BEFORE THE

ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY	)	
	)	
Annual Formula Rate Update and Revenue	)	
Requirement Reconciliation	)	No. 16-0259
Pursuant to Section 16-108.5 of the Public	)	
Utilities Act.	)	

REBUTTAL TESTIMONY AND EXHIBITS

OF

ROBERT M. FAGAN. AND MAXIMILIAN CHANG

ON BEHALF OF

THE PEOPLE OF THE STATE OF ILLINOIS

AG Exhibit 4.0

August 11, 2016

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AG Exhibit 4.1 (Public and Confidential/Proprietary) – ComEd Response to AG Data Request 6.21 Supp_Attach 1 and 2.

I. INTRODUCTION

Q. PLEASE STATE YOUR NAMES, EMPLOYER, AND PRESENT POSITIONS.

A. My name is Robert M. Fagan. I am a Principal Associate at Synapse Energy Economics, Inc., 485 Massachusetts Avenue, Cambridge, MA 02139.

My name is Maximilian Chang. I am a Principal Associate at Synapse Energy Economics, Inc., 485 Massachusetts Avenue, Cambridge, MA 02139.

Q. ARE YOU THE SAME ROBERT FAGAN WHO TESTIFIED PREVIOUSLY ON BEHALF OF THE PEOPLE OF THE STATE OF ILLINOIS ("THE PEOPLE"), REPRESENTED BY THE OFFICE OF THE ILLINOIS ATTORNEY GENERAL ("AG"), IN THIS PROCEEDING REGARDING VOLTAGE OPTIMIZATION AND DATA ANALYTICS ISSUES?

A. Yes, I am.

Q. ARE YOU THE SAME MAXIMILIAN CHANG WHO TESTIFIED PREVIOUSLY ON BEHALF OF THE PEOPLE OF THE STATE OF ILLINOIS ("THE PEOPLE"), REPRESENTED BY THE OFFICE OF THE ILLINOIS ATTORNEY GENERAL ("AG"), IN THIS PROCEEDING REGARDING VOLTAGE OPTIMIZATION AND DATA ANALYTICS ISSUES?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. Our rebuttal testimony responds to ComEd's (the Company) rebuttal testimony which addressed our direct testimony about the Company's overall strategy on voltage optimization and data analytics.

Q. WHAT DATA SOURCES DID YOU RELY UPON TO PREPARE YOUR REBUTTAL TESTIMONY AND EXHIBITS?

A. Consistent with our direct testimony, we relied primarily on the rebuttal testimonies of ComEd witnesses Christine Brinkman and John Prueitt, the Company's Smart Grid Advanced Metering Annual Implementation Progress Report (AIPR), the direct testimony and exhibits of the Company's witnesses, as well as the Company's responses to various data requests. Certain of those responses are provided as exhibits attached to our testimony.

II. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS REGARDING THE COMPANY'S VOLTAGE OPTIMIZATION VALIDATION PROJECT AND VOLTAGE OPTIMIZATION STRATEGY.

A. In response to the Company's rebuttal testimony, we find the following:

- The Company's rebuttal testimony has not demonstrated that its proposed voltage optimization pilot will comprehensively address all or even most of the challenges facing the Company and possible voltage optimization solutions available.
- While the Company referred to voltage studies it conducted at its Oak Park substation, it has indicated that these studies are drafts. Further, its designation of the results of the Oak Park voltage optimization studies as confidential and the failure to share the studies with AEG or the vendors bidding on the voltage optimization validation study shows a lack of transparency and precludes these parties from learning from the Oak Park experience.

- The fact that the Company needed to re-evaluate and re-design the 2011 study for the Oak Park substation in 2015 shows the importance of carefully designing pilot or validation studies and further indicates that the Company still has much to learn about Conservation Voltage Reduction (CVR) design and evaluation.
- We continue to recommend that the Commission require the Company to adopt a more comprehensive and robust validation study and expand upon the current documentation of the company's ongoing voltage optimization efforts.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS REGARDING THE COMPANY'S DATA ANALYTICS PROGRESS.

A. In response to the Company's rebuttal testimony, we find the following:

- Both the IEEE presentation attached to our Direct Testimony as AG Exhibit 2.4 and ComEd's responses to data requests demonstrate that while Exelon is managing its data analytics strategy and investigation, ComEd's independent efforts are more piecemeal and less comprehensive. While Exelon has outlined five Business Intelligence/Data Analytics ("BI/DA") domains (Advanced Metering Infrastructure, Grid, Smart Energy Services, Customer Experiences, and Business Support), ComEd has only taken action on one (Smart Energy Services) and is implementing smaller data projects that do not appear to be part of a comprehensive data utilization strategy.
- We recommend that the Commission require the Company to provide updates on its progress in considering and implementing the five domains identified in the Exelon BI/DA effort.

