providers, markets, control/operations, and customers) —and its sub-domains—encompass Smart Grid *actors* and *applications*. Actors include devices, systems, or programs that make decisions and exchange information necessary for performing applications. Applications are tasks performed by one or more actors within a domain. The NIST conceptual reference model is shown below in Figure 1.

Figure 1

Conceptual Reference Diagram for Smart Grid Information Networks.



b. IEEE Interoperability Reference Perspectives

Once the respective domains and corresponding actors and participants are identified, the IEEE 2030 perspectives are applied. As previously mentioned, the Smart Grid encompasses the integration of power, communications, and information technologies for an improved electric power infrastructure. The IEEE 2030 reference model is a conceptual representation of the smart grid architecture from three perspectives: 1) power systems; 2) communications; and 3) information technology. It presents a set of labeled diagrams that offer standards-based architectural directions for the integration of energy systems with communications and information technology infrastructures that will define the evolving Smart Grid.

A summary of the three perspectives follows:

- *Power systems*: The emphasis of the power system perspective is the production, delivery, and consumption of electric energy including apparatus, applications, and operational concepts. This perspective defines seven domains (consistent with NIST) common to all three perspectives.
- *Communications technology*: The emphasis of the communications technology perspective is communication connectivity among systems, devices, and applications in the context of the Smart Grid and its various domains. The perspective includes communication networks, media, protocols and performance.
- *Information technology*: The emphasis of the information technology perspective is the control of processes and data management flow. The perspective includes technologies that store, process, manage, validate, and control the secure information data flow. Access and integrity controls safeguard data at rest and in use. Information technologies take data from the power systems infrastructure and transform it into business and operational intelligence.

c. GridWise Architecture Council (GWAC) Stack

Once the domains, actors, participants and architecture perspectives are defined, the appropriate layers of the GWAC Stack are defined. Large, integrated, complex systems require different layers of interoperability. To address these layers, Ameren has adopted the “GWAC stack” model, which is comprised of eight vertical cross-layers of interoperation necessary to enable various interactions and transactions on the Smart Grid. Very simple functionality—such as the physical equipment layer and software for encoding and transmitting data—might be confined to the lowest layers. Communication protocols and applications reside on higher levels with the top levels reserved for business functionality. As functions and capabilities increase in complexity and sophistication, more layers of the GWAC stack are required to interoperate so the desired results can be achieved. Each layer typically depends upon—and is enabled by—the layers below it.

The most important feature of the GWAC stack is that the layers define well-known interfaces, establishing interoperability at one layer that can enable flexibility at other layers. To maximize interoperability Ameren examines all applicable layers for each Smart Grid integration ‘point of interest’ or interface. As shown below Figure 2, the eight layers are divided among three “drivers,” each requiring a different level of interoperability:

Technical: Emphasizes the data structures, message exchanges and physical and logical connections across systems and networks.

Informational: Emphasizes the semantic aspects of interoperation, focusing on what information is exchanged and its meaning.

Organizational: Emphasizes the pragmatic (business and policy) aspects of interoperation, especially those pertaining to the management of electricity.



The GridWise Architecture Council’s eight-layer stack provides a context for determining Smart Grid interoperability requirements and defining exchanges of information.

Figure 2

9.1.2 Key Smart Grid Interoperability Design Issues

Once the appropriate domains, actors, participants, perspectives, and layers are identified, functional and non-functional design issues and requirements must be incorporated. These design issues are brought forward from the work associated with the ISSGC. To drive interoperability into products, systems and solutions, several Smart Grid design issues will be evaluated and defined across the required ‘points of interest’ or interfaces within and between actors and applications of the Smart Grid domains. Some of these design elements, more than others, encourage greater interoperability, or are enabled by greater interoperability. In particular, the issues of Technical Maturity and Risk, Openness and Standardization, Manageability, and Upgradeability are very closely correlated with interoperability. To the maximum extent possible and consistent with Ameren’s cyber security practices, the design shall be consistent with the standards of the NIST for Smart Grid interoperability and shall include open standards and internet protocols, as applicable. Ameren will define and incorporate the following design requirements/characteristics into its Smart Grid project lifecycle programs resulting in solution evaluations and selections that will maximize interoperability.

- a. **Capacity** - Capacity is the ability of a communications link to carry data, also known as bandwidth. The requirements for capacity are primarily determined by three factors, as defined in Table 1.

Table 1 – Factors Affecting Communications Capacity

Factor	Definition
Latency	The maximum time that a single message can travel in one/either direction and still successfully implement the application. Expressed in seconds or sub-seconds.
Data Volume	The typical size of messages required by the application, or the total amount of data (measured within an appropriate length of time) required to operate it. Expressed in Bytes. (Ideally, high-volume traffic such as firmware updates should not affect the normal operation of the system. This factor is related to Scalability).Data volume also needs to be defined as X bytes per Y seconds or so.
Event Rate	The rate at which messages (polls, requests, queries, responses, reports, files, etc.) must be transmitted in order for successful application operation. Expressed in events per block of time.

- b. **Technical Maturity and Risk** - The degree to which the solution is well-understood by those who must implement it within the industry. This is the level of certainty that the technology will meet the requirements of the application.

Technology may be in various states and ideally should be selected based upon the following preferred order of maturity:

- Considered best practice
- Considered standard practice
- Used only in pilot projects
- Becoming obsolete *
- Currently only academic research *

* Note that greater maturity is not always better. The technology may be so mature that it is obsolete and, therefore, more risky to implement. For Smart Grid technology deployments, Ameren would not choose any technology that falls into the latter two categories/states listed above.

There is a variety of methods that could be used to address this design issue, for example: solution evolution paths, alternate choices, standard interfaces, swappable equipment, stored replacement parts, and/or service level agreements. Ameren will evaluate the maturity of the Smart Grid solutions based upon, but not limited to, the following factors:

- Product/application past, current and future roadmap.
- Growth of product/application features and functionality.
- Vendor/Manufacturers commitment to ongoing product research and development (R&D).
- Extensive use of the product or service in multiple utility production environments that address and demonstrate its interoperability across a diversity of requirements.
- Adherence to the current guidelines and standards listed in this document and deemed relevant by the industry forums to include NIST and Smart Grid Interoperability Panel (SGIP).

c. Openness and Standardization - Openness is the degree to which it must be easy to obtain the technology used to implement the application. Openness reduces barriers for new vendors to enter the market and encourages choice and competition. Open technologies have few or no royalties or license fees.

Standardization is the degree to which the technologies used to implement the application must be recognized by official organizations and the user community. It is important that smart grid components:

- Share a standardized information model across the system.
- Separate the information model from how data are transmitted so that new technologies can be used in the future.

d. Security, Risk, and Compliance – The processes and protections in which intentional and unintentional risks to the data, equipment, persons and organizations involved are managed so that mission objectives are met. Critical security requirements must be defined for:

- Security (e.g., Availability, Confidentiality, Integrity, Authentication, Non-repudiation, etc.)
- Safety
- Cost
- Schedule
- Reputation
- Legal and Regulatory Compliance
- Privacy

Note: Ameren’s cyber security approach and methodologies are discussed in further detail in the Cyber security section below.

e. Manageability – This is the degree to which devices, systems, and data must be configured, synchronized, tracked, diagnosed and/or maintained. It includes the ability to measure the health and the performance of the system. Ideally all these tasks can be performed remotely on field devices in a Smart Grid system without field dispatch. Use of Simple Network Management Protocol (SNMP) standard Management Information Base (MIBs) for Smart Grid solutions is recommended where applicable. Where additional value is gained, deploying vendor-specific network management systems (NMS) to enhance the operational visibility of the smart grid product/applications is acceptable if economically proven and feasible.

f. Upgradeability – This is the degree to which the devices and systems that implement the application can be changed to adapt to future conditions. Except for hardware, field devices should be upgradeable without sending personnel to the site. Upgradeability is critical to minimize the risk of stranded assets. It is related to Technical Maturity and Risk. It indicates how much an upgrade of the system would cost, and whether it is possible at all. Upgradeability includes the degree to which the system remains backward-compatible with older systems, and to which it can accommodate alternate technologies. This design issue should address upgrades and changes for:

- Hardware and software
- Electronically stored information such as firmware, configuration parameters, algorithms, or security credentials
- Connectivity
- Communications technologies

- g. Scalability** – This is the degree to which the system implementing this application will permit future expansion. Ideally a Smart Grid deployment would have no fixed limits on growth. Rather, it would consist of modular components that could be added over time to accommodate growth without the replacement or abandonment of existing system elements.
- h. Reliability** - The degree to which the solution can automatically recover from power, communications and component failures, in order to minimize the impact to the customer, the utility and the system. Ideally, any Smart Grid system should:
 - Automatically re-route communications messages
 - Coordinate recovery over a wide geographical area
 - Limit the area of impact of failures
 - As a default state, provide a known, safe and recoverable condition whenever power, communications, or control is lost.

Reliability also includes the availability of communications links in the face of failures or high traffic conditions, and ensuring that critical messages are received within their latency requirements. Some solutions to this issue may involve redundant message paths, distributed servers and services, and battery backup capabilities. Appropriate reliability design considerations shall be economically incorporated based upon the business continuity objectives of the Smart Grid application, service, and infrastructures.

Defining the functional and non-functional design requirements for each of the GWAC (OSI) interoperability layers, at each interface (or ‘point of interest’) across the NIST domains from the appropriate IEEE perspectives, drives interoperability deep into Smart Grid solutions.

9.1.3 Standards for Smart Grid Interoperability

As referenced above, standards are critical to enabling interoperable systems and components. Mature, robust standards are the foundation of mass markets for the millions of components that will have a role in the future Smart Grid. They also enable consistency in systems management and maintenance over the life cycles of components and system solutions. There are a variety of proprietary, industry, national, and international standards that are available and applicable to Smart Grid applications. Ameren recognizes and recommends the use of open technologies over proprietary ones, and recommends the use of officially recognized and standardized technologies over those that are not. It is clear that sound interoperability standards are needed to ensure that sizable public and private sector technology investments are not stranded.

Ameren continues to follow the NIST interoperability standards development efforts. As seen from its reference above, the NIST Smart Grid Interoperability Standards Framework is used to guide Ameren’s approaches for Smart Grid initiatives. Ameren will specify, as applicable and practical, standards that are included in this framework and included in the related SGIP Catalog of Standards (CoS) for Smart Grid enabled technologies and application solution suites. Ameren will significantly favor vendor products and solutions during the evaluation processes that support these standards. Examples of standards that Ameren will require are provided below (Table 2) for a sampled representation of their respective domains in which they are applicable.

**Table 2
Representative Examples of Relevant Interoperability Standards by Sample NIST Domains**

Smart Grid Domain	Sample of Relevant Interoperability Standards
Customer	C.12 Suite; ZigBee SE 2.0; HomePlug; OpenHAN; OpenADR
Distribution	DNP3; IEC 61850
Transmission	C37.118; IEC 61850;
Bulk Generation	IEEE 1547; IEC 61850;
Operations	IEC 60870-6/TASE 2 (ICCP); IEC 61850; IEC61968

Moreover, while standards are necessary for achieving interoperability, they are not entirely sufficient. A conformance testing and certification (CTC) regime is essential. NIST, in consultation with industry, government, and other stakeholders, has started work to develop an overall framework for conformance testing and certification and plans to initiate steps toward implementation. Ameren supports and recommends products that meet these interoperability testing requirements as well. This will be an additional evaluation criteria used by Ameren for product evaluation and selection.

9.2 Cyber Security

Risk Management

Ameren's risk management program is sponsored by senior management who maintains ownership and responsibility for the Ameren risk management program. All Smart Grid related systems including those proposed to comply with the Illinois Public Acts 97-616 and 97-646 will be covered and therefore protected by this risk management program. As necessary the risk management program is reviewed by the Information Security group and senior risk management on an annual basis.

a. Summary of Cyber security Risks & Mitigation Strategies During Solution Lifecycle

Ameren's security practices are designed to ensure operational needs are met, and availability, confidentiality, and integrity are realized in their systems. Ameren's cyber security plan details the functions and properties its live systems include. Security is designed from the start, not bolted on and will address regulatory requirements, interoperability, project schedule, project financials, and reputation of Ameren. Additionally, security design will manage the various threats, attacks, unintentional incidents, and risks associated with the system and environment in which the system is deployed. Cyber security is included as a primary component of the system plan, design, build, test, deploy, and operate phases. The goals of Ameren's security processes are to implement appropriate security measures to ensure our systems, processes, and people can:

- Maintain the safety of employees and the public
- Maintain control of the systems
- Respond to disruptions caused by sabotage
- Respond to disruptions caused by natural events
- Resist attacks
- Manage risk
- Protect Ameren data and systems
- Protect customer data
- Meet the business needs
- Provide evidence that requirements are met
- Be trained and aware of threats to Ameren systems
- Have processes in place for change control and configuration management
- Control access
- Have rules in place for exceptions and risk mitigation
- Establish leadership and governance
- Log, monitor, and notify

Ameren's risk assessment methodology is followed when addressing and mitigating cyber vulnerabilities and are based on industry best practices, such as NIST 800-39.

Risk Strategy and planning includes the alignment of risk planning, risk objectives, risk resources, corporate policies, and tools. Ameren then evaluates the risk, which includes identification of threats, assessing the probability, evaluating the impacts, and selecting a mitigation strategy. Ameren then prioritizes the risks and implements the mitigations strategies for these risks. Risks are reviewed, monitored, and communicated to key parties.

In addition to scheduled risk management assessments, risk assessments also occur as part of process lifecycles. Risks are reviewed as part of Incident Management, Project Management, and vendor due diligence, Business Continuity and Disaster Recovery processes. Ameren's cyber security risk is incorporated into the Business Risk Management program.

Different assets quantify and qualify the risks, threats, and vulnerabilities associated with the asset. This assessment includes all elements associated with the asset, including (but not limited to) people, policies, procedures, platforms (hardware and software) and networks. Technical assessments also evaluate the application or components' ability to be updated to meet future cyber security requirements and standards. Finally, steps are identified and implemented to manage the risk to the asset, using the appropriate technology, processes, or controls. Managing the risk may include actions such as two-factor identification, physical isolation of the asset, increased monitoring of the asset, etc.

The methodology is applied to all new systems, interfaces, processes, and devices to be placed into production. Ameren has an established software and security development lifecycle methodology based on NIST SP800-64 which is administered by our Information Technology Project Management Office (PMO). Ameren has embedded Information Security (IS) and their processes into its project methodology to ensure that cyber security issues are fully addressed throughout the project lifecycle. Information Security control checkpoints are set at the end of the plan, design, and build/test phases to ensure that appropriate security assessments and requirements have been met. The project cannot continue without Information Security approval at these checkpoints.

Ameren's Information Security group has developed cyber security checklists, based upon applicable regulations and standards, and uses them during the project lifecycle to gather information on the proposed technologies and processes. This information is then used to assess the risks/vulnerabilities and then to establish a plan to manage the risks and vulnerabilities. Checklist topics include:

- Authentication, Access Control, and Audit
- Change Management Process for Applying Patches and Upgrades
- Process for System Hardening (i.e., Fine Tuning the Security Controls)
- Account Management
- Protocols and Communications
- Procedures for Computer Incident Response Team - Security Breaches
- Documented Business Continuity and Disaster Recovery Plan
- Acceptable Use Policy
- Data Classification and Management
- Data Life Cycle
- Regulatory Compliance
- Vendor Management, Contracts, and Support

b. Summary of Cyber security Criteria Utilized for Vendor and Device Evaluation.

Ameren uses the same processes described in the sections above for vendor and device evaluation. The security requirements listed below were determined by Ameren to be relevant in all Smart Grid security evaluations and are a subset of requirements listed in NISTIR 7628. All vendors are required to provide solutions that meet the minimum security requirements listed below:

- Prove the system or application has not been compromised with malicious software. The proposed solution must provide a centrally managed capability to prove the firmware / software in use is and always has been the same approved version.
- Guarantee only explicitly approved devices and users are allowed to participate within the defined system or architecture. The system or application must support a native capability to authenticate and authorize field devices and system users utilizing third party authentication. Systems such as TACACS, RADIUS, LDAP, or Active Directory are preferred.
- Devices that are not secured in a controlled facility, local tamper detection via FIPS 140-Level 2 is required. Physical tamper detection will save time and money by providing the ability to easily identify signs of tampering without requiring physical removal of the device.

- Confidentiality must be guaranteed in any areas where Ameren proprietary data and information or employee or customer Personally Identifiable Information (PII) is transmitted across logical interfaces identified in NISTIR 7628-Vol 1. To generate assurances that the data has remained confidential Ameren requires the ability to encrypt data in-flight via FIPS 140 approved encryption mechanisms with a 128 bit minimum encryption.
- Centralized key and certificate management to enable the ability to manage the keys used for all systems and users through the infrastructure without requiring a field visit. If a certificate becomes compromised or policy changes dictate revocation or generation of new certificates, mass distribution of new certificates can be reasonably managed allowing greater flexibility and manageability. The system must have the ability to centrally manage keys and/or certificates.
- Mechanisms must exist to ensure remote access or management interface access is granted to a system or system component through only authorized, authenticated, and encrypted mechanisms.
- A centrally managed and automated patch and firmware management system with ability to roll back to the last patch or firmware level if current patching attempt fails.
- The ability to provide non-repudiation for access to all components in system to ensure any action performed or connectivity to is by an approved and authenticated entity.
- Provide the ability to log, alert, and report on security events, use of access rights, system changes, system state and anomalous system behavior on all devices included in proposed solution. All logs should be capable of being sent to a centralized log management system and should support the ability to send logs via syslog.
- Evidence must be provided by vendor that the proposed system has been developed using the Systems Development Lifecycle (SDLC) methodologies including regular auditable penetration testing by third party testers.
- Malware and antivirus protection must be supported by all non-embedded systems or applications. If malware or antivirus software is not supported, a detailed mitigation strategy must be defined and documented.
- The ability to set a standard password policy mirroring Ameren's corporate password policy across the proposed system (password length, complexity, and change frequency) with ability to disable accounts after set amount of invalid logins for set length of time is required.
- Wireless communication methods that conform to the NIST 7761 Wireless Applications and support encryption methods of at minimum 128 bit encryption approved in FIPS 140.

c. Summary of the Relevant Cyber Security Standards and/or Best Practices

Ameren continues to maintain its own policies and procedures as they are related to cyber security. These policies and procedures are based on industry best practices, regulatory guidelines, and standards along with guidance from reputable third parties. The policies developed by Ameren continue to be communicated to all Ameren employees through our Security Awareness training program managed by Information Security and promoted by the HR department. Included in these policies are requirements that Smart Grid vendor solutions adhere to minimum security standards determined by Ameren. These vendors must prove they have a robust security culture at their company which is evidenced in the RFI/RFP evaluation process. During the RFI/RFP process vendor adherence to these standards is evaluated before product purchase. Vendors without an obvious security culture are rejected.

Physical security or tamper detection via FIPS 140-2 mechanisms are required for all devices attached to the Smart Grid. This helps Ameren maintain a robust and secure environment, prevent unauthorized access, and quickly and easily recognize when systems have been compromised. Proper intrusion detection allows quick response and remediation and adds another layer to Ameren's defense-in-depth cyber security strategy.

Background checks are required for all employees at Ameren. Different levels of responsibility and access require different levels of checks. In some instances continued monitoring and testing of employees is required. Continuous employee testing is a requirement of NERC CIP secured and NRC regulated areas of the company. Ameren also requires vendor employees with access to Ameren proprietary information or

customer personal Information pass appropriate background checks before being allowed access to that data.

The requirements, guidance, and standards influencing Ameren policy and procedures are developed utilizing input from many different sources. The sources used are developed by government regulatory agencies, standards setting organizations, industrial organizations and commercial standards organizations that are relevant to Ameren's environment. Sources include, but are not limited to:

- NERC CIP 002 – 009
- AMI-SEC System Security Requirements
- IEC 62351 Parts 1 - 8
- DHS Catalog of Control System Security
- NIST 800-52 and 800-53
- NISTIR 7628 Volumes 1-3
- NIST Catalog of Standards (COS)
- NIST SP800-82
- NIST 1108
- ISO/IEC 18028-2
- ISO 27001 & 2
- ANSI/ISA 99-1 and 99-2
- IEEE 1686-2007
- Ameren Minimum Security Baselines and Policies
- Federal and State Laws

All assets, solutions, applications, etc. will be protected in accordance with all regulatory requirements as well as any minimum security standards established by Ameren. Additionally, Ameren utilizes a defense-in-depth strategy to ensure maximum coverage and protection. This includes measures such as:

- Physical and/or logical isolation of systems/devices.
- Logging/monitoring access.
- Use of appropriate alarms and notifications (both manual and automatic).
- Use of firewalls and Intrusion Detection Systems (IDS).
 - All firewalls and IDS will be logged to a centralized logging solution where automated alerting and reporting will process the log data in real-time.
 - IDS devices will be monitored on a 24x7x365 basis.
- Use of Ameren's Information Technology Operations Center (ITOC) to provide 24x7x365 monitoring and response capabilities.

In circumstances where the applications / devices are not under Ameren's direct control, we will coordinate and provide oversight with the owning entity to ensure appropriate cyber security protection or isolation measures are implemented.

Ameren has established policies and procedures to deal with cyber security breaches. These procedures provide a wide range of response capabilities commensurate with the extent and criticality of the breach. Response actions include, but are not limited to:

- Isolation/containment of the breach
- Safe shutdown of the breached system/component
- Coordination with appropriate authorities and internal stakeholders
- Remediation of the damage
- Post-incident investigation
- Archival of incident/remediation information for continuous monitoring

If warranted, an Incident Command Team is activated to provide command and control of the incident and to ensure that adequate resources are available contain and remediate the breach.