Q. PLEASE EXPLAIN HOW YOUR TESTIMONY IS RELATED TO THE COMPANY'S ANNUAL FORMULA RATE PROCEEDINGS.

A. As we stated in our direct testimony, the investments made or not made by the Company in voltage optimization and data analytics have long-term importance to prudent use of a modernized distribution system and to achieving operational savings and efficiencies. We continue to stress that in order to progress on both issues addressed in our testimony, the Company will need to develop and articulate multi-year strategies that will affect future investments and future annual rate proceedings.

III. VOLTAGE OPTIMIZATION

Q. HOW DO YOU RESPOND TO THE COMPANY'S ASSERTION THAT THE COMPANY'S VOLTAGE OPTIMIZATION VALIDATION PROCESS IS APPROPRIATE AND PRUDENT?

A. A key issue we raised in our direct testimony is that the choice of a single substation for analysis is inappropriate and insufficient to understand voltage optimization opportunities and challenges for the ComEd distribution system.[1] While ComEd witness John Prueitt asserted that a single substation is "sufficiently representative," ComEd did not justify its limited focus on one substation or rebut our concern that a single substation validation study cannot test the various technologies available to control voltage or capture the diverse conditions on ComEd's system.[2]

In defending the Company's action, ComEd witnesses chided us for not mentioning the Oak Park substation projects of 2011 and 2015. However, our review of the studies done there indicates that the Company has much to learn since ComEd required two studies over a four-year period and the final results are still unavailable.

[1] AG Exhibit 2.0 at 22:1-24.
[2] ComEd Exhibit 10.0 at 7:143-145; see also ComEd Exhibit 8.0 at 6-10.

IV. THE OAK PARK PROJECTS

Q. PLEASE DESCRIBE YOUR UNDERSTANDING OF THE CONDITIONS AT THE OAK PARK SUBSTATION.

A. By 2011, the Company had installed advanced or smart meters for customers served by the Oak Park substation as part of a pilot installation program. In June, 2012, the Commission established certain reporting metrics associated with the further deployment of AMI, including Metric 17, which was reporting of "the number and percentage of distribution lines using sensing from an AMI meter as part of ComEd's voltage regulation scheme."[3] Pursuant to Metric 17, ComEd identified 13 feeders out of 5,456 (0.24%) as using sensing from an AMI meter.[4] In the Spring of 2011, ComEd initiated a voltage reduction and volt-var optimization field study. ComEd provided a draft report that found the results of the 2011 study anomalous, and conducted a second study starting in May, 2015.[5] The second study extended into 2016 to gather Winter and Spring data. ComEd did not report either the plan or the results of the Oak Park voltage field studies as part of Metric 17.

Q. PLEASE SUMMARIZE YOUR REVIEW OF OAK PARK PROJECTS.

A. As stated above, the Company has undertaken two projects to develop summer and fall CVR factors for the Oak Park substation. It is our understanding that the Company has not independently validated the results of its studies, nor has the Company shared the draft results of the studies publicly, since the two draft studies have been designated confidential. At the very least, the work done at Oak Park should be used to inform the development and implementation of the proposed validation study at the Hayford

[3] ICC Docket 12-0298, CUB/ELCP Ex. 1.2 and Order at 19-21 (June 21, 2012).
[4] 2016 AIPR at 111.
[5] ComEd Response to AG Data Request 6.21 Supp_Attach 1(Confidential and Proprietary), attached as AG Exhibit 4.1 (Confidential and Proprietary).

substation. The results from the Oak Park substation could also have been used to help inform the 2015 AEG study.

Q. PLEASE DESCRIBE THE FIRST OAK PARK PILOT PROJECT.

A. As described in ComEd's Response to AG data request 6.21 Supp_Attach 1 (Confidential and Proprietary), which is attached to this testimony as (Confidential and Proprietary) Exhibit 4.1, the Company conducted a field trial of distribution voltage reduction and volt-var optimization at the Oak Park substation from May 23, 2011 to May 5, 2012.[6] During this period, the Company reduced voltages for the Oak Park feeders on alternating weeks and compared the results with select feeders from the Berwyn and Forest Park substation as a control group.