Ameren’s project methodologies and security processes require thorough testing before, during and after deployment of all cyber-related hardware, software, processes and networks. This testing involves, but is not limited to:

- Predefined test plans
- Component level and integrated testing
- Interface testing – including testing with legacy systems
- Intrusion/penetration testing
- Automated source code reviews
- Scanning for deviations from approved configurations
- Internal and external audits
- Unannounced audits and testing occurring annually

Testing is conducted as appropriate throughout the entire lifecycle of cyber-related components and systems. Testing criteria, results and remediation are maintained throughout the lifecycle of the implementation and can be used to validate the effectiveness of Ameren security controls.

Ameren’s security processes and project methodologies are periodically reviewed and audited by internal and external groups. These reviews and audits are used to ensure that the required security controls are in place and to demonstrate that all policies, standards and requirements are being followed. These reviews and audits are the verification of ongoing controls and policy monitoring.

Changes to cyber components and systems will be managed by an established Change Management Policy and procedure. All changes are brought before a change control board which has scheduled meetings once a week. The change board communicates more frequently to evaluate proposed changes outside of the scheduled meeting. This policy and procedure ensures that risks are appropriately managed and further ensures that appropriate testing is performed.

Critical/sensitive data relating to the design, development, implementation and operation of systems and devices will be managed with appropriate “need-to-know” processes and techniques.

Ameren has a security awareness and training program that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance requirements. Basic security awareness training is provided to all information system users (including managers and senior executives) before authorizing access to the system. Personnel who have higher levels of information security roles are provided training commensurate with their role.

d. Summary of How Project Supports Emerging Smart Grid Cyber Security Standards

Ameren will continue to work with existing and new Working Groups and Committees to stay “in tune” with the standards as they are being drafted. We will continue to participate in EEI’s Cyber Security Committee and on other emerging Smart Grid cyber standards development efforts.

Ameren’s intent is to design and implement Smart Grid technologies using a foundation of current standards, requirements and best practices. At the same time, we will actively monitor new and developing requirements and apply them to our systems as appropriate, thus continuing to build in cyber security throughout the lifespan of our Smart Grid.

Cyber security strategic planning as well as implementation lifecycle procedures will identify new threats, vulnerabilities, risks and controls. For each of these new issues, Ameren will use the process of: identifying the threat/vulnerability; assessing the risk and impact; and appropriately managing the risk and remediation.

10. Privacy

The foundation for an Advanced Metering Infrastructure is the ability to capture and effectively utilize data. Ameren Illinois is aware that this marked increase in the flow of information also raises concerns about what

data is collected, how the data will be used, and how it will be protected. However, the fact that more detailed customer data may be available with an Advanced Metering Infrastructure does not change the existing, stringent privacy regulations and Ameren Illinois privacy policies and practices.

Ameren Illinois takes extensive measures to ensure the integrity of its systems and to secure and protect customers and customer data. Customer information is safeguarded on secure systems with restricted access. Ameren Illinois has implemented extensive security controls to protect information that is gathered, stored, and transmitted. Contractors acting on Ameren Illinois' behalf are required to comply with our privacy policy. Ameren Illinois treats personal information and data about our customers as confidential, consistent with all legal and regulatory requirements, and will not sell or otherwise provide customer data to third parties without the customer's consent, except:

- To law enforcement officers, pursuant to legal process (such as a warrant or subpoena approved by a judge);
- To contractors providing services on behalf of Ameren Illinois (these services are subject to confidentiality and security obligations);
- To governmental or regulatory agencies with jurisdiction over Ameren Illinois when they require such information;
- To others as required by court order or by applicable laws, rules, or regulations governing Ameren Illinois; or
- To credit reporting agencies and collection agencies if an account is assigned for collection.

Data collected by Ameren Illinois includes:

- Contact information that allows Ameren Illinois to communicate with its customers, including name, address, telephone number and email address;
- Billing information, including payment data, credit history, and Social Security Number;
- Electric and gas usage data gathered by Ameren Illinois meter reading systems; and
- Information gathered when customers participate in programs such as those related to energy efficiency.

Data collected will be used to:

- Bill customers for the energy and services provided to them;
- To enable customers to see their energy usage data and assist them in managing their energy use;
- Help Ameren Illinois efficiently apply resources and manage its assets;
- To troubleshoot and resolve problems with equipment or services;
- Analyze rates and rate structures and make rate offerings to better match customer needs and energy use;
- To project usage demand patterns and plot growth in different geographic or other areas;
- To improve energy supply planning and to better design and engineer our energy distribution systems;
- To communicate with customers about energy usage and help them select the best rate plan, or take better advantage of certain pricing programs offered by Ameren Illinois;
- To communicate with customers about energy saving and energy management methods tailored to their energy usage pattern.

Customer consent to share data about their account:

- Instructions will be readily available to customers explaining how a customer can provide authorization for a third party to receive web-based data for them.

11. Peak Time Rebate Program

Ameren Illinois is required to file a proposed tariff with the Illinois Commerce Commission that offers an opt-in, market-based, peak time rebate (PTR) program to all residential customers with smart meters. Ameren Illinois' tariff filing will be within 60 days after the Commission approves this AMI Plan, and submitted after consultation with the Smart Grid Advisory Council. The PTR program is to be competitively neutral, and provide rebates to

residential retail customers that curtail their use of electricity during specific periods that are identified as peak usage periods. Rebates shall be the amount of compensation obtained through markets or programs at MISO. The rules and procedures for consumers to opt-in to the peak time rebate program shall include electronic sign-up, be designed to maximize participation, and be included on Ameren Illinois' website.

To meet the basic requirements for a residential PTR program, the AMI process will capture hourly usage information for customers participating in a PTR program. This will enable Ameren Illinois to establish a usage baseline for non-PTR event periods, and also determine the customer's response to a PTR event. To maintain competitive neutrality, PTR participants will be allowed to switch from utility provided service to a retail electric supplier (RES) subject to existing switching rules. That is, participation in a PTR program will not be used to delay a direct access switch request. Also, the same type of usage information gathered for PTR participants will be available to RES served customers and available for RES's, subject to proper authorizations for release of customer data.

12. Reporting

On April 1 of each year beginning in 2013, Ameren Illinois will submit a report regarding the progress it has made in implementing this Plan.

The report will:

1. Describe the AMI investments made during the prior 12 months and the AMI investments planned to be made in the following 12 months;
2. Provide a description of progress made in achieving the specific metrics and milestones in the Plan; and
3. Provide any material updates to the Plan.

In addition to the three AMI related metrics defined in the legislation that will be included in the annual June 1 metric plan filing, beginning in 2013 Ameren Illinois will also report on the following milestones each year as part of the annual April 1 AMI progress report:

- Percent of support system installed
- Percent of 2-way network installed
- Number and percent of AMI meters installed
- Number of customers able to access the Web Portal and Web Portal usage statistics
- Number of customers eligible for peak time rebate tariff
- Number of customers signed up for peak time rebate tariff
- Number of customers on PSP, RTP, or other real time rates

13. Summary

Ameren Illinois' vision is to have the capability to serve all of its customers with a cost-beneficial Advanced Metering Infrastructure, serving 62% of electric customers by 2022.

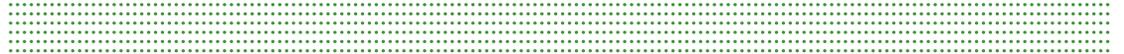
Installation of AMI will provide a number of benefits that will reduce cost to our customers and improve customer service. These benefits include: significant reductions in consumption on inactive accounts, uncollectible expense, and estimated bills; reduction in labor for meter reading and service calls; and additional information available to customers to assist them in managing their energy use and cost. As demonstrated in the Cost / Benefit Analysis the present value of the benefits of the proposed implementation of this AMI Plan exceeds the present value of the costs, therefore the implementation of this Plan is cost beneficial for Ameren Illinois electric customers.

Ameren Illinois will make significant changes in its Information Technology systems, in its Business Processes, and in its Operations to incorporate the features of an AMI and achieve the benefits described in this Plan.

Meter installation is expected to begin in Q2 2014 and will be continuously deployed over 6 years to reach 62% of Ameren Illinois electric customers. Conversion of the first customers to the AMI system is expected in early 2015 with final conversion of all 62% by 2019. Ameren Illinois will report annually on its investments in AMI, its progress toward meeting the metrics and targets, and the status of installation.

Customer awareness and education activities will begin in 2013 and continue throughout the deployment and conversion so that customers are aware of the benefits of AMI and how to take advantage of its features.

Critical to all aspects of this Plan for AMI is to ensure that all systems and customer information is highly secure and governed by strict privacy policies. A robust cyber security plan with policies, processes and equipment that meet national standards and/or guidelines will be implemented, maintained, and enhanced as appropriate.



Ameren Illinois Advanced Metering Infrastructure (AMI) Plan



June 28, 2012 ~~March 30, 2012~~

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1. Introduction

In accordance with the requirements of the Illinois Public Acts 97-616 and 97-646, Ameren Illinois Company (Ameren Illinois) has prepared this Advanced Metering Infrastructure Plan (the "Plan").

The Plan describes how Ameren Illinois intends to install an Advanced Metering Infrastructure and institute operational changes in order to: 1) serve no less than 62% of its electric customers; 2) reduce its state-wide meter reading estimates by at least 56%; 3) reduce its state-wide kWh consumption on inactive meters by at least 56%; and 4) reduce its uncollectible expense by at least \$3.5 million; all by end of year 2022.

The Plan was assembled by a cross-functional team of Ameren co-workers and with the assistance of representatives of Accenture.

This Plan includes the elements required by the Illinois Electric Grid Modernization Act:

1. A Smart Grid **AMI Vision Statement** that is consistent with goal of developing a cost-beneficial Smart Grid;
2. A statement of Smart Grid **AMI Strategy** that includes a description of how Ameren Illinois evaluates and prioritizes technology choices to create customer value;
3. A **Deployment Schedule and Plan** that includes deployment of AMI to no less than 62% of all Ameren Illinois electric customers;
4. A **Cost / Benefit Analysis** that proves the implementation of the AMI Plan is cost beneficial for Ameren Illinois' electric customers.
5. Annual Milestones and **Metrics** for the purposes of measuring the success of the AMI Plan in enabling Smart Grid functions; and enhancing consumer benefits from Smart Grid AMI;
6. A **Consumer Education Plan** to be implemented by Ameren Illinois;
7. A **Cyber Security Plan** that is consistent with guidelines and standards of the National Institute of Standards and Technology;
8. An **Interoperability Plan** that is consistent with guidelines and standards of the National Institute of Standards and Technology, and includes open standards and internet protocol to the maximum extent possible;
9. A description of how Ameren Illinois will secure the **Privacy** of personal information and establish the right of consumers to consent to the disclosure of personal energy information to third parties through electronic, web-based, and other means in accordance with laws and regulations protecting privacy; and;
10. A description of Ameren Illinois' plan for filing a **Peak Time Rebate Program** available to all residential customers with smart meters.

2. Background/Current Situation

History of Meter Automation at Ameren

Ameren Corporation has been an industry leader since the advent of automated metering, having been among the first utility companies in the nation to install these devices on a large scale. Today, automated electric and gas meters exist across most of Ameren's 64,000-square-mile service territory. Full-scale automated meter

reading was introduced across Ameren Missouri's service territory in the 1990's, including Alton and East St. Louis (electric) in Illinois. At the time, the million-meter project was the largest implementation of network meter reading in the U.S. The Alton and East St. Louis service territories in that project are now part of Ameren Illinois.

An aggressive expansion of automated meter reading in Ameren Illinois' service territory began in the spring of 2006 and concluded in early 2010. Now, more than half of Ameren Illinois' gas and electric customers have automated, 1-way, transmit-only meters. This includes 678,000 electric meters and 476,000 gas meters.

During the Ameren Illinois automation project, an advanced radio frequency (RF) network, capable of 1-way and 2-way communications, was installed by Ameren Illinois' service provider, Landis + Gyr, to interface with these meters. The 2-way communications capability has not been leveraged all the way to the meters since at the time of deployment the meters (endpoints) were 1-way. Meter technology, features, and costs have changed dramatically in the last few years, making 2-way automated metering systems the standard for new "greenfield" deployments in the industry.

Due to early automation, Ameren Illinois' customers have been receiving the benefits of automated metering, and with it, a large portion of Ameren Illinois' service territory is ready to move to the next level of metering infrastructure with its additional benefits.

3. Vision

Ameren Illinois' vision is to have the capability to serve all of its customers with a cost-beneficial Advanced Metering Infrastructure, serving 62% of electric customers by 2022. ~~To achieve this vision the Company must have (i) a clear path to full and complete cost recovery (i.e. return of and on investments and operating costs) and (ii) a strong and healthy financial position to provide the financing needed to install and maintain the infrastructure.~~

~~This~~Ameren Illinois' vision includes an AMI infrastructure ~~that~~ will deliver the following enhanced benefits to Ameren Illinois customers in a safe and secure manner:

- Improved efficiency and reduced operating costs from automated meter reading and remote connect/disconnect features;
- Reduction in estimated bills;
- Reduction in uncollectible costs;
- Reduction in consumption on inactive meters and energy theft;
- Service activation/deactivation on date requested;
- Customer access to usage and other information to aid in their energy and cost management;
- Improved reliability through faster response to restoring power;
- Improve reliability by monitoring the system to proactively address issues that might lead to service problems, and
- A foundation for future "beyond the meter" capabilities for Ameren Illinois customers – including smart appliances, net metering, plug-in electric vehicles, and integration of renewable energy resources.

Wherever Advanced Metering Infrastructure is deployed it will include the following functionalities:

- Equipment that is safe to customers, the public, and Ameren Illinois employees and contractors;
- Increased information available to the customer (i.e. daily usage, interval usage, energy pricing, \$/kWh spent on energy to-date, etc.);
- Remote programming for rate changes (i.e. Real Time Pricing (RTP), Power Smart Pricing (PSP), Peak Time Rebate (PTR) and Critical Peak Pricing (CPP));
- Remote disconnect/connect to meet consumption on inactive meters and bad debt metrics;
- Remote diagnostics of the meter;
- Remote detection of service and grid conditions (voltage, power outage, power restoration);

- Remote firmware upgradeability within the meter and the network;
- Secure data and controls to ensure privacy and prevent unauthorized access;
- In/out metering capability to adapt to distributed generation and developing smart grid technologies; and
- Interoperable to the extent possible and practical (e.g. common communications protocols).

4. Strategy

4.1 Introduction of AMI

Ameren Illinois' AMI strategy is to leverage its automated metering deployment and operating experience to move to the next level of Advanced Metering Infrastructure. As Ameren Illinois deploys AMI it will ensure that all systems and equipment are performing as designed to provide for accurate and timely billing. This step will be followed by implementation of advanced metering functionality such as remote connect/disconnect and customer access to usage information. Functionality will be rolled out in stages as shown below.

Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Install foundational meter data management system and AMI system	Process and Bill Residential Simple Rates and customers from RTP program via legacy interface	Provide Web portal for presentment of customer usage	Upgrade processes and system to support remote connect/disconnect	Support Peak time rebate pricing and critical peak pricing
Prepare systems and processes for installation of 2-way communication network	Integrate AMI and MDM systems and prepare for billing	Provide Operational Analytics		Prepare systems & processing for Commercial and Industrial (C&I) billing
Manage Asset Information	Deployment analytics			Event processing such as outage notification and restoration

4.2 Data Communication with Customers

Ameren Illinois expects to purchase smart meters equipped to transmit information from the meter and/or Ameren Illinois' network to the Customer's Home Area Network (HAN) or other premise network for non-residential customers. This will lay the foundation for future meter to HAN communication. However, Ameren Illinois does not plan to utilize this path to communicate with customers initially. Instead, Ameren Illinois intends to make available a web-portal for customers to access their data. This will allow customers with web access to observe their usage without purchasing or installing additional equipment to receive signals from Ameren Illinois. Presently Ameren Illinois is concerned that the current HAN technology isn't fully mature as there are currently several standards that are still emerging. Ameren Illinois' goal is to provide excellent service to its Customers. A concern is that customers may be dissatisfied with the current tools' performance/functionality and withdraw from managing their energy via HAN, if deployed too early. Ameren Illinois will monitor HAN technology as it continues to mature and to improve. Then, with input from stakeholders, Ameren Illinois will determine the most appropriate approach for enhancing its customers' interface choices. Ameren Illinois will also monitor and consider third party vendors to administer customer interface programs and support just as it has done with its Power Smart Pricing program.

4.3 Automated Gas Meters

If there is (i) a clear path to full and complete cost recovery (i.e. return of and on investments and operating costs) and (ii) a strong and healthy financial position to provide the financing needed to install and maintain the infrastructure, the Company proposes to automate gas meters wherever Advanced Metering Infrastructure network is installed for electric metering. Most Ameren Illinois customers receive both electric and gas service from the Company. Utilizing the network infrastructure for both electric and gas metering is an efficient way to drive operating cost down and provide additional benefits to customers. The AMI network will have the capacity and functionality to effectively and efficiently communicate with both electric and gas meters. If the gas meters are not automated along with the electric meters, manual meter reading resources and related infrastructure will need to be retained strictly for reading gas meters.

In nearly all cases, automating the gas meters simply requires the addition of a radio module to the existing gas meter in order to communicate with the network. Automating gas meters will not require additional infrastructure (network) other than incidental equipment needed to reach a few, very rural locations within a targeted service area where customers do not also take electric service from Ameren Illinois. Ameren Illinois does not propose during the deployment of AMI to its electric customers to also extend network infrastructure to its gas-only customers in Operating Centers where it only provides gas service or has a minimal number of electric customers (e.g. Springfield).

A key reason for extending the network to reach even isolated meters (gas and electric) and ensuring that all meters in a given service area are automated is that mixing automated and non-automated meters within a service area presents issues that can be costly and lead to errors. Retaining a labor force for manual reads of a small number of widely separated meters, maintaining inventory of automated and non-automated meters, and carrying extra stock on trucks, is much less efficient and can lead to confusion and errors.

4.4 Ownership/Maintenance of the AMI Components

Ameren Illinois will own and maintain all electric ~~and gas~~ meters on its system and will manage all testing, inventory, records in compliance with II Administrative Code, Title 83, Parts 410 and 500. Ameren Illinois expects to own and operate the AMI network. [Ameren Illinois has deployed Automated Meter Reading \(AMR\) to 54% of its 1.25 million electric customers. To achieve 62% coverage of its electric customer base, Ameren Illinois will convert 16% or approximately 200,000 of its electric customers from AMR to AMI.](#)

4.54 Program Management

In addition to its internal Ameren Illinois Project Team(s), Ameren Illinois has engaged leading consultants with broad experience in AMI projects to assist in project oversight and will continue to engage well-qualified consultants to assist. Examples of this assistance include:

- Creating and evaluating the Request for Proposals (RFPs) for the AMI Network, Meters and the Meter Data Management System (MDMS)
- [Considering Information Technology/Operation Technology \(IT/OT\) Architecture and System Integration \(SI\) options](#)
- Business Process Review and Design
- Cost / Benefit Analysis, [including Societal Benefits of AMI](#)
- [Project Tracking, Reporting and Program Scoping](#)
- [AMI Risk Analyses](#)
- [Consumer Communication Strategies](#)
- Consultation on IT issues
- Consultation on technology

4.65 Number of Meters to be Deployed for 62% Target

To ensure that 62% of Ameren Illinois electric customers are served via AMI by year 2022, Ameren Illinois must install an estimated total of 780,000, 2-way electric meters. The preliminary plan for deployment is shown in section 5.3. ~~Specific geographic areas will be finalized once vendor selections have been finalized. Once vendors are selected, the plan may change to enhance deployment efficiencies and timing of customer benefits~~

4.7 Number of Meters to Reach Vision

~~If there is (i) a clear path to full and complete cost recovery (i.e. return of and on investments and operating costs) and (ii) a strong and healthy financial position to provide the financing needed to install and maintain the infrastructure, it is Ameren Illinois' intent to continue to implement beyond the 10-year scope of this Plan in order to reach all of its electric customers and associated gas customers with AMI capability within approximately 15 years.~~

~~Serving all customers with AMI capability would require the exchange of an estimated 1,252,000 electric meters and addressing up to 850,000 gas meters (primarily radio module installation, and a small number of actual gas meter exchanges where the current meter will not accept a radio module).~~

4.84.6 Information Technology and Business Processes

In planning for a new Advanced Metering Infrastructure (AMI) System, in July of 2011, Ameren Illinois teams began assessing the impacts, requirements, and cost of a new AMI system and a new or upgraded Meter Data Management System (MDMS). To enable the new functionality of the AMI system, Ameren anticipates significant impacts on business processes and information technology infrastructure, including data storage requirements due to the large quantities of AMI interval data as well as changes to the IT infrastructure to support the data movement. ~~In addition, there will be changes to existing systems and business processes.~~

Initial Business Process Requirements Assessment

The teams performed an assessment of the Information Technology (IT) and Business Process Requirements. This assessment was driven by a list of over one hundred processes. The assessment allowed an opportunity, at a very high level, for the business experts and IT to identify potential impacts and requirements to help satisfy the AMI Metrics and Deployment Targets as described in this Plan. This involved the consideration of the following: 1) Installing and Interfacing with a new AMI system, 2) Upgrading the existing or installing a new MDMS, 3) Interface/System Integration work associated with the AMI and MDMS, 4) Customer Information System changes; 5) Internet/Web Development, etc.

~~A Business Process Review (BPR) and Business Process Design (BPD) will be performed once authorization has been received to proceed with the AMI implementation and vendors/systems for AMI and MDMS are selected. This is anticipated to begin in mid-2012.~~

MDMS and AMI (network and meters) Estimate

In September of 2011, a Request for Information (RFI) document was prepared and offered to 12 different MDMS vendors. Information gained through the RFI process was utilized to obtain implementation and list pricing estimates for an MDMS, as well as for developing server, storage, and software cost estimates used in the Cost / Benefit Analysis. Similarly, a RFI was prepared for the AMI system. For integration purposes, estimates developed for interfacing with the new system were arrived at based on the understanding of our existing AMR interfaces in place today.