Q. WHAT WERE THE RESULTS FROM THE FIRST PILOT?

A. The draft Company report found a CVR factor of 0.41 or a reduction of 0.41 percent in energy consumption for a one percent decrease in voltage.[7, 8] The Company noted that the results were at the lower end of results from other field trials.[9, 10] At the time of the first studies, the Company indicated that its expected range for CVR factors was 0.5 to 1.0.[11]

Q. HAVE THE RESULTS FROM THE FIRST PROJECT BEEN INDEPENDENTLY VERIFIED?

[6] ComEd Response to AG Data Request 6.21 Supp_AttachSupp_Attach 1 (Confidential and Proprietary), attached as AG Exhibit 4.1(Confidential and Proprietary).
[7] CVR factor or CVR_f is a dimensionless ratio of the percent reduction in energy (kWh) divided by the percent reduction in voltage.
[8] ComEd Response to AG Data Request 6.21 Supp_Attach 1 (Confidential and Proprietary), Page 1, attached as AG Exhibit 4.1(Confidential and Proprietary).
[9] ComEd Response to AG Data Request 6.21 Supp_Attach 1 (Confidential and Proprietary), Page 10, attached as AG Exhibit 4.1(Confidential and Proprietary).
[10] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Page 2, attached as AG Exhibit 4.1(Confidential and Proprietary).
[11] ComEd Response to AG Data Request 6.21 Supp_Attach 1 (Confidential and Proprietary), Page 2, attached as AG Exhibit 4.1(Confidential and Proprietary).

A. The information provided in response to data requests does not indicate that the Company commissioned an independent analysis of the project results.

Q. WHAT CHALLENGES DID THE COMPANY EXPERIENCE IN CONDUCTING THE FIRST OAK PARK VOLTAGE STUDY?

A. During the analysis period, the Company experienced several challenges that impacted the analysis. According to the draft report, the Company lost some data transitioning between collection and analysis, the voltage reduction and volt-var control system was not operable for a few weeks in the Fall, and the control settings changed after March 5, 2012, which resulted in the exclusion of three months of data for the Spring.[12] The Company's critique of the first report noted that "inconsistencies such as this were later found to be a result of the testing procedure used, equipment malfunctions that had occurred, and other potential factors that the study failed to fully account for."[13]

Q. WHAT IS THE SIGNIFICANCE OF THESE CRITIQUES?

A. These critiques indicate that experimental design and actual field conditions may differ. They also demonstrate the importance of a more robust validation study that incorporates the appropriate design and implementation planning.

Q. PLEASE DESCRIBE THE SECOND OAK PARK PROJECT.

A. As described in AG 6.21 Supp Attach 2 (Confidential), the Company conducted a field trial of distribution voltage reduction and volt-var optimization at the Oak Park substation from May 2015 through the Fall of 2015.[14] The second study operated the CVR system

[12] ComEd Response to AG Data Request 6.21 Supp_Attach 1 (Confidential and Proprietary), Page 6, attached as AG Exhibit 4.1(Confidential and Proprietary).
[13] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Page 2, attached as AG Exhibit 4.1(Confidential and Proprietary).
[14] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Page 7, attached as AG Exhibit 4.1(Confidential and Proprietary).

on an alternate day basis rather than an alternate week basis, and modified the regression analysis to include additional factors that were not included in the first study.

Q. WHAT WERE THE RESULTS FROM THE SECOND STUDY?

A. According to the draft report produced by the second study the Company found the following:

- An Oak Park substation Summer CVR factor of 0.92 based on average voltage reductions of 2.67 percent and corresponding energy reductions of 2.48 percent (0.92 = 2.48/2.67). Otherwise stated, this result means that for a one percent reduction in voltage, the Company found a corresponding reduction in energy usage of 0.92 percent for the substation.
- An Oak Park substation Fall CVR factor of 0.69 based on average voltage reductions of 3.06 percent and corresponding energy reductions of 2.11 percent (0.69 = 2.11/3.06).

The Company indicated that these results matched well with results from other utilities.[15] The Company noted that it will continue the project into 2016 in order to develop Winter and Spring CVR factors.[16]

Q. HAVE THE RESULTS FROM THE SECOND PROJECT BEEN INDEPENDENTLY VERIFIED?

A. I do not have sufficient information to determine if the Company commissioned an independent analysis of the project results.