~~It is anticipated that extensive expanded/new systems~~In March 2012, Ameren Illinois issued RFPs to a shortlisted group of AMI and architecture will be required for the implementation of MDMS and AMI; these costs/vendors. The results of the RFP process are also included still being analyzed to select the best value vendor for deployment in the Ameren Illinois' service territory. The updated estimates used in the Cost/Benefit Analysis.

Request for Proposal

~~The MDMS represents Ameren Illinois' best understanding of projected pricing for AMI and MDMS deployment. It is anticipated the review of the RFPs will be completed and AMI system RFPs were released on March 29, 2012. The evaluation of responses and selection of vendors is expected final contracts negotiated by the middlefourth quarter of 2012.~~

Business Process Review

Following the evaluation of the RFPs and selection of the MDMS and AMI system vendors, a Planning Phase will begin and will include a Business Process Review and Design and System Architecture Review for both the MDMS and AMI systems, ~~in addition to other activities as deemed necessary.~~ The business process reviews will match the phased rollout of functionality described above in section 4.1. Concurrently with the Business Process Review, it is expected that an Organizational Impact Team be utilized to review the Business Process Review assessment documents as they are completed. This team will be responsible for addressing any business/user impacts, identifying training needs, and arranging for training as required. This effort will continue through the Application Development Phase and continue as necessary through implementation.

A Business Process Review (BPR) and Business Process Design (BPD) will be performed once authorization has been received to proceed with the AMI implementation and vendors/systems for AMI and MDMS are selected. The Ameren Illinois has completed the BPR/BPD Request for Proposal (RFP) and will issue it upon receiving an approved plan. The BPD is anticipated to begin in early 2013.

Information Technology Development and Integration

The Information Technology Application Development phase of the project, which includes the analysis, design, coding, integration and unit testing of the new functionality required to support AMI deployment within Ameren Illinois, is expected to begin following the Planning Phase for each Stage. Application Development will continue for approximately 30 months.

Ameren Illinois will use a combination of internal and external resources to complete application development and system integration effort. An RFP will be issued for development and integration as BPD begins.

Product Test Phase and Production Readiness Phase

~~It is anticipated that both a Product Test Phase and Production Readiness Phase will be utilized. Within~~During the Product Test Phase, project resources will identify, write, and execute test scripts to validate the accuracy of the new or modified functionality. Product test scripts are executed by analysts and business resources and are utilized to validate that the programming logic meets the business and process requirements. The timeframe for this testing phase is to be determined but will most likely begin several months after coding begins and will continue through pre-implementation development as the MDMS and AMI software is prepared for implementation ~~which will occur in phases.~~

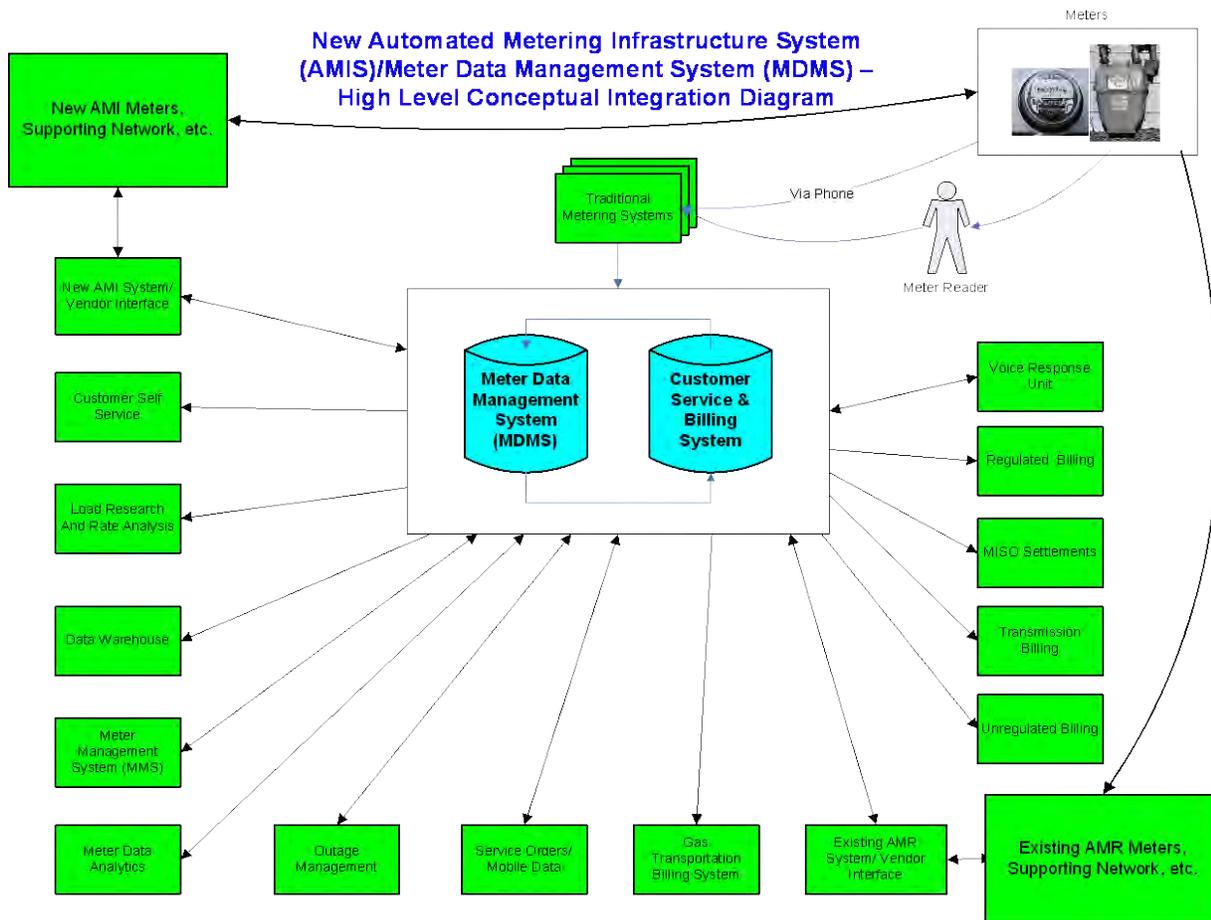
The Production Readiness Phase includes "day-in-the-life" scenario testing. The goal of this phase is to ensure that all of the components of the impacted applications are functioning as designed and will support the day-to-day operations of Ameren Illinois and customer facing applications. This phase includes testing of the new AMI and MDMS systems, interfaces between the AMI System, the service bus and business process management as well as other internal interfaces, to ensure that all are functioning properly and efficiently. This phase is expected to occur following the Product Test Phase but prior to implementation and is meant to test each interface and component of software.

Implementations

Production implementation of the AMI and MDMS systems, and related interface changes, are likely to occur in "phases". The exact timing of each phase's implementation will be established during the planning phase of each planned functionality Stage. Functionality necessary to meet deployment plans and core objectives of the bill are planned to be in place by early to mid-4th Quarter 2015.

The various items discussed above, including the various phases are conceptual in nature and subject to change as the project more fully develops and vendors are determined, and the planning process continues.

The following diagram demonstrates the extensive interfaces and interaction of the system and information with the implementation of AMI and MDMS systems.



4.97 Data Analytics

Ameren Illinois intends to incorporate data [analytic solution\(s\) analytics solutions](#) in its Advanced Meter Infrastructure program. Ameren piloted some of these features with its AMR system in Illinois and Missouri and found them to be valuable tools in managing and operating the automated meters/network.

Data analytics utilizes daily readings, meter flags, and usage patterns to increase the scope, speed, and accuracy of meter problem identification.

Benefits include the ability to:

- Check on the health of the meter/module
- Identify/initiate predictive inspections and maintenance
- Recognize anomalies that might suggest reading errors, equipment malfunction, tampering, and service or system issues
- Recognize meters that have been incorrectly configured
- Improve Customer Service as problems are identified without estimates or bill correction
- Check on network health

- Check on interval read performance and other performance statistics such as disconnect/reconnects executed

Data Analytics also provide:

- The ability to verify AMI vendor performance/contract metrics
- Information and analysis that can be leveraged in other utility functions (such as load research and energy efficiency) data per customer
- Ability to filter outage information from AMI last gasp messages due to planned work or recloser activity

The increased amount of data, and the introduction of 2-way communications and controls (e.g. remote disconnect) will likely justify the need for data analytics solutions.

4.10 Technology8 Technology Evaluation and Customer Value

Ameren Illinois evaluates technology solutions in a thorough and conservative way, considering the life cycle of the technology, its integration with systems and processes, and its economic and customer benefits. Ameren Illinois is taking this same approach as it evaluates AMI related technology.

As explained throughout this plan, Ameren Illinois is implementing a phased approach to AMI to ensure system operation and to enhance customer ability to take advantage of AMI features. Once Ameren Illinois has ensured accurate and timely billing of an account on the AMI network, the implementation of advanced features such as remote connect /disconnect and customer access to usage and rate evaluation information on a web-portal will follow. These features will be accompanied by targeted customer education as explained in the customer education section below. Using the AMI as a foundation, Ameren Illinois will then continue to leverage information from other successful AMI deployments, research agencies such as EPRI, and the newly created Ameren Illinois Technology Applications Center (also known as the Smart Grid Test Bed) to further evaluate and deploy features and programs that are economic and enhance customer benefits.

4.119 Positioning for the Future

In many respects Ameren Illinois sees the installation of AMI as a journey. The Company expects to explore the full capability of the system, and as it sees value with a sustained valid business case, integrate those features and benefits into the business systems and operations.

Examples of potential enhancements that will be evaluated:

- Volt/Var Optimization: Integrating the voltage sensing capabilities of the advance meters to enhance the voltage optimization functionality.
- Distributed Generation: Using the in and out metering capability of the advanced meters to facilitate net metering, including [enhanced integration of distributed renewables and](#) the eventual integration of electric vehicle-to-grid storage.
- HAN and Smart Appliance Communication: Implementing direct meter to in-home device communication capability as customers desire these features, as home communication standards are finalized, and as in-home device technology improves in functionality and becomes even more economical.
- Enhanced Rate Options and Services: Providing increased rate choices and other retail services, through Retail Electric Suppliers, other third party service providers, or Ameren Illinois directly as appropriate.

4.1210 Program Management Office

Ameren Illinois has a significant amount of experience with automated meter deployment. Deployments must be well-planned with firm milestones and clear vendor performance metrics that will be clearly tracked. AMI introduces additional considerations associated with: 2-way communications, new meter and system functionality, cyber security and privacy issues, MDMS and business process changes, IT process changes,

AMI Vendor interfaces and processes, a service-oriented architecture implementation and a customer web portal.

In order to track and take action with regard to project scope, schedule and cost, Ameren Illinois has created a Program Management Office (PMO). The PMO key roles are:

- Program/Project Governance – Ameren Illinois has a rigorous capital program management process that requires large investments to go through reviews at numerous phases to ensure that the project/program is achieving its financial, strategic, operational, and customer benefit objectives.
- Cost / Benefit Analysis /Financial Tracking–Ameren Illinois requires large capital investments to be analyzed using discounted cash flow to ensure projects/programs provide net customer benefits. The PMO will continue to review, update, and communicate net customer benefits if the AMI program scope, cost, or schedule changes. A key tenet of Ameren Illinois' capital program management process is robust cost tracking and financial management. Corporate policy requires monthly forecast updates of project costs and cash flows.
- Scope, Quality, and Business Process Integration Management– The AMI PMO will have a dedicated workgroup that will focus on developing and integrating AMI into its business framework. Key to successful implementation of AMI will be a thorough review of more than 200 processes and how each of these business processes at Ameren Illinois is affected by AMI. Another critical effort of AMI deployment will be ensuring that the cost of quality is minimized by employing deep dive quality analyses during planning and design that prevent defects during the AMI implementation, as cost of prevention is cheaper than cost of repair.
- Scheduling – The AMI PMO will have a dedicated scheduler that in conjunction with the cost management group, will develop and implement an Earned Value Management System (EVMS) that tracks performance against cost and schedule baselines. For large capital investments at Ameren Illinois, EVMS is the required methodology for identifying leading indicators on project and program health.
- Issues and Risk Management – The Ameren Illinois PMO will have resources responsible for risk and issue management. Ameren Illinois policy requires a minimum monthly update of risks and issues, with assigned impacts and probabilities. Ameren Illinois capital program management standard practice uses the collective probability weighted impact of program risk as the program's contingency. Ameren Illinois' leadership will hold management reserve to address unidentified risks.
- Technology and Vendor Selection – The AMI PMO will use a robust procurement and sourcing process to identify the AMI technology and associated vendor that provides Ameren Illinois customers with the lowest Total Cost of Ownership (TCO).
- Field Deployment – The Ameren Illinois PMO will be staffed with internal project management personnel that have significant experience with deploying automated meters.
- Information Technology Management–The AMI PMO will use Ameren's Information Technology Project Management process and Ameren Illinois project management policy to guide the development of the AMI network infrastructure and the Meter Data Management system.
- Testing/Commissioning – As part of the quality management process, the AMI PMO will develop a testing/commissioning plan for all elements of the AMI deployment. Examples of testing/commissioning will include Factory Acceptance Testing (FAT) for meters and hardware, Performance Testing to ensure scalability, User Acceptance Testing (UAT) for software, Ameren Illinois meter shop bench testing, software design reviews, etc.
- Change Management- An Advanced Metering Infrastructure will touch nearly every aspect of the Ameren Illinois business as new equipment is installed, and many processes are revised or replaced. A thorough and effective Change Management program will be essential to ensure that everyone within the organization understands the purpose, scope and reasons for the change, and their individual roles in the success of the project. Communications, training, feedback, alignment, and constant improvement will be keys to success. Change management will occur in many forms: Company-wide communications; imbedded changes and training within IT and business process changes, specific training programs for field, shop, and call center personnel; new policies; etc.

5. Deployment Plan

5.1 Vendor Evaluation Process

In September 2011, Ameren Illinois conducted a Request for Information (RFI) process with multiple AMI vendors to identify viable AMI solutions and to estimate the cost and timeframe to deploy equipment. This information was used in the Cost / Benefit Analysis.

Ameren Illinois' evaluation was focused to determine if the proposed solutions, at a high level, would:

- Meet cyber security standards/requirements
- Meet interoperability standards
- Meet electric and gas meter functionality requirements
- Meet communication bandwidth and latency requirements
- Meet training needs
- Meet deployment schedule
- Provide pricing options

~~Ameren Illinois determined that several vendors' solutions could meet these requirements based upon the RFI responses; however, detailed analysis is still required once firm proposals to the RFP are received.~~

The AMI system and MDMS Request for Proposals (RFPs) were released to potential vendors on March 29, 2012. The evaluation of responses and selection of vendors is expected by the mid-4th Quarter of 2012. The initial review of the RFPs refines the pricing originally estimated using the RFIs.

5.2 Technology

5.2.1 AMI Communication Network

Ameren Illinois is primarily considering has selected Radio Frequency (RF) technology for its base AMI network system, both in the Field Area Network (FAN) and the Wide Area Network (WAN). However, other communications technology may be incorporated to address unique situations where distance, topography, RF interference, etc., make other technology a better choice.

5.2.2 Meters

Ameren Illinois plans to purchase all AMI meters equipped as currently defined 'smart' meters, which means that they will include:

For Residential, Commercial and Industrial Meters:

- Load profile (ability to record and store usage in intervals that are appropriate to the application)
- Time of Use (TOU) features (measure of usage during specific hours of on and off-peak periods)
- Power Outage reporting and verification
- Remote voltage (and current for some C&I applications) monitoring capability for indication of the status of the service
- Remote diagnostic capability to help identify and resolve issues with equipment and system operations;
- Remote programming capability, eliminating the need for a physical visit to the meter. These remote capabilities will include:
 - Firmware upgrades;
 - Full meter program load to configure the meter's options;
 - Software "bug" fixes;
 - Security patches;
 - Time synchronization to ensure all demand, TOU, and interval time periods are accurate;
 - Load profile and channel configuration; and
 - Ability to change TOU schedules, and DST/ST switch points (i.e. the on and off-peak time periods, Daylight Savings Time/Standard Time dates, etc.).

- Manual probing capability via the optical meter port or a local wireless field read using a handheld wireless tool in the event the network is inoperable or unavailable and a physical visit to the meter is required to download data or perform diagnostic or programming functions; and
- Capability to be programmed to measure bi-direction power flow (to and from the customer) to address distributed generation or alternative energy sources and related tariffs.

For Single Phase, Residential and Small Commercial Meters Only

- Radios capable of communicating with Home Area Networks (~~the communications standard has not been selected~~all vendors that proposed an AMI solution are capable of meeting the Zigbee Smart Energy Profile (SEP) 1.0 or 1.1 standard and have included road maps to be SEP 2.0 compliant upon adoption of the 2.0 standard); and
- 200Amp internal switch for remote disconnect and connect.

5.3 Deployment

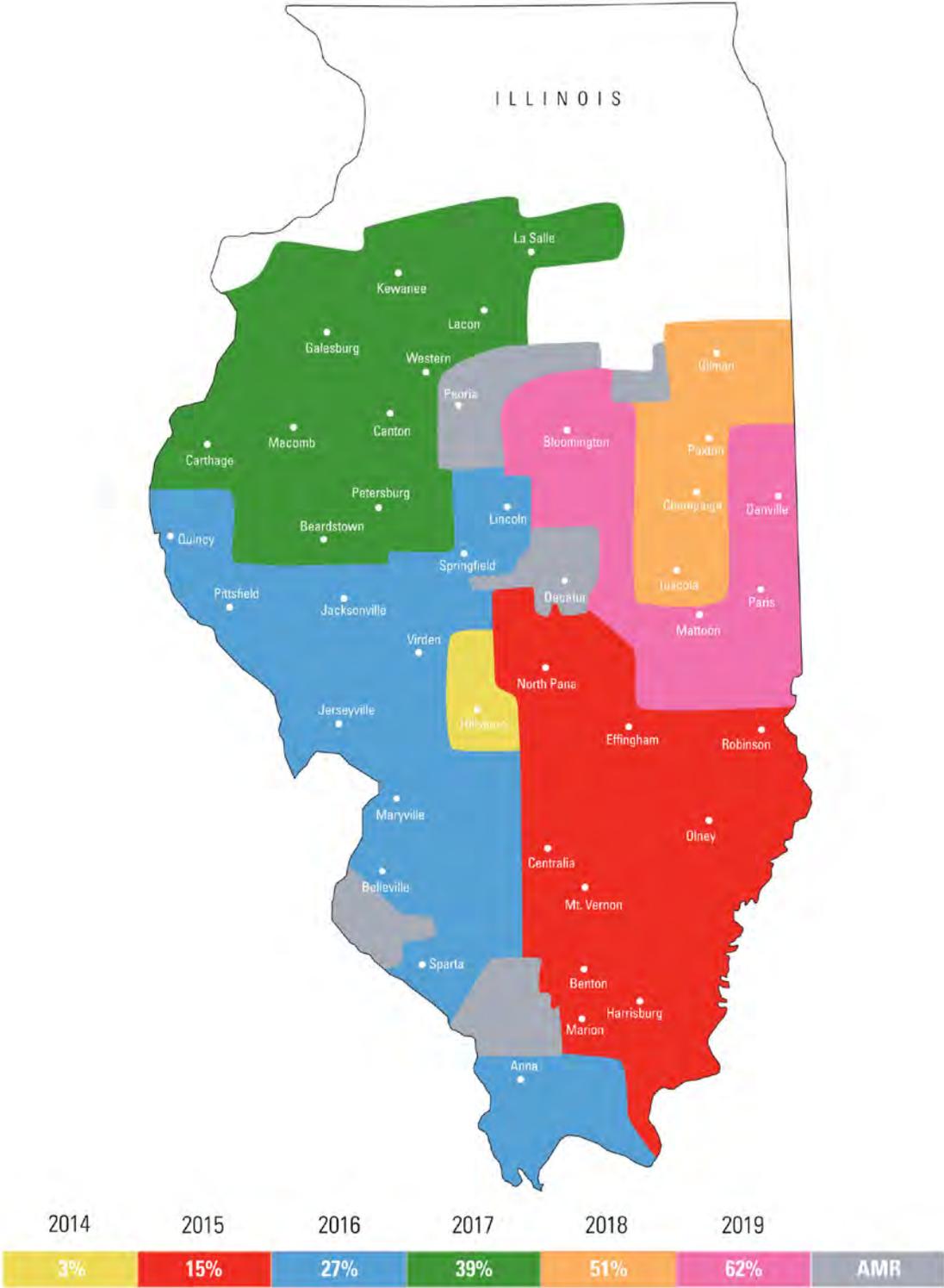
5.3.21 Deployment Approach

As noted earlier in this Plan, to ensure that ~~62% of~~ Ameren Illinois meets the statutory requirement to deliver AMI to 62% of electric customers are served via AMI by 12/31/the end of 2022, Ameren Illinois must install an estimated total of 780,000, AMI-equipped electric meters. ~~The specific service areas where AMI is to be deployed have yet to be determined. These areas and the deployment sequence are subject to the selection of the vendors/equipment and other system and process decisions assuming 2011 meter count.~~

Initial deployment of AMI meters is expected to begin in ~~4Q 2013, ramping up in Q2 2014 and 2015 as per the preliminary, annual deployment schedule. Initially, Customer Service System (CSS), Meter Management System (MMS), and AMI interfaces will be implemented that will allow meter records and customer account information to be updated daily, prior to the AMI Support Systems: IT, MDMS, and initial business processes, and completed by mid-2014.the end of 2019.~~ Per previous AMR deployment lessons learned, the measured start is intended to provide an opportunity to verify that the logistics, warehousing operation, module and network performance, training, installation quality, vendor processes and head-end system all meet expectations before moving forward with full deployment. Automated reads will not be used for billing or billing inquiries during the initial Stage.

Ameren Illinois has developed a deployment plan that will initially provide AMI meters to areas of Ameren Illinois' service territory that do not have AMR. The deployment plan follows a sequence of rolling out AMI meters to areas contiguous to those previously deployed, simplifying logistics, taking advantage of communication network efficiencies, and realizing greater benefits for Ameren Illinois' customers.