Q. DID THE COMPANY DESCRIBE LESSONS LEARNED IN THE SECOND PROJECT?

[15] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Page 11, attached as AG Exhibit 4.1(Confidential and Proprietary).
[16] ComEd Response to AG Data Response 6.21 Supp_Attach 2 (Confidential and Proprietary), Page 11, attached as AG Exhibit 4.1(Confidential and Proprietary).

A. Yes, the Company draft report noted several positive learning opportunities from the second study. For example, the Company discussed the impacts of temperature effects that were not included in the study.[17] In addition, the Company used AMI meter data to determine that a majority of the voltage violations were associated with a single transformer.[18]

Q. WHAT IS THE SIGNIFICANCE OF THESE CONCLUSIONS?

A. In the second project, the Company demonstrates that it has learned and applied valuable lessons from the first Oak Park project, but that the work at Oak Park needs to continue in order to develop Winter and Spring factors.

Q. DO YOU HAVE OTHER OBSERVATIONS ABOUT THE OAK PARK SUBSTATION PROJECTS?

A. I note that the AEG report estimated the benefit cost ratio associated with the Oak Park substation to be 5.33 based on the parameters of their analysis.[19] In the AEG analysis, AEG developed ComEd global voltage optimization factors applied to each substation in their calculations.[20] The ComEd voltage optimization factors would be analogous to the CVR factors reported by the Company in the Oak Park substation projects since both reflect the ratio between the change in energy usage and change in voltage.[21] The AEG global voltage optimization factors were 0.69 for residential loads, 0.90 for commercial loads, and 0.47 for industrial loads.[22] Based on customer counts, the 19 feeders for the Oak Park substation appear to be predominantly residential.[23] I believe that a comparison

[17] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Pages 8-9, attached as AG Exhibit 4.1(Confidential and Proprietary).
[18] ComEd Response to AG Data Request 6.21 Supp_Attach 2 (Confidential and Proprietary), Pages 10, attached as AG Exhibit 4.1(Confidential and Proprietary).
[19] ComEd Response to AG Data Request 17.10.
[20] AEG. *Voltage Optimization (VO) Feasibility Study: Final Report.* March 9, 2015.Page 92.
[21] AEG (2015) Page 44.
[22] AEG (2015) Table 16, A-67.
[23] ComEd Response to AG Data Request 17.08 Attachment 1.

of the Oak Park substation actual CVR results to the AEG theoretical calculations would be informative in validating the AEG results and recommendations. Yet it appears that the Oak Park studies were not provided to AEG and that the Company is not integrating its own research on voltage optimization into the studies it has obtained or requested from vendors.

It has taken the Company two study projects over the last four years to determine that the CVR factors for the Oak Park substation are consistent with other utilities' experience with CVR factors. This suggests that the Company may face inconsistencies between the AEG calculations and what will actually transpire if voltage optimization is implemented without sufficient study and validation. This supports our recommendation for the Company to develop a more comprehensive validation study.

Q. **HAS THE COMPANY UTILIZED THE OAK PARK STUDIES IN THE VALIDATION STUDY IT IS CURRENTLY CONSIDERING?**

A. The Company has not explicitly linked the past and ongoing work at Oak Park with the proposed validation study at Hayford substation.[24] To the best of our knowledge, ComEd did not share the Oak Park experience with vendors bidding on the validation study RFPs. [25]

V. VALIDATION PROJECT CONCERNS

Q. DO YOU HAVE ADDITIONAL CONCERNS REGARDING THE VALIDATION PROJECT RFP FOR THE HAYFORD SUBSTATION?

A. Yes, the Company's RFP for the validation project requests pricing for both a single substation, as we described in our direct testimony[26] and requests additional pricing for

[24] ComEd Response to AG Data Request17.05
[25] ComEd Response to AG Data Request 17.05
[26] AG Exhibit 2.0, Page 19:8-20:24.

full deployment of voltage optimization for 2,900 ComEd distribution feeders.[27] The request for pricing for the single substation and for full deployment suggests that the Company is only interested in a limited pilot going to full deployment using the single technology or approach proposed in the pilot or validation study. In our direct testimony, we cited examples of voltage optimization projects that addressed a subset of a utility's feeders and substations.[28] These phased deployment projects ranged from 13 to 19 substations and associated feeders.[29] In contrast, the RFP issued by the Company appears to be an "all or nothing" approach asking vendors to propose a single approach for the validation study for a single substation and then propose full deployment, presumably using the approach implemented in the validation study. Indeed, the RFP does not appear to allow a vendor to suggest multiple validation methods or implementation approaches.[30]