The figure and tables below illustrate the preliminary, annual deployment plan to 1) based on 2011 meter count to provide AMI capability to serve 62% of electric customers by the end of 2021, and 2) continued deployment to provide AMI capability to serve all electric customers by the end of 2026.—2019.



Percent of Total Ameren Illinois Electric AMI Meters by Year

Operating Center	Division	Deployment Sequence	# of Electric Meters
2014			
Hillsboro	5	1	40,419
2014 Total			40,419
2015			
Hillsboro	5		473
North Pana	4	2	20,205
Effingham	4	3	14,068
Robinson	4	4	13,630
Olney	4	5	13,428
Centralia	6	6	17,203
Mount Vernon	6	7	22,541
Benton	6	8	18,160
Harrisburg	6	9	9,599
Marion	6	10	18,693
2015 Total			148,000
2016			
Marion	6		8,626
Anna	6	11	10,930
Sparta	6	12	25,516
Jerseyville	2	13	15,897
Virden	2	14	11,643
Pittsfield	2	15	6,013
Quincy	2	16	26,747
Jacksonville	2	17	13,535
Springfld	3	18	13,402
Lincoln	3	19	15,691
2016 Total			148,000

Operating Center	Division	Deployment Sequence	# of Electric Meters
2017			
Lincoln	3		1,531
Petersburg	2	20	10,931
Beardstown	2	21	13,847
Carthage	2	22	8,312
Macomb	2	23	11,398
Canton	2	24	11,669
Western	1	25	12,647
Lacon	1	26	16,600
Galesburg	1	27	44,547
Kewanee	1	28	15,473
LaSalle	1	29	1,045
2017 Total			148,000
2018			
LaSalle	1	29	36,919
Gilman	4	30	14,266
Paxton	4	31	15,749
Tuscola	4	32	22,865
Tuscola	4	33	-
Champaign	4	34	58,201
2018 Total			148,000
2019			
Champaign	4		23,085
Danville	4	35	33,166
Bloomington	3	36	61,604
Mattoon	4	37	21,385
Paris	4	38	8,760
2019 Total			148,000
6 Year Total (2014-2019)			780,419

[Operating Center Deployment Plan](#)

5.3.3 Meter and Network Deployment Phases

Deployment will be performed in a phased approach. The following information defines the significant milestone and timelines (known at this point) for phases of deployment.

Phase 1 – Pre-Deployment Preparation

- Electric Meter Preparation
 - Prepare Electric Meter Shops for AMI processing
 - Medical Tag Survey completed by meter readers/subcontractors to improve mass deployment efficiencies and safety.
 - Identify electric facilities to be excluded from mass deployment and addressed one-by-one due to complexity, safety, and reliability issues.
 - Begin purchasing AMI equipment.
 - Exchange a limited number of meters in advance of mass deployment in each area as service personnel work orders in the normal course of business.
 - Initiate advanced electric meter installations by Ameren Illinois' meter technicians in the first deployment area.
- Network Preparation
 - Identify coops, municipalities, and other such areas that Ameren does not currently own the poles or have pole-attachment agreements and obtain pole use agreements prior to network deployment in those given areas.
 - Identify Wi-Fi areas that may cause interference and reduce network performance. Then, identify actions needed to mitigate these issues.
- Meter Reading Preparation
 - Complete meter location surveys to improve installer efficiencies in locating meters during deployment.
 - Attain meter reading route maps.
 - Verify that premise access keys are available at each operating center to be deployed.

Phase 2 –Network Deployment

- Network Deployment is anticipated to begin near the end of [4QQ3](#) 2013, subject to vendor selection and contract negotiations.
- Network equipment installation / turn on process
 - Site Surveys (as required and as needed) will be completed and documented.
 - A list of meter locations to be automated will be evaluated using meter density of the residential/commercial area. Surveys of the areas (as required and as needed) will be performed to establish the sites needed for network equipment installation.
 - The proposed network device locations will be evaluated by Ameren Illinois to determine if they are acceptable based on established installation standards, availability of power, etc.
 - Equipment installation
 - An approved electrical utility service will be provided to the network equipment based on the standards described by the customer standard electrical code.
 - Network equipment performance criteria will be established and performance against these criteria will be evaluated.
 - Additional equipment or testing is verified by the installation vendor to determine if established locations of the network equipment are adequate.

Phase 3 – Mass Deployment Process ([Starting Q4 2013](#))

Phases 1 and 2 outline the activities to be completed in preparation for the meter mass deployment. Phase 3 continues the preparation by establishing a warehouse/deployment logistics facility, staffing, securing meters and modules, establishing vendor deployment processes, and training.

As stated previously in the Deployment Approach section, the initial deployment of meters will begin in [4Q 2013Q2 2014](#) to verify the functionality of the AMI vendor technology, and associated deployment activities.

The AMI Support Systems, including the Meter Data Management System and the Ameren Illinois Business Process changes will be underway during the beginning of mass deployment and will be completed in phases. Network and some meters will be in place when the support systems are in place and testing of the AMI can begin.

Key activities associated with Mass Deployment include:

- Warehouse/deployment logistics Facility
 - A warehouse/logistics facility will be secured in a strategic location to serve the mass deployment activities. This facility will be the logistics hub for electric meters, gas modules, and network equipment. The facility will house equipment for electric meter read imaging (a digital photograph of the removed meter face to capture the reading and nameplate data) and will serve as the hub for the installer workforce. As the mass deployment progresses, there may be a need to add a satellite facility closer to the deployment locations for all but imaging activities.
- Staffing
 - A workforce will be secured to support the warehouse/logistics facility, installation of residential electric meters, gas modules, and network devices adhering to current labor agreements and meeting Ameren Illinois diversity requirements.
- Performance Check of Meters
 - New AMI meters will be delivered to the warehouse/logistics facility and quarantined there until samples of each lot are tested at an Ameren Illinois Meter Shop. In addition to accuracy testing, Ameren Illinois expects to test other functions such as the RF communications functions and remote disconnect/connect functions on these samples.
 - All meter testing, installation, record keeping, etc. will be performed in accordance with the Illinois Administrative Code, Title 83, Parts 410 and 500.
- Scheduling/Installation
 - Mass deployment is structured around route plans. Installers are assigned daily work according to the meter reading route schedule. Electric meter exchanges are not to be performed during the read window.
 - If the meter is not accessible, unsafe to install, damaged, non-compatible, obstructed, etc..., the meter will be skipped by the installer and will become the responsibility of Ameren Illinois to automate.
 - As meters are exchanged or gas modules installed, Ameren's database which matches the meter to the customer account, must be updated. Pending the Vendor RFP, it is expected that a vendor-provided software package will provide the tool to manage this activity.
 - Ameren Operating Centers will be prepared to support the deployment, including response to unsafe conditions (i.e. damaged meter, gas leaks, etc.), access issues, and skipped meter investigations.
- Cyber Security and Installation
 - At the time of meter installation, cyber security features will be enabled as described in the Cyber Security Plan, Section 10. The specific cyber security features and steps will be product/vendor specific and cannot be described until AMI equipment selection has been made.
- Training
 - Topics will include: OSHA requirements, gas safety, vehicle safety, electric meter and gas module installation, and customer service to include specific instruction regarding Ameren Illinois Smart Meter Medical / Privacy Policies.
- Customer Contact
 - Deployment activities will follow the process as described in the Customer Education Plan, Section 9.
- Performance, Quality, Safety, and Customer Service

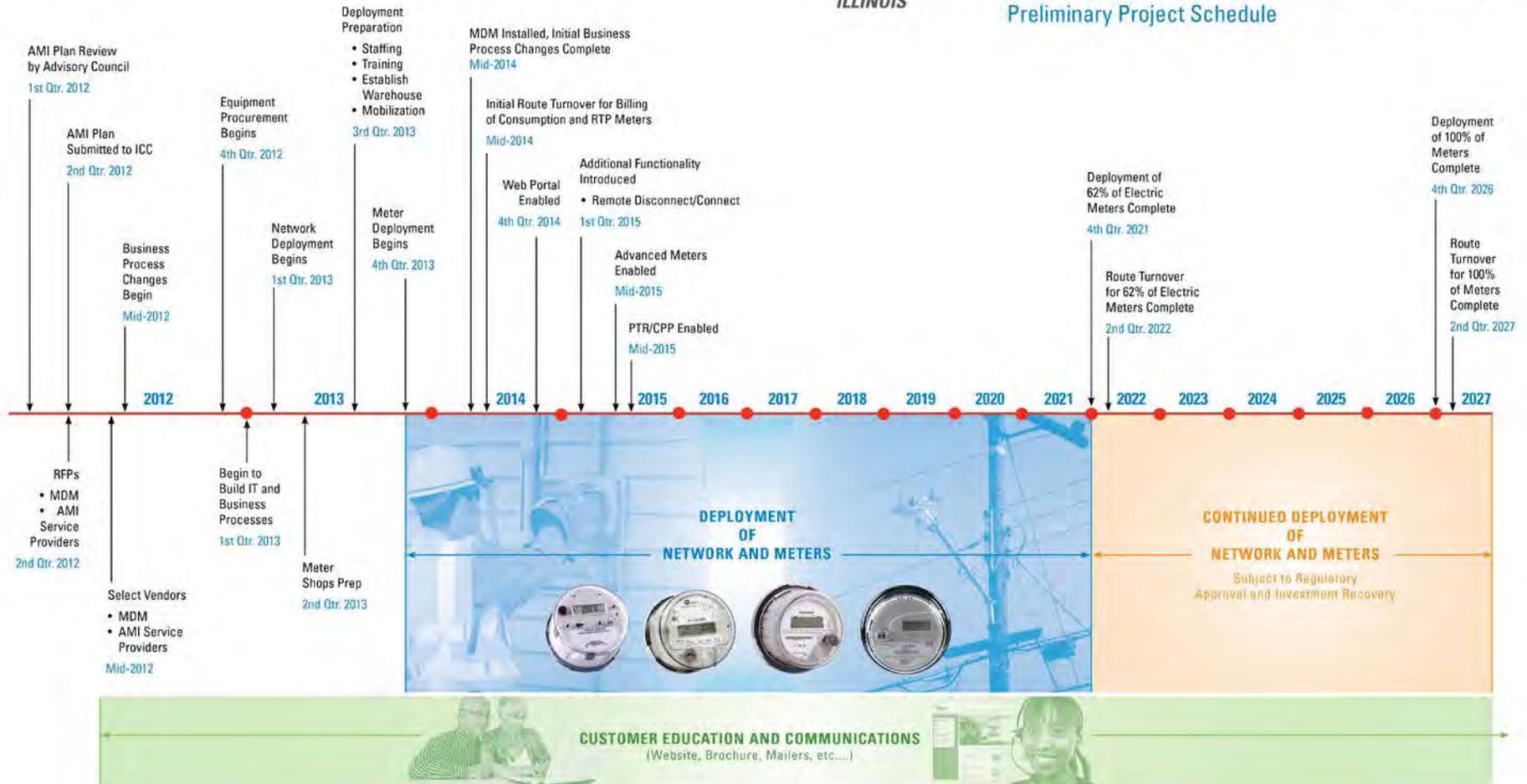
- Daily “Live” and “Post” installation audits will be completed by supervision. Daily tailgate sessions will be conducted to review weekly/monthly team performance goals, safety concerns, audit results, risks to the project.
- Customer-owned Facilities
 - During mass deployment of residential meters, if unsafe conditions are identified (e.g. damaged, customer-owned meter socket) Ameren Illinois will assist the customer so that facilities can be left in a safe and operable situation.
- Route Turnover
 - ‘Basic’ residential and small commercial cumulative electric meters will be converted (during a route turnover) to AMI-read when the IT systems and initial business process changes are complete and tested (anticipated to be ~~mid-2014~~early 2015).
 - Advanced Meters ~~are not expected to~~will be converted to AMI-read ~~until mid-late~~ 2015. This will allow time to test out the new systems and process and perform the ‘coding’ necessary to accept advanced meters.
 - Advanced meters are defined as meters where more than one read is required for billing: Interval, Time of Use, Demand and kWh, etc. Although interval usage may be measured and collected, if it is not used for billing, the meter is not considered Advanced.
 - Manual and automated reads will be compared prior to conversion of the route to AMI-read to ensure that the automated reads are accurate.
 - A specified % of a route (to be determined) must include AMI meters before the route may be converted to AMI-read.
 - Automated residential meter read performance will be required to meet a specified daily performance metric for one complete billing cycle before being converted to AMI-read.
 - Advanced electric meter read performance will need to meet a specified daily performance metric for one complete billing cycle before the meter may be converted to AMI-read.
- Test electric meter remote functionality, but not implement until the performance of the equipment/systems are proven in each Operating Center. Criteria will be established.

Phase 4 - Stabilization

- Address remaining non-automated skipped and non-compatible meters.
- Install Advanced Electric Meter external antennae’s or other equipment to improve performance as needed.
- Monitor network/meter performance and ensure necessary network enhancements are completed.

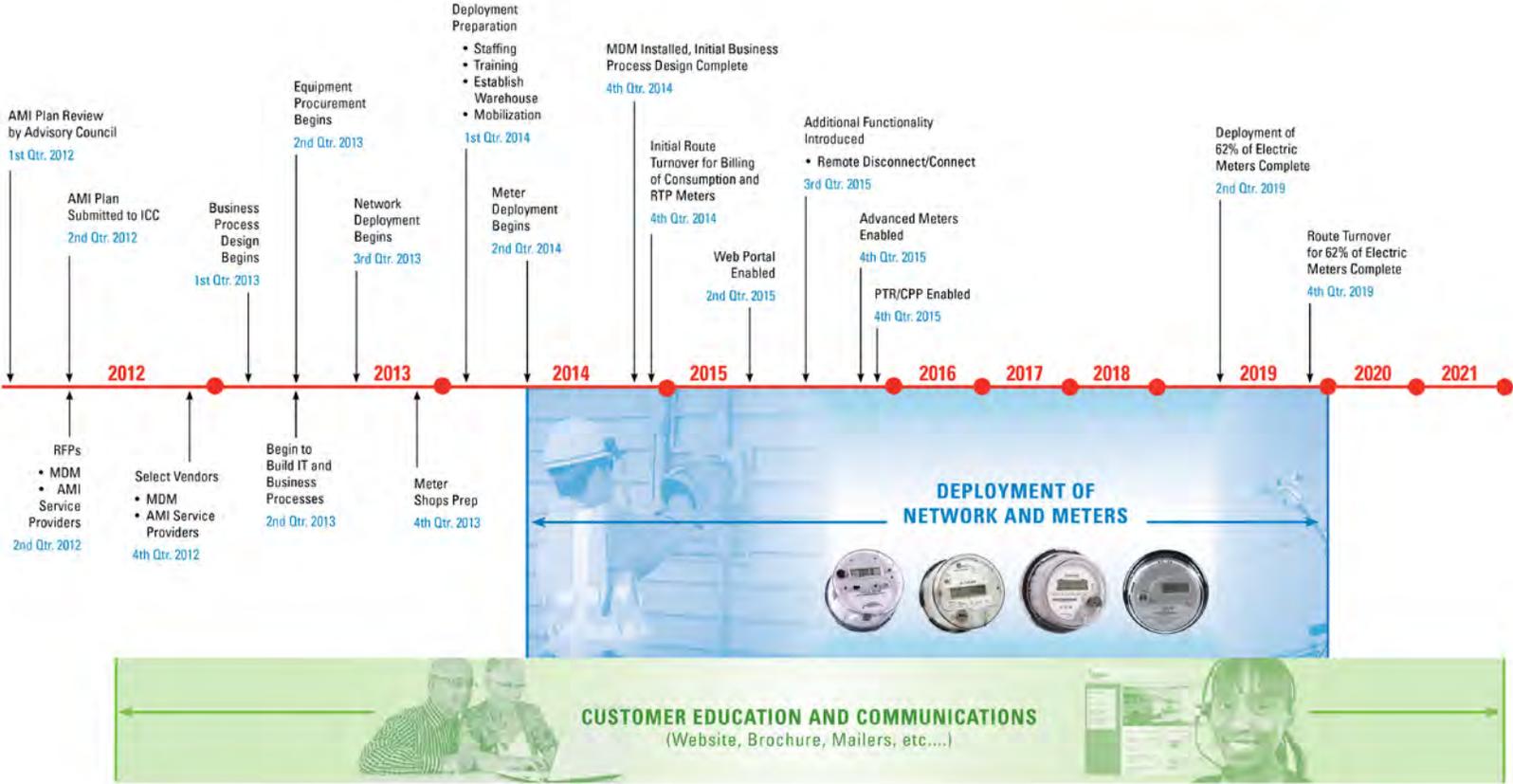


Advanced Metering Infrastructure (AMI) Preliminary Project Schedule





Advanced Metering Infrastructure (AMI)
 Preliminary Project Schedule



Ameren Illinois Advanced Metering Infrastructure Plan

Prepared by Ameren Illinois rev 6/12

6. Cost/Benefit Analysis

6.1 Cost / Benefit Analysis Results

As support for the AMI Plan, Ameren Illinois has developed a Cost/Benefit Analysis of implementing AMI within the Ameren Illinois service territory. A detailed explanation of the costs, benefits, and net present value analysis is provided in Attachment 1 to this AMI Plan. This analysis demonstrates that the present value of benefits exceeds the present value of costs by **\$153406 million** over the 20 year analysis period (~~2012-2031~~2013-2032). Therefore, the implementation of this Plan is cost beneficial for Ameren Illinois electric customers.

6.2 Benefits

The Ameren Illinois AMI Cost / Benefit Analysis includes the identification of benefits associated with the AMI implementation. Installation of AMI will provide a number of benefits that will reduce cost to our customers and improve customer service. These benefits include: reduction in meter reading costs, reduction in field & meter services costs, reduction in unaccounted for energy, efficiency improvement in billing and customer management, IT cost savings, reduced consumption on inactive meters, reduced uncollectibles, reliability improvement and outage management, and demand response, energy efficiency, and other societal benefits. There are also many indirectadditional benefits such as reliability improvement, enablement of distributed generation, new home services, and plug in electric vehicles, increased customer convenience, increased employee and public safety, job creation, and environmental benefits from reduced emissions. The timing of the benefits is based on the deployment plan discussed above. A summary of the 20-year cumulative values is listed in Table 717 of the AMI Cost/Benefit Analysis. These benefits total \$8591,277 million over the 20-year analysis period.

6.3 Costs

The Cost / Benefit Analysis also includes the descriptions and estimates of the major cost elements associated with the AMI implementation. Costs are separated by general area (AMI Meters, Information Technology and Management / Other) and by cost category (Capital and O&M). The timing of the costs is based on the deployment plan discussed above. A summary of the 20-year cumulative values is listed in Table 2 of the AMI Cost/Benefit Analysis. These costs total \$550566 million over the 20-year analysis period.

7. Measuring AMI Plan Success

Ameren Illinois will measure the AMI Plan success in enabling Smart Grid functions and enhancing consumer benefits from smart grid AMI based on the following milestones and metrics.

7.1 Legislative Defined Metrics

The following AMI related metrics were defined in the Illinois Public Acts 97-616 and 97-646. Baseline calculations, yearly incremental metric goals, and reporting schedule were explained in detail in Ameren Illinois MAP-M filing.

1. Ameren Illinois will achieve a 56% reduction in the number of estimated bills as compared to Baseline (the average of the actual number of estimated bills in years 2008, 2009, and 2010) by the end of year 2022.
2. Ameren Illinois will achieve a 56% reduction in the kWh consumption on inactive meters compared to Baseline (the average of the actual kWh of consumption on inactive meters in years 2009 and 2010) by the end of year 2022.
3. Ameren Illinois will achieve a \$3.5 million reduction in uncollectible expense as compared to Baseline (the average of the actual uncollectible expense in years 2008, 2009, and 2010) by the end of year 2022.

Until the AMI infrastructure is deployed and commissioned, and processes are implemented, existing manual methods may will be required used as needed to achieve the yearly incremental metric goals. Although these methods may be needed to achieve the goals in the short term, they are not the most as efficient or cost effective as AMI in the long term, and do not provide the additional benefits of AMI. The manual methods that are planned are:

1. Estimated Bills Metric – additional on-cycle manual meter reading.
2. Consumption on Inactive Meter Metric – completion of additional manual disconnects for locked-hot meters with consumption.
3. Uncollectibles Metric – completion of additional manual disconnects for non-pay.

7.2 Milestones

Ameren Illinois will use milestones to track the success of the AMI implementation. These milestones include, but are not limited to, the following:

- Percent of support system installed
- Percent of 2-way network installed
- Number and percent of AMI meters installed
- Number of customers able to access the Web Portal and Web Portal usage statistics
- Number of customers eligible for peak time rebate tariff
- Number of customers signed up for peak time rebate tariff
- Number of customers on PSP, RTP, or other real time rates

8. Consumer Education and Communication Plan

8.1 Introduction

As we begin the deployment of AMI meters, Ameren Illinois believes that effective consumer education is essential wants our customers to realizing the benefits of an AMI. Consumers must have a clear understanding of the implementation process, the current and future benefits of AMI, the available tools and information that will help them achieve these benefitsfull advantage of the program, and the changes in energy usage habits that may be required to realize the benefits. To further enhance customer education and maximize efficiency

The Consumer Education and results,Communication Plan has been developed to take customers through four distinct phases, beginning with education about AMI and its current and future benefits and culminating in the acceptance and engagement in smart energy pricing programs. We recognize that not all customers will elect to fully participate in all four phases, but we are committed to attracting as many as possible and helping them to realize the entirety of the benefits available to them.

In addition to completing quantitative research to establish a baseline level of Ameren Illinois will proactively partnercustomer awareness about AMI, we have and will continue to leverage other customer research, as well as best practices and lessons learned through AMI implementations conducted by other utilities. Our primary customer audiences are residential and small businesses. We will use our own customer segmentation data as well as segmentation research recently completed by the Smart Grid Customer Collaborative (SGCC) to develop and maintain strategies and messaging to meet the needs of our audiences.