Q. HAS COMED PROVIDED ANY ADDITIONAL STUDIES AND/OR ANALYSES THAT DOCUMENT THE COMPANY'S VOLTAGE OPTIMIZATION EFFORTS?

A. No. Despite claims that voltage optimization integration will require new technologies and that those technologies will need to be integrated with the ComEd distribution system, the Company has produced only the AEG report and the confidential Oak Park studies (marked as drafts) as the analyses and studies undertaken by the Company to evaluate technologies to address this issue.[31] While the Company has asserted that it is evaluating several competing technologies for its voltage optimization validation project,

[27] ComEd Response to AG Data Request 6.25 Supp-Attach_1 (Confidential).
[28] AG Exhibit 2.0, Page 19:8-20:24.
[29] AG Exhibit 2.0, Page 9:8-16.
[30] ComEd Response to AG Data Request 6.25 Supp-Attach_1 (Confidential).
[31] ComEd Response to AG Data Request 17.01.

it has not produced any documentation of such an evaluation.[32,33] Further, as discussed above, its RFP is limited to the extent that multiple approaches are not anticipated. Finally, the Company does not appear to be following its initial timetable: in its rebuttal testimony, the Company did not provide any additional or updated information regarding progress on selecting a validation study vendor or a proposed voltage optimization solution.[34]

Q. PLEASE RESPOND TO THE COMPANY'S CRITICISM OF YOUR TESTIMONY REGARDING THE OAK PARK SUBSTATION.

A. The Company criticizes our testimony for not mentioning the Oak Park substation project results.[35] While it is true we do not mention the substation by name, we discussed the Company's Metric 17: Voltage and VAR controls, which encompasses the Oak Park substation.[36] The Metric 17 report shows no change in "the number and percentage of distribution lines using sensing from an AMI meter as part of ComEd's voltage reduction scheme."[37] In its reporting on Metric 17, the Company has not referred to any studies or other work on voltage optimization to indicate that it was studying voltage regulation or expanding its voltage regulation efforts.

Q. PLEASE EXPLAIN YOUR CONCERNS REGARDING THE COMPANY'S DESIGNATION OF THE OAK PARK PROJECT RESULTS AS CONFIDENTIAL.

[32] ComEd Response to AG Data Request 6.08 Supplemental.
[33] ComEd Response to AG Data Response 6.25 Supplemental 2.
[34] ComEd Response to AG Data Response 17.06
[35] ComEd Ex 10.0 lines 82-84.
[36] AG Exhibit. 2.0; 5:10-17; 10:11-15.
[37] *Compare* 2016 AIPR at page 111, Metric 17 *to* 2013 AIPR at page 27, Metric 17. Available at: https://icc.illinois.gov/electricity/utilityreporting/InfrastructureInvestmentPlans.aspx.

A. It is unclear why the Company has designated the 2011 and 2015 Oak Park studies as confidential.[38, 39] Our original request to the Company resulted in an objection to the request.[40] Two weeks later the Company provided the confidential reports. As discussed above, the results of the first report and second report support our recommendation that the Company should design a comprehensive validation project. The challenges experienced by the Company in the Oak Park studies suggest that there are still lessons to be learned. The Company has claimed that it is interested and engaged in voltage optimization, yet it is not publicly disseminating the results of its voltage studies to vendors and contractors who could incorporate lessons learned from the Oak Park studies.

Q. THE COMPANY CRITICIZES YOUR FAILURE TO MENTION THE OAK PARK SUBSTATION IN YOUR TESTIMONY. WERE THE OAK PARK SUBSTATION EFFORTS DISCUSSED IN THE AEG REPORT?

A. No, there is no specific reference to ComEd's 2011 study or ongoing work in the 2015 AEG report. According to ComEd, "[t]he Oak Park substation was part of the general population under study; the AEG study was not intended as an evaluation of that pilot."[41]

Q. DO YOU FIND THAT PROBLEMATIC?

A. Yes; ComEd has had five years to investigate and evaluate voltage management using the smart meter technology available in the Oak Park substation. While it conducted a study on voltage management in 2011, it apparently did not convey the results or methodology

[38] ComEd Response to AG Data Request 6.21 Supp_Attachment 1 (Confidential and Proprietary), attached as AG Exhibit 4.1(Confidential and Proprietary).

[39] ComEd Response to AG Data Request 6.21 Supp_Attachment 2 (Confidential and Proprietary), attached as AG Exhibit 4.1(Confidential and Proprietary).