Throughout the phases of the AMI implementation, we will use familiar and established communication channels such as bill messages and inserts, newsletters and direct mail to educate and inform our customers. We will leverage partnerships with local media outlets, local officials, civic and business leaders and organizations, emergency responders, as well as local and state agencies and consumer groups to integrate customer educationto help reach our customers. We also plan to coordinate with and leverage the resources of the Illinois Science and Energy Innovation Trust.

Our overall intent is to provide information in a timely and transparent manner, educating customers about the complete benefits of AMI and their future options of pricing plans and technologies that will help them better manage their energy use.

8.2 Research and Lessons Learned

This section summarizes the key lessons learned from our past AMR deployment, consigned research and information about other advanced meter deployments.

8.2a Ameren Illinois AMR Deployment

Ameren Illinois embarked upon an aggressive expansion of automated meter reading in its service territory in the spring of 2006. Upon the completion of this work in early 2010, approximately 678,000 (more than half) of the Ameren Illinois' electric customers had automated, one-way, transmit-only (AMR) meters.

While the AMI deployment will be significantly larger in terms of customer benefits and future available technologies, Ameren Illinois learned many lessons through the AMR deployment and will incorporate many of the successful communications strategies in the upcoming AMI deployment. Our key goals for the AMR communications were:

1. Customers would be aware of the initiative, understand when and how the upgraded meters would be deployed in their community, and understand how AMR would benefit them.
2. Ameren co-workers would be actively informed throughout the deployment and adequately prepared to respond to customer questions.

3. Stakeholders would be proactively briefed and updated throughout the implementation to help inform and field questions from their respective audiences and constituents.

Various types of communications and communications channels were used to help meet our goals. The project was announced with a statewide news release and supporting documentation provided to the ICC and state legislators. Prior to the first installation in the Champaign area, a Customer Service manager made a Champaign morning TV news show appearance. AMR information also was provided on Ameren.com.

As communities were identified for installation, the communications plan rolled out in a systematic and consistent manner.

Time before deployment	Description
6 weeks	Personal contact is made with local mayors, police and other community leaders. Additional information is provided to address any local community needs.
4 weeks	Localized news release is conducted and a media event arranged to demonstrate the installation of the AMR technology in the local community.
2-4 weeks	Direct mail piece is sent to customers announcing the timeline of the installation of their meter and highlighting specific benefits.
Day of	Installer attempts a courtesy contact with the customer to inform them of brief interruption of power. After the install is complete, a door hanger is left that provides information about the installation, general benefits and whether or not a return visit is required.

As a result of this successful implementation, Ameren Illinois will build off these core communication elements in the deployment of AMI. These elements include, but may not be limited to:

1. Contact with local mayors, emergency responders, community leaders, stakeholders and organizations.
2. Advanced notice to customers announcing the timeline of the installation and highlighting current and future benefits.
3. Localized news release and media briefing.
4. Courtesy contact prior to installation and door hangers left after installation.

8.2b Ameren Illinois Commissioned AMI Research

In early 2012, Ameren Illinois commissioned Market Strategies International (MSI) to develop and conduct a quantitative study to measure the baseline awareness about AMI among Ameren Illinois customers. This study was intended to help guide the development and delivery of our stakeholder and customer education plan. Ongoing research will be conducted to track progress and to strategically guide the sustained communications.

8.2 Key Findings from the MSI research:

- 63% of customers have heard the term “smart grid.” Among the 63% hearing the term:
 - o 40% don’t know much about what it means
 - o 34% have a favorable impression, 29% are neutral, 16% have an unfavorable impression, and 21% don’t know.

- 45% of customers have heard the term "smart meter." Among the 45% hearing the term:
 - 25% of those who have heard the term don't know much about what it means
 - 35% have a favorable impression, 28% are neutral, 23% have an unfavorable impression and 14% don't know.
- 46% of all customers feel that smart meters would be "mostly an advantage", 40% seeing the meters as "having no impact" and 8% as "mostly a disadvantage".
- Customers indicated that improving reliability, bill accuracy, customer service, and giving customers more control of home energy usage as the top smart meter benefits.

8.2c Other research and professional networking

Benchmarking research was conducted with nearly a dozen U.S. utilities that have or are undergoing grid modernization and AMI deployment. Additionally, AIC representatives attended an AMI Customer Education and Outreach Workshop that included representation from CenterPoint Energy, Baltimore Gas & Electric (BGE), Kansas City Power & Light (KCP&L), Oklahoma Gas & Electric (OGE), Commonwealth Edison, HydroOttawa and Sacramento Municipal Utility District (SMUD) to learn from their AMI deployment experiences.

These are the major takeaways of these engagements:

External Stakeholders

- All utilities interviewed stressed the effectiveness of one-on-one and small group meetings/presentations. These intimate discussions were used as the primary vehicle to prepare local leaders for grid modernization and AMI deployment.
- All utilities attended city council/local government meetings to create awareness among large audiences in deployment territories.
- The majority of utilities performed staged messaging leading up to and through deployment.
- A few utilities demonstrated advanced meter technology and the meter exchange process for local officials.
- Several utilities equipped local officials/stakeholders with presentations to share with constituents upon request.
- Utilities found that external stakeholders appreciated receiving fact sheets and research findings as well as details regarding utility and consumer benefits.
- A few built new partnerships using teachers and young student ambassadors to help with events and one-on-one outreach efforts.

Customers

- Overall, customers responded most positively to messages regarding cost savings and control over energy usage.
- Messaging was found to be most effective when it was focused to specific demographics with tailored approaches.
- The majority of utilities performed staged messaging leading up to and through deployment.
- Utilities leveraged existing, familiar channels and communications vehicles to reach customers.
- Messaging should be consistent, and concise and easy to understand.

Internal Stakeholders

- Utilities formed employee ambassador programs to educate employees to communicate intelligently with customers and other stakeholders.
- Utilities made grid modernization and AMI program information readily available to employees via a company intranet site, periodic newsletters and emails.
- Some utilities equipped employees with messaging toolkits including FAQ pages, fact sheets, talking points, wallet cards, news stories, etc.

- Employee feedback mechanisms were found to be vital to enabling improvement of communications efforts throughout stages of deployment.

8.3 Goals

~~Educate~~Based on the Ameren Illinois and other available research, we will build off the initial smart grid awareness to educate all stakeholders about the benefits of grid modernization and the fundamental role AMI will have as a part of building a more secure energy future. ~~Explain~~We have already:

- Developed a detailed briefing presentation, overview video, project fact sheets and other educational materials.
- Developed a centralized Internet site to serve as the source for information on grid modernization and AMI.
- Trained and engaged our Community Relations Coordinator (CRC) team to conduct outreach visits and presentations about AIC’s Modernization Action Plan (MAP) and AMI to individual and organizational stakeholders.
- Provided an update to the members of the General Assembly.

~~As our communications, outreach and education progresses, consumer benefits that include awareness and understanding about future AMI technologies that and features will increase, eventually leading to customer action and choices resulting in improved energy efficiencies. We will help customers understand how these advancements will optimize the operation of appliances and consumer devices; and the value of timely and detailed usage information for selecting the most appropriate pricing structures to fit individual customer lifestyles; and information that can lead to behavior modification consumer choices resulting in improved energy efficiencies–lifestyles.~~

8.3 Objectives

- ~~Educate co-workers on AMI so that they are able to answer customer questions and provide ongoing communications throughout the deployment period.~~

~~Prepare~~Our goals include helping our customers for AMI by educating about its and stakeholders to:

- Understand AMI to be an integral component of the Modernization Action Plan (MAP).
- Understand and be able to communicate the benefits now and in the future of AMI to their families, friends, neighbors, constituents and others.
- ~~Enhance~~Understand the ~~customer experience through the process~~benefits of AMI deployment.
- ~~Address concerns consumers may have about the health, safety~~advanced meters and ~~privacy of AMI.~~ pricing programs (such as Peak Time Rebate <PTR>).
- ~~Communicate to affected customers details about the deployment of the new metering system.~~
- ~~Educate public officials, the media, opinion leaders and others who may interact with customers during the deployment process.~~
- Understand AMI is a “normal” course of doing business with Ameren Illinois.
- Use an effective “two-way” communication channel to provide feedback, ask questions and gather information.

8.4 Objectives

The objectives and intended measures of the Customer Education and Communication Plan are:

Objective	Measure
Customers are informed and educated about AMI and the deployment process	Research, number of calls/emails/letters, content of feedback, media monitoring
Customers accept AMI	Customer satisfaction scores and feedback
Little or no project delays due to communications	Number of delays attributed to communications
Negative perceptions and concerns are alleviated	Number of calls/emails/letters, content of feedback
Co-workers have the information they need to answer customer questions and provide on-going communications throughout the deployment period.	Internal co-worker meetings, regular internal communications, surveys
Public officials, the news media, opinion leaders and others are educated about the deployment of the new metering system.	Tracking of informational sessions, individual meetings, news coverage and presentations

8.5 Key Message Components

~~Developing~~To help our customers accept and engage in AMI capabilities, we have begun to develop concise, consistent messages ~~that will foster customer acceptance and engagement of AMI capabilities is necessary to achieve maximum benefit of~~ regarding the benefits of grid modernization. ~~Key message components should help the customer form a single-minded message or point of view as to why Smart Grid and AMI are needed as part of MAP.~~

Customer point of view: Building a smart grid is going to enhance my lifestyle; my community; my environment; and my future generations.

Proposed Key Message Components:

- ~~1. How AMI works~~
- ~~2. Information AMI collects~~
- ~~3. Privacy of customer information — extensive security controls~~
- ~~4. Identify key features and benefits of AMI~~
- ~~5. How consumers can use AMI information to become more energy efficient~~
- ~~6. How consumers can use AMI information to lower their energy bills~~
- ~~7. Assure consumers that AMI is safe (educate on facts regarding radio frequencies)~~
- ~~8. Power quality and reliability benefits of AMI~~
- ~~9. How the company uses data collected from AMI~~
- ~~10. General benefits of AMI, such as lower utility cost of operation~~
- ~~11. Future potential benefits to an AMI system such as pricing structures and peak-time programs~~

1. How advanced meters and AMI work: Advanced meters are sometimes called “smart” because they allow for two-way communication. This means meters can talk to the utility and the utility can talk back so that operational, reliability and billing efficiencies can be realized. Eventually, these meters will allow customers to obtain timely information about their energy usage.
2. Information collected by advanced meters: AMI is designed to effectively and securely capture and transmit data. Information collected is used for power quality, outages and tampering and safety alerts, like overheating. This information will allow Ameren Illinois to troubleshoot and resolve problems with equipment or services, analyze rates and rate structures and suggest rate options that better match customer needs and energy use, and when requested, assist customers in managing their energy use. AMI meters collect information that is used in the daily operations of the utility and interval usage data is used to generate bills and assist with reducing, restoring and communicating outages.

3. Privacy of customer information – extensive security controls: Ameren Illinois is, and always has been, committed to safeguarding customer privacy. Advanced meters do not transmit customer account numbers, names or other personal identifying information. Data transmitted from advanced meters will be covered by the same rigorous privacy and security protections that are in place for other account information. Ameren Illinois treats personal information and other data about our customers as confidential, consistent with all legal and regulatory requirements. In addition, customers no longer will need to provide access to their property for meter reading since the meters will be read remotely.
4. Identify key features and benefits of AMI: An advanced meter can alert Ameren Illinois when there is an outage, meaning the customer will no longer need to report the outage. For customers who depend on life-saving medical equipment, this means added peace of mind. Customers who are moving to a new home and want to establish electric service will no longer need to wait for a utility worker to physically turn on the service. An advanced meter reduces the incidences of estimated billing, ensuring the most accurate bill is delivered each month. In time, customers also will be able to access their usage information for greater awareness, billing inquiries and to take advantage of special pricing structures that could help them save money.
5. Energy efficiency advantages: In time, the meters will enable customers to learn how they are currently using energy and how they can use less to spend less.
6. Health and safety impacts/concerns: Like all commercially available telecommunication equipment, advanced meters are required to meet Federal Communications Commission (FCC) limits. Ameren Illinois has reviewed independent lab results demonstrating that advanced meters meet or exceed FCC limits. Common household items like cell phones, microwave ovens, baby monitors, cordless telephones and Wi-Fi routers emit much more radio frequency (RF) than advanced meters which only transmit for a few seconds every hour for a total of no more than two minutes per day.
7. Power quality and reliability benefits of AMI: AMI will help pinpoint and resolve potential and current problem areas in the grid without having to send crews to a location to investigate. This provides more efficient use of resources and reduces the amount of fuel used and carbon emissions emitted from trucks. If crews are necessary, AMI provides information regarding the tools, equipment and resources needed to fix the problem. AMI will enable the ability to identify equipment that may not be operating at its full potential for repair or replacement before it fails. In the event of an outage, power can potentially be rerouted around the problem area, allowing for faster restoration times during outages. AMI helps measure power quality at the point of use so that too much or too little voltage is not delivered to businesses and residences which could damage electric equipment or appliances in the home or business. This will also reduce the amount of “line loss” that is experienced ... energy waste resulting when electrical energy is transmitted across power lines.
8. How Ameren Illinois uses data collected from AMI: Ameren Illinois will use the data collected through AMI to bill customers for energy services, troubleshoot and resolve problems with equipment or services, analyze rates and rate structures and suggest rate options that better match customer needs and energy use and, when requested, assist customers in managing their energy use.
9. Cyber-security concerns: Ensure AMI is secure. As the technology is deployed, Ameren Illinois will closely adhere to our own stringent standards regarding cyber security. We will also reference the standards set forth by the US Department of Energy (DOE) and National Institute of Technology and Standards (NIST). The radio signals and data that pass through the smart grid system will be protected and secured through the implementation of the most current and stringent cyber security standards. The network data security, in addition to strict Ameren Illinois customer privacy policies, will ensure customer privacy.

10. What will happen during the installation of the AMI meter: The customer will receive a letter or other direct information from Ameren Illinois approximately 4 weeks prior to the install. This information will announce the timeline and provide an overview of the current and future benefits of AMI. On the day of the meter switch, the installer will do a courtesy knock on the door; explain the work to be performed and inform the homeowner that a brief power outage will occur that may result in the need to reset clocks and electronic equipment. When the work is complete, the installer will leave a door hanger at the home explaining the procedure that took place, reiterating the benefits of the meter and communicating any further action needed by the homeowner.

8.5 Stakeholders

Ameren Illinois AMI deployment will require communication and engagement with a variety of stakeholders, and those stakeholders often have different reasons for the type and degree of information they require based on what matters to them.

~~These basic stakeholder groups will consist of the following:~~

- ~~• Consumers of energy — includes not only residential and non-residential customers of record, but families, employees and others who use energy~~
- ~~• Affected customers — those customers who have been identified to receive the new meter~~
- ~~• Regulators~~
- ~~• Municipal officials~~
- ~~• Educational institutions~~
- ~~• Community Action Agencies~~
- ~~• Civic and Opinion leaders and advocates~~
- ~~• Legislators~~

~~Media~~We categorize these stakeholders in the groups below and aim to articulate what information they would find valuable as well as a level of engagement that we would expect this group to have with Ameren Illinois. We base this on the benchmarking study as well as our own experience with these stakeholder groups through the AMR deployment. We split these stakeholders into three groups (Customers, External Stakeholders and Internal Stakeholders).

Stakeholder Type	Rationale/Approach	Level of Expected Engagement
CUSTOMERS		
Consumers of energy	Includes not only residential and non-residential customers of record, but families, co-workers and others who use energy.	Medium
AMI customers	Residential and non-residential customers who have been identified to receive the new meter and whom we will engage directly before, during and after the meter installation.	Medium
EXTERNAL STAKEHOLDERS		
Regulators	Regulatory stakeholders will be monitoring our project closely and will want scheduled and ad-hoc status and progress reports on the deployment.	Medium/High
Local government officials/staff	Stakeholders in a variety of roles within townships and municipalities where we will	Medium/High

	be installing AMI, RF equipment and meters. They need to know the particulars of the project for safety, security and constituent communications.	
Educational institutions (UIUC, UIS, Bradley, SIU, WIU, EIU, ISU, Millikin, Illinois Wesleyan, Augustana, the Junior College network, etc.)	Stakeholders who have (or could have) research and/or educational stake in energy projects, particularly in smart grid areas. Would act as both a communication/education conduit but also as a supporter of the effort to upgrade the electric grid and emerging customer-facing technologies.	Low/Medium
Economic Development organizations and Chambers of Commerce	Stakeholders who have responsibility to promote areas within the Ameren Illinois service territory as opportunities for economic development initiatives. Their interests lie in enhancing the infrastructure in these areas to attract and retain businesses and economic activity.	Low/Medium
Business/corporate communities	Like the economic development stakeholders, business communities are interested in attracting and retaining commerce, resources and talent in their communities.	Low/Medium
Third Party Service Providers (ARES, aggregators, technology providers, energy service providers, etc.)	Since third parties will provide customers with much of the new services and technologies made possible by AMI, it is very important that these entities be kept informed and involved.	Medium
Consumer Organizations (CUB, ELPC, AARP, Sierra Club, etc.)	Consumer organizations are important stakeholders which have been actively engaged in the AMI discussion. Maintaining open lines of communication is key.	Medium
Civic and Opinion leaders and advocates (Rotary, Kiwanis, VFW, etc.)	Civic and opinion leaders have an opportunity to share and communicate information about AMI with their members/constituents.	Low
Legislators	Legislators will be monitoring the project to ensure that the commitments of SB1652 are met and constituent questions answered.	Medium/High
Religious Affiliations/Clergy	We will engage these organizations and individuals as appropriate throughout the deployment.	Medium/Low
Metro and Community	The various news media stakeholders from	Medium/High

News Media (Broadcast, Cable, Print and Internet)	all channels will need to be engaged in communication and educated on project impacts, benefits, status, progress, etc.	
INTERNAL STAKEHOLDERS		
Ameren Illinois co-workers, retirees, vendors, etc.	Ameren Illinois co-workers present an opportunity to educate and engage on the overall benefits, timeline and available tools resulting from the project. While they will be effectively communicated to regarding how this project might change their roles and responsibilities with the company, they have the opportunity to share the resulting benefits, tools and impacts of the project with their friends, family, neighbors and fellow parishioners, volunteers and communities.	Medium/High

• ~~Ameren Illinois co-workers~~

8.6 Audience Customer Segmentation

While Ameren Illinois has a foundation of robust customer segmentation data that can be leveraged to model AMI adoption and customer behaviors, we will couple this baseline information from our service territory with research that has been recently completed by the Smart Grid Customer Collaborative (SGCC). The SGCC is a multidisciplinary organization made up of utilities, vendors, consultants, researchers and other interested stakeholders created so these groups could share research, best practices and resources to provide value to its members and other interested parties.

The specific research that we reference below is from the document titled “CONSUMER PULSE RESEARCH PROGRAM–WAVE 1”, dated September, 2011. It is important to note that these are aggregated segments from research performed nationwide and not attributable directly to Ameren’s service territory.

This behavioral segmentation will enable more targeted messaging when and where appropriate. These segments represent “five distinct population groups that are defined holistically: they are different in terms of their lifestyles, attitudes, values, behaviors, motivations, technology adoption, communications preferences, etc.” The opportunities to educate and engage these customers are described below:

Segment	Defining Statement	Demographics	Opportunities to Engage
Easy Street	“We can afford to pay for electricity. The cost isn’t that much, on our budget.”	<ul style="list-style-type: none"> • High levels of education • Highest income of any segment – 28% above \$100K • Middle aged, moderate–liberal politics 	<ul style="list-style-type: none"> • Easy Street customers are unlikely to exhibit a high level of engagement with energy management. Simplicity and ease-of-use are keys to acceptance. • Messaging should emphasize environmental benefits and stewardship for future generations.

		<ul style="list-style-type: none"> Fairly diverse: 15% Hispanic, 13% African American 	
DIY & Save	<p>“Energy efficiency and smart grid programs sound appealing, because they would help us save money.”</p>	<ul style="list-style-type: none"> Middle-income Families; 20% have three or more children at home Diverse range of ages from 25-65+ Largely White, 12% Hispanic Average levels of education Conservative politics 	<ul style="list-style-type: none"> Product, program design and messaging should emphasize saving money and de-emphasize environmental benefits. There are opportunities to market products and programs that leverage their DIY interest and experience. Consider outreach through faith-based affiliations and communities.
Concerned Greens	<p>“Smart grid and smart meters will help protect the environment.”</p>	<ul style="list-style-type: none"> Highest levels of education High income –23% above \$100K Moderate/liberal politics Middle aged (65% are between 25-54) More women than men Largely White, 14% Hispanic 	<ul style="list-style-type: none"> Segment is receptive to environmental concerns and tries to protect the environment through their own actions. This segment is the most naturally inclined toward participating in energy efficiency and smart grid programs. Like new technology and have the resources to make investments in better energy management.
Young America	<p>“We wish someone would tell us how smart grid can help us save money and help the</p>	<ul style="list-style-type: none"> Youngest and most ethnically diverse segment Lowest levels of education and income Least likely to 	<ul style="list-style-type: none"> The primary focus in communication with this segment should be education. They are concerned about environmental issues and face financial constraints - let them know how smart grid products and

	environment.”	<p>have kids under 18 at home</p> <ul style="list-style-type: none"> • Likely to live in apartments/condos/ mobile homes 	<p>programs can help address both issues.</p> <ul style="list-style-type: none"> • May be considered a longer term developmental opportunity as they mature and become more likely to be homeowners.
Traditionals	“Frankly, we’re not at all sure smart grid is needed.”	<ul style="list-style-type: none"> • Predominantly older (25% are age 65+) • The most politically conservative and religious segment • Relatively low levels of education • Average income • More men than women • Mostly white 	<ul style="list-style-type: none"> • Program/product design and promotion for this segment should emphasize immediate money savings. • Messaging may also communicate that energy efficiency can contribute to having a comfortable home.

Understanding—the needs of each customer segment will help focus and tailor messages and solutions to deliver the most effective education about AMI and efficient implementation of consumer awareness programs. In addition, segmentation will identify customers with a higher propensity to engage in energy use changes or technology that achieves energy saving goals.

Further audience research and/or customer segmentation may be engaged using customer analytics to identify the likelihood of specific residential customer segments or propensity to follow a certain behavior or take a certain action. With this modeling, certain geographic areas or customer segments may be identified that require specific messaging to address special customer concerns, or to target consumers for program participation.—take a certain action.

8.7 Communication Vehicles and Channels

There are a variety of communication avenues available to help educate stakeholders about the benefits of AMI. As a part of this communication plan, Ameren Illinois will produce a range of messages delivered through a variety of available vehicles and channels for the purposes of general awareness and education, addressing issues and concerns, communicating timing, methods and impacts of the AMI deployment, and promoting available programs. The phases of the communication plan described in the next section drive which communication vehicles or channels are selected to inform and educate consumers as well as what messages are delivered. These communication vehicles and channels may include:

Customer Communications

Vehicles/Collateral	Description
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Frequently Asked Questions (FAQ)	A document that outlines questions and associated answers stakeholders might ask once they become aware of the AMI program. Will be a living document that will improve over time as more is learned.
Scripting for Customer Service Representatives (CSRs)	CSR and Field teams will be equipped with scripts and message points to make customers aware and to provide details of the deployment and programs for inquiring customers. This vehicle could also be used as a prompting to ask customers if they are aware of the project should they call around the time of their installation (if information is available).
Leveraging earned media news releases and news media advisories	Through the traditional and established communications mix, news releases and news media advisories will allow Ameren Illinois to communicate benefits, associated milestones and status/progress of deployment.
Bill Messaging/Inserts	Information placed on bills to raise awareness on benefits and impacts and pointing customers to more information (website, newsletter, phone number, etc.)
Customer Newsletter (Facts On Energy)	The newsletter will be used to provide regular updates on the project, its benefits, impacts and to share customer testimonials, etc. The newsletter offers an opportunity to share what customers can expect during deployment as well specific scenarios of how they will benefit from AMI.
Advertising (print, radio, TV, digital, billboards, etc.)	Targeted advertising in areas may be considered to raise awareness of the deployment and to reach large customer segments.
Dedicated web pages that include fact sheets, contact information, programs, FAQs	Web pages will be created and managed to supply specific information for customers around the benefits of AMI as well as the details of the project. These pages could also provide links to other information such as FAQ's, demonstration videos, external research, customer testimonials, and possibly an interactive map showing deployment timeframes. Once PTR rates and the customer portal are available, information regarding those will also be available.
Videos demonstrating: <ul style="list-style-type: none"> • installation process • how the “AMI system” works/meter accuracy 	Videos may be created to show customers what they can expect during installation as well as understand how the system works for greater awareness and education. Once it becomes available, more information can be displayed in this vehicle about the customer portal as well as the PTR rates and other tools that may exist in the future.

<ul style="list-style-type: none"> • how to access and use information available to the customer via a web portal • other “tools” available on the market to supplement customer energy management 	
<p>Deployment communications</p> <ul style="list-style-type: none"> • direct mail • automated calling in advance of exchange • door “knock” • door hangers • “Welcome Kit” 	<p>While we will determine the most effective way to communicate with customers during deployment, we may employ the use of direct mail pieces and, possibly, automated calling to customers to make them aware of the pending installation. On the day of installation we will use a door knock to directly engage the customer to let them know of the installation and a post-installation door hanger (multiple for multi-unit dwellings) informing them of the installation and its benefits, where to go for questions and more details around enabling programs. Finally, we may find that in some areas of high engagement/propensity to participate in programs a “Welcome Kit” would help convert a higher percentage to participate in the customer portal and/or adopt specific rates.</p>
<p>Flyer/wallet card</p>	<p>A wallet card could be used by co-workers and deployment teams to hand out to friends, customers, family, neighbors, etc. These cards would be limited to information about the benefits, but would point the customer to a place for more information (website, phone number, etc.). Deployment teams could use this card as a hand-out in the field should they get questions that they cannot answer directly or immediately.</p>
<p>Educational brochure(s)</p>	<p>A multi-faceted brochure would have a variety of different topics on it and could change/differ depending on deployment stage (awareness/education, deployment, engagement). This brochure could be used to hand-out at grassroots events, for municipalities/townships to have on hand in their facilities and in other public places like libraries, grocery stores, etc.</p>

[The illustrations below are design concepts of the types of communications collateral Ameren Illinois may create to share the story of AMI with our customers:](#)

[Door hanger left after install](#)



[Website page](#)



[Mobile unit of hands-on, interactive displays](#)



External Stakeholder Communication

While some external stakeholders will take information as consumers of energy or impacted customers, we wish to educate them in different ways and with different media. External stakeholders require more detail around how AMI will impact their constituents, as well as any safety or security dependencies that require mitigation.

<p>PowerPoint presentations for Community Relations Coordinators (and others)</p>	<p>This extension of the Speakers Bureau would allow trained communicators to share details of the project and its benefits with stakeholders. This could also be shared with end customers through external stakeholders in forums such as City Council meetings, Community Action Agency meetings, Rotary Meetings, Chamber of Commerce meetings, etc.</p>
<p>Informational Binders</p>	<p>Notebooks containing informational and educational pieces</p>

	about AMI to be distributed to elected and municipal leaders for the purpose of helping them speak intelligently about AMI to their community audiences.
Legislative Updates	Formal or informal updates may be conducted as needed or as requested by Legislative members and leaders.
Regulatory Filings	Regulatory findings will provide updates and status related to the AMI deployment.
Interactive Displays	Interactive displays may be considered that allow for interactive engagement with audiences on how AMI works, its benefits and resulting functionality to customers. These could also serve as a “call to action” for customers to engage with rates and usage information.
Mobile Demonstrations	A mobile demonstration may be considered to visit customer deployment areas and engage with communities and their leaders and provide education.

Internal Stakeholders

In addition to what is listed above, Internal Stakeholders have several vehicles available to them to get information regarding the program including but not limited to:

Vehicle	Description
Intranet pages	A section on Scholar could be created to post information about the program as well as updates on project progress, co-worker testimonials, job postings related to the project, updates on milestones and commitment metrics, etc.
Internal Town Hall Meetings	In addition to the videos, project information could be shared at Town Hall meetings to further educate co-workers on how they can make a difference in promoting the project and educating their family, friends, and neighbors.
“Actions Matter” Co-Worker Video Segment	A segment in the internal videos shown at “town hall” meetings may include information about the project as well as up-to-date information on its progress and ways in which it is changing how Ameren Illinois interacts with its customers.
Ameren Journal	A quarterly newsletter sent to employees and retirees discussing key company initiatives.
Internal memos	Employees receive regular, weekly memos from executive leadership who share information on timely issues and initiatives.
Ambassador Programs	We may explore the concept of a formal ambassador program where interested co-workers volunteer for in-depth training on the AMI deployment and are available to assist

	with grassroots efforts (i.e., Neighborhood Associations, community festivals, booths at sponsored events, etc.)
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8.8 Channels

Many different communications channels will be leveraged to ensure the message reaches the intended audiences. Some of these proposed channels are listed and detailed below:

Channel	Description
AmerenIllinois.com or unique URL	Dedicated web pages providing complete information about the AMI project. Website will ultimately list planned MAP and AMI projects, a customer portal for accessing energy usage, etc.
Customer Service (Call Center)	Service representatives will be trained to respond to customer inquiries and concerns regarding the AMI project and will know where to refer customers for additional information.
Direct Mail	Personalized letters, postcards or other materials sent directly to impacted customers.
Email	Possible program that allows customers to sign up for email alerts regarding the AMI deployment.
Social Media (Twitter, YouTube, etc.)	Alerts and educational materials may be incorporated into an overall social media strategy for AMI.
Customer Portal	A website that may or may not be incorporated in AmerenIllinois.com that allows customers easy access to personal energy usage and signing on for future pricing programs that become available as a part of the AMI project.
Customer Forums	Customer forms could be employed in some areas to provide more detailed conversations with customers on the messaging, tactics and AMI deployment process. These forums would be professionally mediated and conducted in an organized, controlled and “roundtable” environment.
1:1 Meetings	1:1 Meetings will be held with stakeholders that wish to be briefed on the project separate from any public forum (i.e., City manager and staff, mayors, council, chamber of commerce meeting).
Public/private meetings	Meetings where information can be shared with constituents of an organization or in a public forum (Rotary meeting, University Board of Trustees meeting, city council meeting, etc.)
Community outreach to mayors, community action	Proactive meetings to educate and engage these groups and address any special needs or concerns.

agencies, and senior citizen organizations	
Community Events, Fairs, Festivals	In conjunction with regularly sponsored events, Ameren Illinois may feature the AMI deployment through educational and possible hands-on materials, displays and demonstrations.
Open Houses	Possible events sponsored by Ameren Illinois in communities scheduled for AMI deployment to provide overview of the project, education, information and possible hands-on activities.

~~8.9 This behavioral segmentation will enable more targeted messaging when and where appropriate. Potential segments that Ameren Illinois had previously identified include:~~

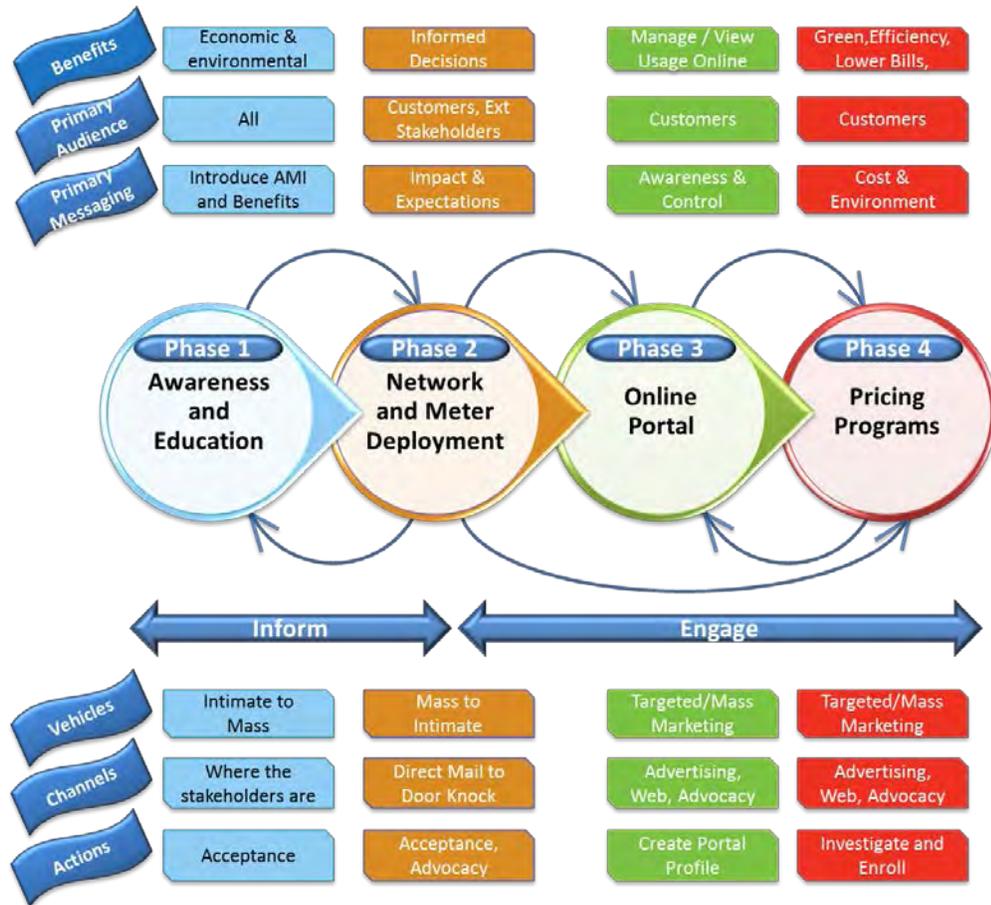
- ~~● **Established and Enabled** — These are customers who typically have a higher education, higher income, above average energy usage, and are generally between the ages of 35-64. This group represents approximately 5% of residential customers.~~
- ~~● **Young and Transient** — Generally customers in this group have incomes less than \$20K, and consist of a household size of one or two members. They are the youngest customer group, and are more likely to be an active eCustomer participant. This group represents approximately 1% of residential customers. Their usage is below average with typical variation.~~
- ~~● **Middle Lane** — These customers are “middle of the road” on most attributes. They are mostly middle age, with average education levels and have incomes between \$20K and \$50K. Their energy usage is “average steady”. They are familiar with the web, but are not avid users. Their education level is average. This group represents 8% of residential customers.~~
- ~~● **High Users** — Customers in this group are also mostly middle age. They are less educated and have incomes between \$20K and \$50K. They are more likely to live in an urban area. They are the highest users of energy and represent the 21% of the eCustomer population. This group represents 6% of residential customers.~~
- ~~● **Budgeting Web Users** — These customers are typically older with education and income levels similar to the residential base. They are most likely to use Budget Billing, Direct Debit, Real Time Pricing (RTP), and energy efficient products. They are active users of the website to pay bills. They represent 50% of all eCustomers. Their electric usage is low (gas is average). This group represents 40% of all residential customers.~~
- ~~● **Disengaged** — This group is made up of older customers who have very little contact with any of the Ameren channels. They account for 50% of the age 65 and over population. They have an average income and education level. Product and program adoption is often low. They have low electric and low gas usage. They are not likely to engage in web-based services. This group represents 40% of residential customers.~~

~~Understanding which customer segments to target and which messages and solutions are best focused for each segment will result in more effective education about AMI and efficient implementation of consumer awareness programs. In addition, behavioral segmentation will identify customers with a higher propensity to engage in behavioral changes or technology that achieves energy saving goals.~~

8.7 Implementation Plan

The Consumer Education and Communication plan will consist of four phases. Throughout each phase, various degrees of emphasis will be placed on the eleven key components identified to achieve maximum benefit of grid modernization.

The graphic below depicts the stages and key themes of the benefits, audience, messaging, vehicles, channels and expected actions after each stage.



Phase 1 Customer Engagement: Global Early Awareness

This phase Timing: Begins approximately 180 days prior to deployment in an area

Phase 1 will incorporate education of co-workers, municipal/local officials and consumers, educational institutions, civic leaders and opinion leaders of the benefits of grid modernization from a global perspective ~~as well as address early concerns of health, safety or privacy.~~ It will encompass the many aspects of grid modernization and will include AMI as a part of the overall strategy to improve service to customers.

Engagement	Benefits	Conclusions	Actions
<ul style="list-style-type: none"> Connect the value of upgrading the grid Introduction to AMI and its benefits 	<ul style="list-style-type: none"> There are environmental and economic benefits of this project I will be able to make more informed decisions about: <ul style="list-style-type: none"> My impact on the environment Opportunities to save money/energy Alternative power supply (renewables, etc.) My power will be more reliable (outages fewer and shorter in duration, improved power quality) 	<ul style="list-style-type: none"> I trust Ameren Illinois to make good decisions AMI is good for Illinois, my community and my family Due to a variety of factors, I will use energy differently in the future Improving the grid will help customers and Ameren manage this change Current meters don't have the functionality needed 	<ul style="list-style-type: none"> Appreciate Ameren Illinois efforts Go to Ameren.com to get more information and sign up for Customer/MAP Newsletter Acceptance of improvements Support on-going grid modernization Take action in managing energy

Messaging Components

<ul style="list-style-type: none"> How AMI works Information AMI collects and how it's used Customer Data Privacy 	<ul style="list-style-type: none"> Key features and current/future benefits of AMI AMI is safe and secure
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicle	Channels	Targeted Stakeholders
Co-worker presentations	Internal Town Hall Meetings	Internal (co-workers)
Informational Binders	1:1 Meetings	External (Municipalities, Business/corporate communities,

		Community Action Agencies, Civic and Opinion Leaders, Educational Institutions, Economic Development Communities)
PowerPoint Presentations	1:1 Meetings, Speakers Bureau's, Public/Private Meetings	External (Municipalities, Business/corporate communities, Community Action Agencies, Civic and Opinion Leaders, Educational Institutions, Economic Development Communities)
Website Content	AmerenIllinois.com & Intranet (Scholar)	All
FAQ's	Ameren.com, Intranet, Community Outreach, Open Houses, etc.	All
"Actions Matter" Co-Worker Video Segment	Internal Town Hall Meetings, Intranet (Scholar)	Internal (co-workers)
Customer Service Scripting	Call Center/Customer Service	Affected Customers
News Releases & News Media Advisories	News Media	All
Customer Newsletter ("Facts on Energy")	Ameren.com, Intranet, Direct Mail, E-mail,	All
Educational Brochures	1:1 Meetings, Public/Private Meetings, Community Outreach,	Affected Customers and External
Bill Inserts/Messaging	Direct Mail (within bills)	Affected Customers
Legislative Briefings	Legislative Update Meetings (Scheduled and Ad Hoc)	External (Legislators)
Regulatory Filings (Scheduled)	Regulatory Process	External (Regulators)

~~Sample Tactics: Co-worker presentations, municipal officials' updates, website content, articles in customer newsletter, third-party validations~~

Phase 2 Customer Engagement: Network and Meter Deployment

~~This education~~ Timing: Begins 90 days prior to deployment in an area

Phase 2 will ~~be designed to~~ inform customers about the new AMI system in regions identified for deployment. ~~It and~~ will focus on the actual installation of new meters. This phase ~~is will be~~ targeted to customers who will receive the new metering system and will inform then on what they can expect. Additional emphasis will be placed on the privacy of information and customer benefits.

~~Sample Tactics: Co-worker updates, municipal official visits, targeted community presentations, direct mail, press releases to affected communities, bill messages, local radio and TV talk shows, community action agency visits, automated phone calls~~

Note: All vehicles, channels and stakeholder alignment activity continue from the Awareness and Education phase and are repeated through each specific deployment area for External Stakeholder and Customers.

Engagement	Benefits	Conclusion	Action
<ul style="list-style-type: none"> Localized rollout of communications to areas of AMI deployment 	<ul style="list-style-type: none"> I will be able to make more informed decisions about: <ul style="list-style-type: none"> My impact on the environment Opportunities to save money/energy Alternative power supply (renewables, etc.) 	<ul style="list-style-type: none"> AMI meters will help improve reliability AMI meters will improve customer service AMI meters are safe and secure AMI meters will eliminate estimated 	<ul style="list-style-type: none"> Acceptance of AMI Investigate products that allow me to take action in managing energy Support on-going grid modernization

Messaging Components

<ul style="list-style-type: none"> How AMI works What can I expect during deployment Information AMI collects and how it is used Customer Data Privacy 	<ul style="list-style-type: none"> Key Features and current/future benefits of AMI AMI is secure AMI is safe
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	Ameren.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
Deployment Collateral (Deployment)	Direct Mail, Automated calling, Door “Knock”	Affected Customers

Information, Door Hangers, "Welcome Kit")		
Flyer/wallet card	Face to face	Affected Customers
Brochures	Open Houses	All
Interactive Displays	Open Houses, Community Events, Other as identified	All
Mobile Demonstrations	Open Houses, Community Events, Other as identified	All

Phase 3 Customer Engagement: Online Energy Management

Timing: Once delivery of online capability is more clearly anticipated (projected Q4 2014)

Phase 3 will targetfocus on those customers who have AMI installed to inform them about the energy web portal available to them online. With this tool, customers can become better educated about their energy usage and the information available to them which will allow them to make informed decisions regarding their energy usage and life-stylelifestyle changes they may choose to make to begin using energy differently.

Engagement	Benefits	Conclusions	Actions
<ul style="list-style-type: none"> Data generated by meters help customers to understand and modify their energy consumption 	<ul style="list-style-type: none"> I can make more informed decisions about: <ul style="list-style-type: none"> How to lower my bill Alternative power supply Appliances I use/buy Rate options 	<ul style="list-style-type: none"> Due to a variety of factors, I will use energy differently in the future AMI meters give me more information if I want it when I want it 	<ul style="list-style-type: none"> Regularly visit the online energy manager portal Investigate products that allow me to take action in managing energy Support on-going grid modernization

Messaging Components

<ul style="list-style-type: none"> How AMI works Customer Data Privacy Information AMI collects and how it is used Key Features and current/future benefits of AMI 	<ul style="list-style-type: none"> AMI is secure How consumers can use AMI information to become more energy efficient and lower their energy bills
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Possible Vehicles, Channel and Stakeholder Alignment		
Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	AmerenIllinois.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
News Media	Earned media around positive customer testimonials, social networking, etc.	All
Website Content	AmerenIllinois.com & Intranet (Scholar)	All
Newsletter content	Direct Mail, E-Mail, Social Media	All

~~Sample Tactics: Target growing eCustomer population, utilize social media, consider “energy savings” challenges, and evaluate partner synergies~~

Phase 4 Customer Engagement: Smart Energy Pricing Programs

~~This phase of the plan~~ **Timing: Once delivery of Pricing Programs are more clearly anticipated (projected mid-2015)**

Phase 4 will contain information specific to pricing programs developed and how customers can take advantage of them. This phase will be developed in cooperation with the Smart Grid Advisory Council, the body responsible for establishing an Illinois Science and Energy Trust for the purpose of providing consumer education regarding smart meters and related consumer-facing technologies and services and peak time programs. As recommended by the Smart Grid Advisory Council, this on-going phase will also be coordinated with other stakeholders and third party vendors and suppliers. This phase will continue throughout the lifespan of the AMI meters, evolving as new pricing programs and energy technologies and services are developed that benefit customers.

Engagement	Benefits	Conclusion	Action
<ul style="list-style-type: none"> New pricing structures (tariffs) that support behavior modification in energy use 	<ul style="list-style-type: none"> Lower electric bills More efficient utilization of the grid 	<ul style="list-style-type: none"> How people use energy is changing There are simple things I can do to manage how I use energy I like saving money 	<ul style="list-style-type: none"> Investigate pricing structures Support on-going grid modernization

		<ul style="list-style-type: none"> on my energy bill I like teaching my family about how they can contribute 	
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Messaging Components

<ul style="list-style-type: none"> How AMI works Information AMI Collects Customer Data Privacy Key Features and Benefits of AMI 	<ul style="list-style-type: none"> AMI is secure How consumers can use AMI information to become more energy efficient and lower their energy bills Future Benefits
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Possible Vehicles, Channel and Stakeholder Alignment

Vehicles	Channels	Targeted Stakeholders
Demonstration Videos	AmerenIllinois.com, Intranet, Social Media	All
Advertising	Newspapers, Radio, TV, Outdoor, etc.	All
News Media	Earned media around positive customer testimonials, social networking, etc.	All
Website Content	AmerenIllinois.com & Intranet (Scholar)	All
Newsletter content	Direct Mail, E-Mail, Social Media	All

8.8 Communication Vehicles

There are a variety of communication avenues available to help educate consumers about the benefits of AMI. As a part of this communication plan, Ameren Illinois will produce a range of messages and materials for the purposes of general awareness, addressing concerns, communicating plans and methods of deployment, and promoting specific programs. The phase of the communication plan drives which communication vehicles are selected to inform and educate consumers. These communication vehicles may include:

- A list of Frequently Asked Questions (FAQs) and their respective answers
- Scripting for customer service representatives
- Press releases and media advisories
- Bill messages
- Bill inserts
- Customer newsletter (Facts On Energy)

- Advertising (print, radio, TV, billboards etc.)
- PowerPoint presentations for community relations coordinators (and others)
- Dedicated web pages that include fact sheets, contact information, programs, FAQs
- Videos demonstrating:
 - installation process
 - how the “AMI system” works/meter accuracy
 - how to access and use information available to the customer via a web portal
 - other “tools” available on the market to supplement customer energy management
- Deployment communications will likely include the following for affected customers:
 - direct mail
 - door hangers
 - automated calling in advance of exchange
- Flyer/wallet card for co-workers to use as a reference guide; distribute to customers, family, friends
- Educational brochure(s) for use at community events
- Actions Matter Co-worker Video segment
- Community outreach to mayors, community action agencies, and senior citizen organizations

Social media outreach

8.10 Customer and Stakeholder Issues Management Plan

Ameren Illinois intends to develop a comprehensive issue management plan that allows us to manage and appropriately respond to issues raised by customers or stakeholders. This function will cut across many organizations within Ameren Illinois (Customer Service, External Affairs, Regulatory, Technology, Executive and Senior Leadership Teams, etc.) and will require careful planning, coordination, enablement of technology and process changes within many of these teams.

Issues or concerns expressed by a stakeholder in a municipality or township would also be included and may necessitate a more rigorous process that might include executive intervention depending on the source and the issue.

A core focus will be ensuring a timely and appropriate response to the issue in a manner that is appropriate for the source of the issue as well as the issue. Tracking of issue types, location, source, response and accountable co-workers will be important to ensure that we leverage the data and help identify trends. Ameren Illinois may need to reallocate resources if trends indicate particular areas that need attention.

8.11 Low Income & Assistance Programs

Ameren Illinois regularly assists customers who are facing hardship or are economically disadvantaged. As the AMI deployment gets underway, we wish to take special care to make sure these customers are aware of the deployment, that any concerns regarding health and privacy issues are alleviated and that they are aware of the benefits AMI will bring to them.

Like other customer segments, low-income customers will benefit from bills that are based on actual usage rather than estimated billing. The fact that they will not experience the over- or under-inflation of an estimated monthly bill will allow better budgeting. Because the advanced meters can alert Ameren Illinois when there is an outage and shorten the duration of the outage, these customers depending on life-saving medical equipment will have peace of mind. In addition, the shortened outages may prevent loss of food stored in refrigerators and freezers.

Through the funds that we will provide to the Illinois Science & Energy Trust, Ameren Illinois would like to see educational efforts leveraged consistently across our service territory. We have found that working with communication action agencies, such as LIHEAP, has been extremely beneficial to the low-income population. It is possible that LIHEAP and other similar agencies could be provided communication tools, and perhaps, specialized training that would assist these customers in understanding their bills and learning how to modify behaviors to decrease their energy consumption.

Ameren Illinois plans to have several types of communications to all customers impacted by the AMI deployment. These communications will span from direct and personal letters or cards to grass roots events such as neighborhood association meetings, local festivals or municipal events. Because social agencies, and often faith-based organizations, are familiar to and trusted by the low-income audience, we may work specifically with these organizations to plan outreach events unique to these customers.

It is our intent to provide information in a timely and transparent manner, educating all customers about the complete benefits of AMI and their future options of pricing plans and technologies that will help them better manage their energy use.

8.912 Considerations

Throughout the course of the communication of grid modernization and AMI implementation various issues may arise which require additional communications. The communications team will remain in close contact with individuals responsible for information technology, labor, regulatory, organizational and others.

9. Smart Grid Interoperability and Cyber Security

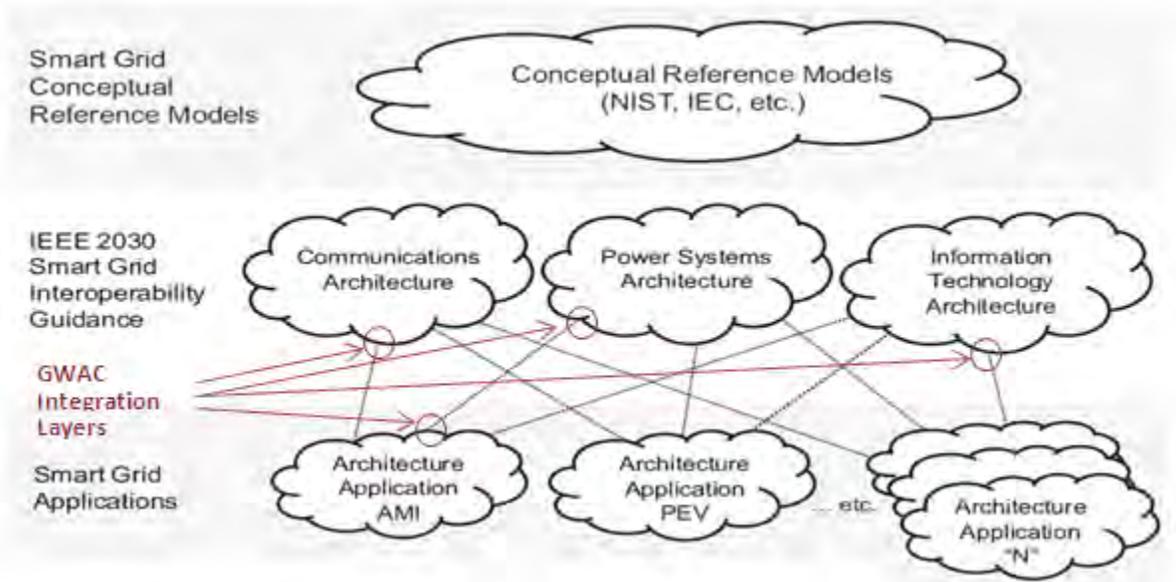
9.1 Interoperability

Ameren's approach to Smart Grid Interoperability shall follow the established frameworks defined by the National Institute of Standards and Technology (NIST) and further augmented by the work of the Institute of Electrical and Electronics Engineers (IEEE), the GridWise Architecture Council (GWAC) and of the Illinois Statewide Smart Grid Collaborative (ISSGC). These interoperability frameworks and guidelines together will provide Ameren the foundation to plan, design, build, test, deploy, maintain, and operate required Ameren Smart Grid systems and solutions across their asset lifecycle.

Frameworks describe conceptual reference models for discussing the characteristics, uses, behaviors, interfaces, and other elements of Smart Grid domains as well as the relationships among these elements both within and across these domains. The models are tools for identifying the standards and protocols needed to ensure interoperability and cyber security, and defining and developing architectures for systems and subsystems within the Smart Grid.

Because Smart Grid encompasses the integration of power, communications, and information technologies for an improved electric power infrastructure, Smart Grid interoperability must take into consideration the interconnected power system elements, overlaid with communications and information system technologies that together enable a modern and more intelligent power ecosystem. It is this integrated, automated approach that can allow productive options to both utility operators and customers to improve power system reliability, asset utilization, and efficiency, in a secure manner.

The figure below highlights the relationship of the above frameworks and guidelines used by Ameren to maximize interoperability across its Smart Grid investments.



Consistent with the NIST *Framework and Roadmap for Smart Grid Interoperability Standards* document, Interoperability is defined as the capability of two or more networks, systems, devices, applications, or components to externally exchange and readily use information securely and effectively. It is anticipated that Smart Grid will be a system of systems and network of networks. The systems and networks, to be interoperable, should share a common meaning of exchanged information that will elicit agreed-upon and expected responses. Smart Grid interoperability is usually associated with the following:

- Hardware/software components, systems, and platforms that enable communications to take place. This kind of interoperability is often centered on communication protocols and the infrastructure needed for those protocols to operate.
- Data formats, where messages transferred by communication protocols have a well-defined syntax and encoding schema.
- Interoperability on the content level so a common understanding of the meaning of the data can be exchanged.

Finally, these frameworks must not only provide the reliability, fidelity and security of the information exchanges between and among these Smart Grid systems, but must also achieve desired performance levels. To transition legacy systems and networks into more intelligent and secure electric power infrastructure, the standards-based smart grid approach will be used to promote and achieve interoperability.

9.1.1 Ameren Adopted Frameworks for Interoperability

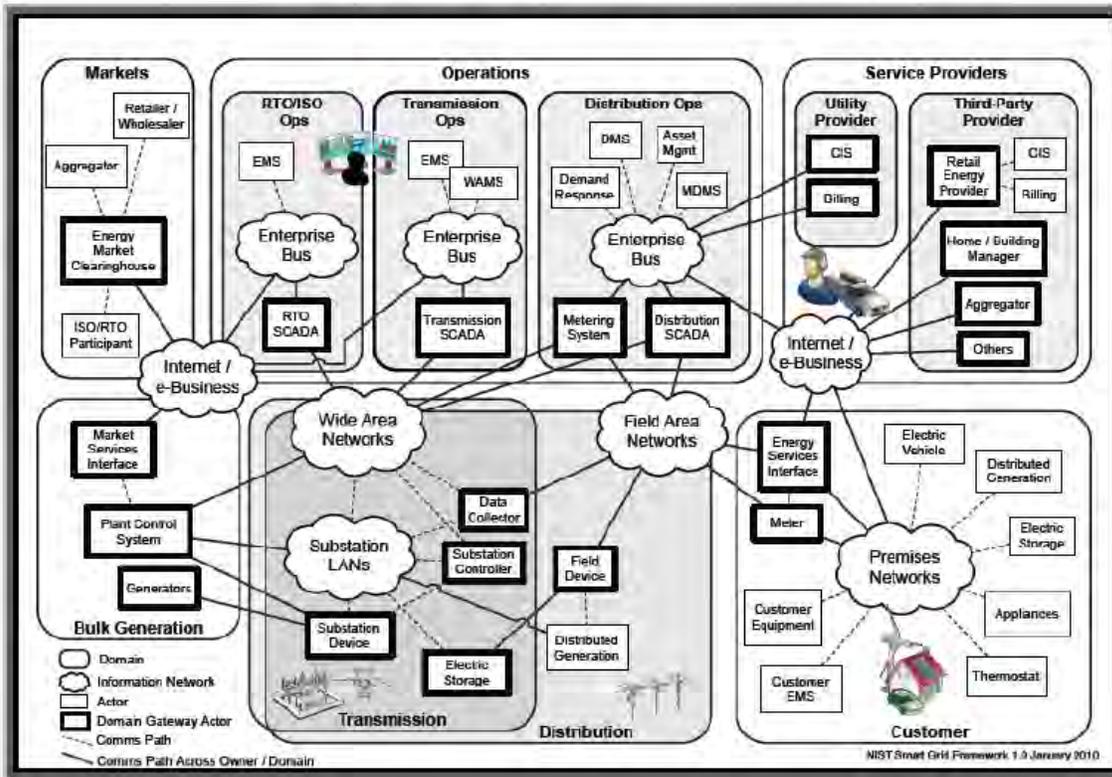
As referenced above these frameworks help form a three-tiered approach to achieving interoperability. From the NIST conceptual model, appropriate Smart Grid domains are defined. From the IEEE 2030 standard, three interoperability perspectives are further captured from the views of the power system (and its components), the communications systems (and its components) and the information systems. Finally, the GWAC model or stack (similar to the Open Systems Interconnect – OSI model) defines the required layers of interaction of/between the domain actors, participants and their respective technology interfaces. These frameworks are described in more detail below.

a. NIST Framework and Roadmap for Smart Grid Interoperability Standards

The NIST conceptual model provides a high-level, overarching perspective. It is not only a tool for identifying actors and possible communications paths in the Smart Grid, but also a useful way for identifying potential intra- and inter-domain interactions and potential applications and capabilities enabled by these interactions. The conceptual model is intended to aid in analysis and foster understanding of Smart Grid inter-operational intricacies of the Smart Grid implementation.

The conceptual model supports planning and organization of the diverse interconnected environments that will compose the Smart Grid. Seven Smart Grid domains are defined. Each domain (bulk generation, transmission, distribution, service providers, markets, control/operations, and customers) —and its sub-domains—encompass Smart Grid *actors* and *applications*. Actors include devices, systems, or programs that make decisions and exchange information necessary for performing applications. Applications are tasks performed by one or more actors within a domain. The NIST conceptual reference model is shown below in Figure 1.

Figure 1
Conceptual Reference Diagram for Smart Grid Information Networks.



b. IEEE Interoperability Reference Perspectives

Once the respective domains and corresponding actors and participants are identified, the IEEE 2030 perspectives are applied. As previously mentioned, the Smart Grid encompasses the integration of power, communications, and information technologies for an improved electric power infrastructure. The IEEE 2030 reference model is a conceptual representation of the smart grid architecture from three perspectives: 1) power systems; 2) communications; and 3) information technology. It presents a set of labeled diagrams that offer standards-based architectural directions for the integration of energy systems with communications and information technology infrastructures that will define the evolving Smart Grid.

A summary of the three perspectives follows:

- *Power systems:* The emphasis of the power system perspective is the production, delivery, and consumption of electric energy including apparatus, applications, and operational concepts. This perspective defines seven domains (consistent with NIST) common to all three perspectives.
- *Communications technology:* The emphasis of the communications technology perspective is communication connectivity among systems, devices, and applications in the context of the Smart Grid and its various domains. The perspective includes communication networks, media, protocols and performance.
- *Information technology:* The emphasis of the information technology perspective is the control of processes and data management flow. The perspective includes technologies that store, process, manage, validate, and control the secure information data flow. Access and integrity controls safeguard data at rest and in use. Information technologies take data from the power systems infrastructure and transform it into business and operational intelligence.

c. GridWise Architecture Council (GWAC) Stack

Once the domains, actors, participants and architecture perspectives are defined, the appropriate layers of the GWAC Stack are defined. Large, integrated, complex systems require different layers of interoperability. To address these layers, Ameren has adopted the “GWAC stack” model, which is comprised of eight vertical cross-layers of interoperation necessary to enable various interactions and transactions on the Smart Grid. Very simple functionality—such as the physical equipment layer and software for encoding and transmitting data—might be confined to the lowest layers. Communication protocols and applications reside on higher levels with the top levels reserved for business functionality. As functions and capabilities increase in complexity and sophistication, more layers of the GWAC stack are required to interoperate so the desired results can be achieved. Each layer typically depends upon—and is enabled by—the layers below it.

The most important feature of the GWAC stack is that the layers define well-known interfaces, establishing interoperability at one layer that can enable flexibility at other layers. To maximize interoperability Ameren examines all applicable layers for each Smart Grid integration ‘point of interest’ or interface. As shown below Figure 2, the eight layers are divided among three “drivers,” each requiring a different level of interoperability:

Technical: Emphasizes the data structures, message exchanges and physical and logical connections across systems and networks.

Informational: Emphasizes the semantic aspects of interoperation, focusing on what information is exchanged and its meaning.

Organizational: Emphasizes the pragmatic (business and policy) aspects of interoperation, especially those pertaining to the management of electricity.



The GridWise Architecture Council’s eight-layer stack provides a context for determining Smart Grid interoperability requirements and defining exchanges of information.

Figure 2

9.1.2 Key Smart Grid Interoperability Design Issues

Once the appropriate domains, actors, participants, perspectives, and layers are identified, functional and non-functional design issues and requirements must be incorporated. These design issues are brought forward from the work associated with the ISSGC. To drive interoperability into products, systems and solutions, several Smart Grid design issues will be evaluated and defined across the required ‘points of interest’ or interfaces within and between actors and applications of the Smart Grid domains. Some of these design elements, more than others, encourage greater interoperability, or are enabled by greater interoperability. In particular, the issues of Technical Maturity and Risk, Openness and Standardization, Manageability, and Upgradeability are very closely correlated with interoperability. To the maximum extent possible and consistent with Ameren’s cyber security practices, the design shall be consistent with the standards of the NIST for Smart Grid interoperability and shall include open standards and internet protocols, as applicable. Ameren will define and incorporate the following design requirements/characteristics into its Smart Grid project lifecycle programs resulting in solution evaluations and selections that will maximize interoperability.

- a. **Capacity** - Capacity is the ability of a communications link to carry data, also known as bandwidth. The requirements for capacity are primarily determined by three factors, as defined in Table 1.

Table 1 – Factors Affecting Communications Capacity

Factor	Definition
Latency	The maximum time that a single message can travel in one/either direction and still successfully implement the application. Expressed in seconds or sub-seconds.
Data Volume	The typical size of messages required by the application, or the total amount of data (measured within an appropriate length of time) required to operate it. Expressed in Bytes. (Ideally, high-volume traffic such as firmware updates should not affect the normal operation of the system. This factor is related to Scalability).Data volume also needs to be defined as X bytes per Y seconds or so.
Event Rate	The rate at which messages (polls, requests, queries, responses, reports, files, etc.) must be transmitted in order for successful application operation. Expressed in events per block of time.

- b. **Technical Maturity and Risk** - The degree to which the solution is well-understood by those who must implement it within the industry. This is the level of certainty that the technology will meet the requirements of the application.

Technology may be in various states and ideally should be selected based upon the following preferred order of maturity:

- Considered best practice
- Considered standard practice
- Used only in pilot projects
- Becoming obsolete *
- Currently only academic research *

* Note that greater maturity is not always better. The technology may be so mature that it is obsolete and, therefore, more risky to implement. For Smart Grid technology deployments, Ameren would not choose any technology that falls into the latter two categories/states listed above.

There is a variety of methods that could be used to address this design issue, for example: solution evolution paths, alternate choices, standard interfaces, swappable equipment, stored replacement parts, and/or service level agreements. Ameren will evaluate the maturity of the Smart Grid solutions based upon, but not limited to, the following factors:

- Product/application past, current and future roadmap.
- Growth of product/application features and functionality.
- Vendor/Manufacturers commitment to ongoing product research and development (R&D).
- Extensive use of the product or service in multiple utility production environments that address and demonstrate its interoperability across a diversity of requirements.
- Adherence to the current guidelines and standards listed in this document and deemed relevant by the industry forums to include NIST and Smart Grid Interoperability Panel (SGIP).

c. Openness and Standardization - Openness is the degree to which it must be easy to obtain the technology used to implement the application. Openness reduces barriers for new vendors to enter the market and encourages choice and competition. Open technologies have few or no royalties or license fees.

Standardization is the degree to which the technologies used to implement the application must be recognized by official organizations and the user community. It is important that smart grid components:

- Share a standardized information model across the system.
- Separate the information model from how data are transmitted so that new technologies can be used in the future.

d. Security, Risk, and Compliance – The processes and protections in which intentional and unintentional risks to the data, equipment, persons and organizations involved are managed so that mission objectives are met. Critical security requirements must be defined for:

- Security (e.g., Availability, Confidentiality, Integrity, Authentication, Non-repudiation, etc.)
- Safety
- Cost
- Schedule
- Reputation
- Legal and Regulatory Compliance
- Privacy

Note: Ameren’s cyber security approach and methodologies are discussed in further detail in the Cyber security section below.

e. Manageability – This is the degree to which devices, systems, and data must be configured, synchronized, tracked, diagnosed and/or maintained. It includes the ability to measure the health and the performance of the system. Ideally all these tasks can be performed remotely on field devices in a Smart Grid system without field dispatch. Use of Simple Network Management Protocol (SNMP) standard Management Information Base (MIBs) for Smart Grid solutions is recommended where applicable. Where additional value is gained, deploying vendor-specific network management systems (NMS) to enhance the operational visibility of the smart grid product/applications is acceptable if economically proven and feasible.

f. Upgradeability – This is the degree to which the devices and systems that implement the application can be changed to adapt to future conditions. Except for hardware, field devices should be upgradeable without sending personnel to the site. Upgradeability is critical to minimize the risk of stranded assets. It is related to Technical Maturity and Risk. It indicates how much an upgrade of the system would cost, and whether it is possible at all. Upgradeability includes the degree to which the system remains backward-compatible with older systems, and to which it can accommodate alternate technologies. This design issue should address upgrades and changes for:

- Hardware and software
- Electronically stored information such as firmware, configuration parameters, algorithms, or security credentials
- Connectivity
- Communications technologies

- g. Scalability** – This is the degree to which the system implementing this application will permit future expansion. Ideally a Smart Grid deployment would have no fixed limits on growth. Rather, it would consist of modular components that could be added over time to accommodate growth without the replacement or abandonment of existing system elements.
- h. Reliability** - The degree to which the solution can automatically recover from power, communications and component failures, in order to minimize the impact to the customer, the utility and the system. Ideally, any Smart Grid system should:
 - Automatically re-route communications messages
 - Coordinate recovery over a wide geographical area
 - Limit the area of impact of failures
 - As a default state, provide a known, safe and recoverable condition whenever power, communications, or control is lost.

Reliability also includes the availability of communications links in the face of failures or high traffic conditions, and ensuring that critical messages are received within their latency requirements. Some solutions to this issue may involve redundant message paths, distributed servers and services, and battery backup capabilities. Appropriate reliability design considerations shall be economically incorporated based upon the business continuity objectives of the Smart Grid application, service, and infrastructures.

Defining the functional and non-functional design requirements for each of the GWAC (OSI) interoperability layers, at each interface (or ‘point of interest’) across the NIST domains from the appropriate IEEE perspectives, drives interoperability deep into Smart Grid solutions.

9.1.3 Standards for Smart Grid Interoperability

As referenced above, standards are critical to enabling interoperable systems and components. Mature, robust standards are the foundation of mass markets for the millions of components that will have a role in the future Smart Grid. They also enable consistency in systems management and maintenance over the life cycles of components and system solutions. There are a variety of proprietary, industry, national, and international standards that are available and applicable to Smart Grid applications. Ameren recognizes and recommends the use of open technologies over proprietary ones, and recommends the use of officially recognized and standardized technologies over those that are not. It is clear that sound interoperability standards are needed to ensure that sizable public and private sector technology investments are not stranded.

Ameren continues to follow the NIST interoperability standards development efforts. As seen from its reference above, the NIST Smart Grid Interoperability Standards Framework is used to guide Ameren’s approaches for Smart Grid initiatives. Ameren will specify, as applicable and practical, standards that are included in this framework and included in the related SGIP Catalog of Standards (CoS) for Smart Grid enabled technologies and application solution suites. Ameren will significantly favor vendor products and solutions during the evaluation processes that support these standards. Examples of standards that Ameren will require are provided below (Table 2) for a sampled representation of their respective domains in which they are applicable.

**Table 2
Representative Examples of Relevant Interoperability Standards by Sample NIST Domains**

Smart Grid Domain	Sample of Relevant Interoperability Standards
Customer	C.12 Suite; ZigBee SE 2.0; HomePlug; OpenHAN; OpenADR
Distribution	DNP3; IEC 61850
Transmission	C37.118; IEC 61850;
Bulk Generation	IEEE 1547; IEC 61850;
Operations	IEC 60870-6/TASE 2 (ICCP); IEC 61850; IEC61968

Moreover, while standards are necessary for achieving interoperability, they are not entirely sufficient. A conformance testing and certification (CTC) regime is essential. NIST, in consultation with industry, government, and other stakeholders, has started work to develop an overall framework for conformance testing and certification and plans to initiate steps toward implementation. Ameren supports and recommends products that meet these interoperability testing requirements as well. This will be an additional evaluation criteria used by Ameren for product evaluation and selection.

9.2 Cyber Security

Risk Management

Ameren's risk management program is sponsored by senior management who maintains ownership and responsibility for the Ameren risk management program. All Smart Grid related systems including those proposed to comply with the Illinois Public Acts 97-616 and 97-646 will be covered and therefore protected by this risk management program. As necessary the risk management program is reviewed by the Information Security group and senior risk management on an annual basis.

a. Summary of Cyber security Risks & Mitigation Strategies During Solution Lifecycle

Ameren's security practices are designed to ensure operational needs are met, and availability, confidentiality, and integrity are realized in their systems. Ameren's cyber security plan details the functions and properties its live systems include. Security is designed from the start, not bolted on and will address regulatory requirements, interoperability, project schedule, project financials, and reputation of Ameren. Additionally, security design will manage the various threats, attacks, unintentional incidents, and risks associated with the system and environment in which the system is deployed. Cyber security is included as a primary component of the system plan, design, build, test, deploy, and operate phases. The goals of Ameren's security processes are to implement appropriate security measures to ensure our systems, processes, and people can:

- Maintain the safety of employees and the public
- Maintain control of the systems
- Respond to disruptions caused by sabotage
- Respond to disruptions caused by natural events
- Resist attacks
- Manage risk
- Protect Ameren data and systems
- Protect customer data
- Meet the business needs
- Provide evidence that requirements are met
- Be trained and aware of threats to Ameren systems
- Have processes in place for change control and configuration management
- Control access
- Have rules in place for exceptions and risk mitigation
- Establish leadership and governance
- Log, monitor, and notify

Ameren's risk assessment methodology is followed when addressing and mitigating cyber vulnerabilities and are based on industry best practices, such as NIST 800-39.

Risk Strategy and planning includes the alignment of risk planning, risk objectives, risk resources, corporate policies, and tools. Ameren then evaluates the risk, which includes identification of threats, assessing the probability, evaluating the impacts, and selecting a mitigation strategy. Ameren then prioritizes the risks and implements the mitigations strategies for these risks. Risks are reviewed, monitored, and communicated to key parties.

In addition to scheduled risk management assessments, risk assessments also occur as part of process lifecycles. Risks are reviewed as part of Incident Management, Project Management, and vendor due diligence, Business Continuity and Disaster Recovery processes. Ameren's cyber security risk is incorporated into the Business Risk Management program.

Different assets quantify and qualify the risks, threats, and vulnerabilities associated with the asset. This assessment includes all elements associated with the asset, including (but not limited to) people, policies, procedures, platforms (hardware and software) and networks. Technical assessments also evaluate the application or components' ability to be updated to meet future cyber security requirements and standards. Finally, steps are identified and implemented to manage the risk to the asset, using the appropriate technology, processes, or controls. Managing the risk may include actions such as two-factor identification, physical isolation of the asset, increased monitoring of the asset, etc.

The methodology is applied to all new systems, interfaces, processes, and devices to be placed into production. Ameren has an established software and security development lifecycle methodology based on NIST SP800-64 which is administered by our Information Technology Project Management Office (PMO). Ameren has embedded Information Security (IS) and their processes into its project methodology to ensure that cyber security issues are fully addressed throughout the project lifecycle. Information Security control checkpoints are set at the end of the plan, design, and build/test phases to ensure that appropriate security assessments and requirements have been met. The project cannot continue without Information Security approval at these checkpoints.

Ameren's Information Security group has developed cyber security checklists, based upon applicable regulations and standards, and uses them during the project lifecycle to gather information on the proposed technologies and processes. This information is then used to assess the risks/vulnerabilities and then to establish a plan to manage the risks and vulnerabilities. Checklist topics include:

- Authentication, Access Control, and Audit
- Change Management Process for Applying Patches and Upgrades
- Process for System Hardening (i.e., Fine Tuning the Security Controls)
- Account Management
- Protocols and Communications
- Procedures for Computer Incident Response Team - Security Breaches
- Documented Business Continuity and Disaster Recovery Plan
- Acceptable Use Policy
- Data Classification and Management
- Data Life Cycle
- Regulatory Compliance
- Vendor Management, Contracts, and Support

b. Summary of Cyber security Criteria Utilized for Vendor and Device Evaluation.

Ameren uses the same processes described in the sections above for vendor and device evaluation. The security requirements listed below were determined by Ameren to be relevant in all Smart Grid security evaluations and are a subset of requirements listed in NISTIR 7628. All vendors are required to provide solutions that meet the minimum security requirements listed below:

- Prove the system or application has not been compromised with malicious software. The proposed solution must provide a centrally managed capability to prove the firmware / software in use is and always has been the same approved version.
- Guarantee only explicitly approved devices and users are allowed to participate within the defined system or architecture. The system or application must support a native capability to authenticate and authorize field devices and system users utilizing third party authentication. Systems such as TACACS, RADIUS, LDAP, or Active Directory are preferred.
- Devices that are not secured in a controlled facility, local tamper detection via FIPS 140-Level 2 is required. Physical tamper detection will save time and money by providing the ability to easily identify signs of tampering without requiring physical removal of the device.

- Confidentiality must be guaranteed in any areas where Ameren proprietary data and information or employee or customer Personally Identifiable Information (PII) is transmitted across logical interfaces identified in NISTIR 7628-Vol 1. To generate assurances that the data has remained confidential Ameren requires the ability to encrypt data in-flight via FIPS 140 approved encryption mechanisms with a 128 bit minimum encryption.
- Centralized key and certificate management to enable the ability to manage the keys used for all systems and users through the infrastructure without requiring a field visit. If a certificate becomes compromised or policy changes dictate revocation or generation of new certificates, mass distribution of new certificates can be reasonably managed allowing greater flexibility and manageability. The system must have the ability to centrally manage keys and/or certificates.
- Mechanisms must exist to ensure remote access or management interface access is granted to a system or system component through only authorized, authenticated, and encrypted mechanisms.
- A centrally managed and automated patch and firmware management system with ability to roll back to the last patch or firmware level if current patching attempt fails.
- The ability to provide non-repudiation for access to all components in system to ensure any action performed or connectivity to is by an approved and authenticated entity.
- Provide the ability to log, alert, and report on security events, use of access rights, system changes, system state and anomalous system behavior on all devices included in proposed solution. All logs should be capable of being sent to a centralized log management system and should support the ability to send logs via syslog.
- Evidence must be provided by vendor that the proposed system has been developed using the Systems Development Lifecycle (SDLC) methodologies including regular auditable penetration testing by third party testers.
- Malware and antivirus protection must be supported by all non-embedded systems or applications. If malware or antivirus software is not supported, a detailed mitigation strategy must be defined and documented.
- The ability to set a standard password policy mirroring Ameren's corporate password policy across the proposed system (password length, complexity, and change frequency) with ability to disable accounts after set amount of invalid logins for set length of time is required.
- Wireless communication methods that conform to the NIST 7761 Wireless Applications and support encryption methods of at minimum 128 bit encryption approved in FIPS 140.

c. Summary of the Relevant Cyber Security Standards and/or Best Practices

Ameren continues to maintain its own policies and procedures as they are related to cyber security. These policies and procedures are based on industry best practices, regulatory guidelines, and standards along with guidance from reputable third parties. The policies developed by Ameren continue to be communicated to all Ameren employees through our Security Awareness training program managed by Information Security and promoted by the HR department. Included in these policies are requirements that Smart Grid vendor solutions adhere to minimum security standards determined by Ameren. These vendors must prove they have a robust security culture at their company which is evidenced in the RFI/RFP evaluation process. During the RFI/RFP process vendor adherence to these standards is evaluated before product purchase. Vendors without an obvious security culture are rejected.

Physical security or tamper detection via FIPS 140-2 mechanisms are required for all devices attached to the Smart Grid. This helps Ameren maintain a robust and secure environment, prevent unauthorized access, and quickly and easily recognize when systems have been compromised. Proper intrusion detection allows quick response and remediation and adds another layer to Ameren's defense-in-depth cyber security strategy.

Background checks are required for all employees at Ameren. Different levels of responsibility and access require different levels of checks. In some instances continued monitoring and testing of employees is required. Continuous employee testing is a requirement of NERC CIP secured and NRC regulated areas of the company. Ameren also requires vendor employees with access to Ameren proprietary information or

customer personal Information pass appropriate background checks before being allowed access to that data.

The requirements, guidance, and standards influencing Ameren policy and procedures are developed utilizing input from many different sources. The sources used are developed by government regulatory agencies, standards setting organizations, industrial organizations and commercial standards organizations that are relevant to Ameren's environment. Sources include, but are not limited to:

- NERC CIP 002 – 009
- AMI-SEC System Security Requirements
- IEC 62351 Parts 1 - 8
- DHS Catalog of Control System Security
- NIST 800-52 and 800-53
- NISTIR 7628 Volumes 1-3
- NIST Catalog of Standards (COS)
- NIST SP800-82
- NIST 1108
- ISO/IEC 18028-2
- ISO 27001 & 2
- ANSI/ISA 99-1 and 99-2
- IEEE 1686-2007
- Ameren Minimum Security Baselines and Policies
- Federal and State Laws

All assets, solutions, applications, etc. will be protected in accordance with all regulatory requirements as well as any minimum security standards established by Ameren. Additionally, Ameren utilizes a defense-in-depth strategy to ensure maximum coverage and protection. This includes measures such as:

- Physical and/or logical isolation of systems/devices.
- Logging/monitoring access.
- Use of appropriate alarms and notifications (both manual and automatic).
- Use of firewalls and Intrusion Detection Systems (IDS).
 - All firewalls and IDS will be logged to a centralized logging solution where automated alerting and reporting will process the log data in real-time.
 - IDS devices will be monitored on a 24x7x365 basis.
- Use of Ameren's Information Technology Operations Center (ITOC) to provide 24x7x365 monitoring and response capabilities.

In circumstances where the applications / devices are not under Ameren's direct control, we will coordinate and provide oversight with the owning entity to ensure appropriate cyber security protection or isolation measures are implemented.

Ameren has established policies and procedures to deal with cyber security breaches. These procedures provide a wide range of response capabilities commensurate with the extent and criticality of the breach. Response actions include, but are not limited to:

- Isolation/containment of the breach
- Safe shutdown of the breached system/component
- Coordination with appropriate authorities and internal stakeholders
- Remediation of the damage
- Post-incident investigation
- Archival of incident/remediation information for continuous monitoring

If warranted, an Incident Command Team is activated to provide command and control of the incident and to ensure that adequate resources are available contain and remediate the breach.

Ameren’s project methodologies and security processes require thorough testing before, during and after deployment of all cyber-related hardware, software, processes and networks. This testing involves, but is not limited to:

- Predefined test plans
- Component level and integrated testing
- Interface testing – including testing with legacy systems
- Intrusion/penetration testing
- Automated source code reviews
- Scanning for deviations from approved configurations
- Internal and external audits
- Unannounced audits and testing occurring annually

Testing is conducted as appropriate throughout the entire lifecycle of cyber-related components and systems. Testing criteria, results and remediation are maintained throughout the lifecycle of the implementation and can be used to validate the effectiveness of Ameren security controls.

Ameren’s security processes and project methodologies are periodically reviewed and audited by internal and external groups. These reviews and audits are used to ensure that the required security controls are in place and to demonstrate that all policies, standards and requirements are being followed. These reviews and audits are the verification of ongoing controls and policy monitoring.

Changes to cyber components and systems will be managed by an established Change Management Policy and procedure. All changes are brought before a change control board which has scheduled meetings once a week. The change board communicates more frequently to evaluate proposed changes outside of the scheduled meeting. This policy and procedure ensures that risks are appropriately managed and further ensures that appropriate testing is performed.

Critical/sensitive data relating to the design, development, implementation and operation of systems and devices will be managed with appropriate “need-to-know” processes and techniques.

Ameren has a security awareness and training program that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance requirements. Basic security awareness training is provided to all information system users (including managers and senior executives) before authorizing access to the system. Personnel who have higher levels of information security roles are provided training commensurate with their role.

d. Summary of How Project Supports Emerging Smart Grid Cyber Security Standards

Ameren will continue to work with existing and new Working Groups and Committees to stay “in tune” with the standards as they are being drafted. We will continue to participate in EEI’s Cyber Security Committee and on other emerging Smart Grid cyber standards development efforts.

Ameren’s intent is to design and implement Smart Grid technologies using a foundation of current standards, requirements and best practices. At the same time, we will actively monitor new and developing requirements and apply them to our systems as appropriate, thus continuing to build in cyber security throughout the lifespan of our Smart Grid.

Cyber security strategic planning as well as implementation lifecycle procedures will identify new threats, vulnerabilities, risks and controls. For each of these new issues, Ameren will use the process of: identifying the threat/vulnerability; assessing the risk and impact; and appropriately managing the risk and remediation.

10. Privacy

The foundation for an Advanced Metering Infrastructure is the ability to capture and effectively utilize data. Ameren Illinois is aware that this marked increase in the flow of information also raises concerns about what

data is collected, how the data will be used, and how it will be protected. However, the fact that more detailed customer data may be available with an Advanced Metering Infrastructure does not change the existing, stringent privacy regulations and Ameren Illinois privacy policies and practices.

Ameren Illinois takes extensive measures to ensure the integrity of its systems and to secure and protect customers and customer data. Customer information is safeguarded on secure systems with restricted access. Ameren Illinois has implemented extensive security controls to protect information that is gathered, stored, and transmitted. Contractors acting on Ameren Illinois' behalf are required to comply with our privacy policy. Ameren Illinois treats personal information and data about our customers as confidential, consistent with all legal and regulatory requirements, and will not sell or otherwise provide customer data to third parties without the customer's consent, except:

- To law enforcement officers, pursuant to legal process (such as a warrant or subpoena approved by a judge);
- To contractors providing services on behalf of Ameren Illinois (these services are subject to confidentiality and security obligations);
- To governmental or regulatory agencies with jurisdiction over Ameren Illinois when they require such information;
- To others as required by court order or by applicable laws, rules, or regulations governing Ameren Illinois; or
- To credit reporting agencies and collection agencies if an account is assigned for collection.

Data collected by Ameren Illinois includes:

- Contact information that allows Ameren Illinois to communicate with its customers, including name, address, telephone number and email address;
- Billing information, including payment data, credit history, and Social Security Number;
- Electric and gas usage data gathered by Ameren Illinois meter reading systems; and
- Information gathered when customers participate in programs such as those related to energy efficiency.

Data collected will be used to:

- Bill customers for the energy and services provided to them;
- To enable customers to see their energy usage data and assist them in managing their energy use;
- Help Ameren Illinois efficiently apply resources and manage its assets;
- To troubleshoot and resolve problems with equipment or services;
- Analyze rates and rate structures and make rate offerings to better match customer needs and energy use;
- To project usage demand patterns and plot growth in different geographic or other areas;
- To improve energy supply planning and to better design and engineer our energy distribution systems;
- To communicate with customers about energy usage and help them select the best rate plan, or take better advantage of certain pricing programs offered by Ameren Illinois;
- To communicate with customers about energy saving and energy management methods tailored to their energy usage pattern.

Customer consent to share data about their account:

- Instructions will be readily available to customers explaining how a customer can provide authorization for a third party to receive web-based data for them.

11. Peak Time Rebate Program

Ameren Illinois is required to file a proposed tariff with the Illinois Commerce Commission that offers an opt-in, market-based, peak time rebate (PTR) program to all residential customers with smart meters. Ameren Illinois' tariff filing will be within 60 days after the Commission approves this AMI Plan, and submitted after consultation with the Smart Grid Advisory Council. The PTR program is to be competitively neutral, and provide rebates to

residential retail customers that curtail their use of electricity during specific periods that are identified as peak usage periods. Rebates shall be the amount of compensation obtained through markets or programs at MISO. The rules and procedures for consumers to opt-in to the peak time rebate program shall include electronic sign-up, be designed to maximize participation, and be included on Ameren Illinois' website.

To meet the basic requirements for a residential PTR program, the AMI process will capture hourly usage information for customers participating in a PTR program. This will enable Ameren Illinois to establish a usage baseline for non-PTR event periods, and also determine the customer's response to a PTR event. To maintain competitive neutrality, PTR participants will be allowed to switch from utility provided service to a retail electric supplier (RES) subject to existing switching rules. That is, participation in a PTR program will not be used to delay a direct access switch request. Also, the same type of usage information gathered for PTR participants will be available to RES served customers and available for RES's, subject to proper authorizations for release of customer data.

12. Reporting

On April 1 of each year beginning in 2013, Ameren Illinois will submit a report regarding the progress it has made in implementing this Plan.

The report will:

1. Describe the AMI investments made during the prior 12 months and the AMI investments planned to be made in the following 12 months;
2. Provide a description of progress made in achieving the specific metrics and milestones in the Plan; and
3. Provide any material updates to the Plan.

In addition to the three AMI related metrics defined in the legislation that will be included in the annual June 1 metric plan filing, beginning in 2013 Ameren Illinois will also report on the following milestones each year as part of the annual April 1 AMI progress report:

- Percent of support system installed
- Percent of 2-way network installed
- Number and percent of AMI meters installed
- Number of customers able to access the Web Portal and Web Portal usage statistics
- Number of customers eligible for peak time rebate tariff
- Number of customers signed up for peak time rebate tariff
- Number of customers on PSP, RTP, or other real time rates

13. Summary

Ameren Illinois' vision is to have the capability to serve all of its customers with a cost-beneficial Advanced Metering Infrastructure, serving 62% of electric customers by 2022. ~~To achieve this vision the Company must have (i) a clear path to full and complete cost recovery (i.e. return of and on investments and operating costs) and (ii) a strong and healthy financial position to provide the financing needed to install and maintain the infrastructure.~~

Installation of AMI will provide a number of benefits that will reduce cost to our customers and improve customer service. These benefits include: significant reductions in consumption on inactive accounts, uncollectible expense, and estimated bills; reduction in labor for meter reading and service calls; and additional information available to customers to assist them in managing their energy use and cost. As demonstrated in the Cost / Benefit Analysis the present value of the benefits of the proposed implementation of this AMI Plan exceeds the present value of the costs, therefore the implementation of this Plan is cost beneficial for Ameren Illinois electric customers.

Ameren Illinois will make significant changes in its Information Technology systems, in its Business Processes, and in its Operations to incorporate the features of an AMI and achieve the benefits described in this Plan.

~~Equipment~~Meter installation is expected to begin in ~~early 2013~~Q2 2014 and will be continuously deployed over ~~86~~ years to reach 62% of Ameren Illinois electric customers. Conversion of the first customers to the AMI system is expected in ~~mid-2014~~early 2015 with final conversion of all 62% by ~~mid-2022~~2019. Ameren Illinois will report annually on its investments in AMI, its progress toward meeting the metrics and targets, and the status of installation.

Customer awareness and education activities will begin in 20123 and continue throughout the deployment and conversion so that customers are aware of the benefits of AMI and how to take advantage of its features.

Critical to all aspects of this Plan for AMI is to ensure that all systems and customer information is highly secure and governed by strict privacy policies. A robust cyber security plan with policies, processes and equipment that meet national standards and/or guidelines will be implemented, maintained, and enhanced as appropriate.