[40] ComEd Response to AG Data Request 6.21, attached as AG Exhibit 4.1, attached as AG Exhibit 4.1 (Confidential and Proprietary).

[41] ComEd Response to AG Data Request 17.05.

of that study to AEG when AEG was retained to evaluate voltage optimization for ComEd. As described above, the 2011 Oak Park study and the follow-up study conducted in 2015 demonstrate that the Company continues to learn from the experience of one substation over the course of four years and that work still needs to continue.

Q. YOU PREVIOUSLY POINTED OUT THAT COMED DID NOT INCLUDE INFORMATION ABOUT THE OAK PARK STUDIES IN ITS RFP FOR THE PENDING VALIDATION STUDY. DO YOU FIND THAT PROBLEMATIC?

A. Yes. ComEd should build on lessons learned. The design and implementation problems discovered in the first Oak Park study should be available to vendors so that their designs do not repeat the design flaws ComEd has already identified.

Q. PLEASE RESPOND TO THE COMPANY'S CRITICISM OF EXPANDING THE VALIDATION PROJECT BEYOND A SINGLE SUBSTATION.

A. As we stated in our direct testimony, the Company should expand its validation project to be more comprehensive.[42] While the Company asserts that it is reviewing multiple solutions,[43] its implementation at only one substation limits the scope and flexibility of the validation project. Moreover, the Company's experience with the Oak Park substations raises questions about the significance and reliability of the AEG calculated benefit cost ratios: AEG calculated a benefit to cost ratio of 5.33 for the Oak Park substation, but the Company's first study initially produced inconclusive results and required re-evaluation.[44] This suggests that the Company may learn valuable information from substations that are different from the "average" or that utilize different types of

[42] AG Exhibit 2.0, page 21:11-12.
[43] ComEd Response to AG Data Request 6.25 Supplement 2 Revised.
[44] ComEd Response to AG Data Request 17.10.

technological approaches. A well-designed validation study should capture these potentially diverse effects.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. We continue to recommend that the Commission direct ComEd to adopt a more comprehensive and robust validation study for voltage optimization. We further recommend that ComEd be required to expand upon the current documentation reported in Metric 17 regarding the Company's ongoing voltage optimization efforts so that the Commission stays informed about the types of technology used and the results achieved from Company studies. In the near term and upon development of the Oak Park substation Winter and Spring CVR factors, the Company should provide the Commission with an updated analysis and independent assessment of the ongoing Oak Park pilot project.

We continue to conclude that the Company's proposed validation study is not prudent, because it is too limited to provide the information necessary to enable the Company to (1) fairly and carefully review all voltage optimization options, and (2) act on options that can result in consumer savings. The Company's own experience with the Oak Park substation indicates that study design is critical, that implementation challenges must be plainly identified and managed, and that AMI sensing data can be utilized to identify anomalous equipment (transformers, circuits etc.). It has taken the Company over four years to conduct, analyze, re-conduct, and re-analyze the voltage optimization strategy that relied upon AMI sensing data and this work is ongoing. Presumably the validation study currently under review will produce more timely and robust results.

VI. DATA ANALYTICS

Q. PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS ON DATA ANALYTICS.

A. We find the following:

- The business information / data analytics (BI/DA) information provided by the Company suggests that ComEd does not have a comprehensive strategy for its data resources and opportunities and ComEd's rebuttal testimony does not dispel that conclusion. While it has obtained data services for "smart energy services," ComEd identified this as one of five "domains" in which data can be used in its operations.[45] The Smart Energy Service domain RFP is dated September 2015,[46] and sought services for that domain only. It is unclear when the five domains were initially identified and to what extent they have been adopted by ComEd as the structure of its BI/DA efforts. The five domains are discussed in the IEEE presentation by ComEd CIO and Exelon VP of IT Carol Bartucci, dated May 2016 and attached to our Direct Testimony as AG Ex. 2.4. Exelon's 2013 RFP, attached to our Direct Testimony at AG Ex. 2.5 refers to five somewhat different functional requirements, being "AMI Operations, Revenue Protection, Customer System Planning, and Reliability," [47] which are also referenced in Ms. Brinkman's rebuttal testimony.[48] These documents refer to all of the Exelon utilities and do not identify any ComEd specific activities or plans. It is unclear what ComEd efforts are independent of the efforts of the other Exelon utilities.
- The Company's responses to post-rebuttal data requests indicate that it is proceeding in only one of the five domains identified by Exelon and referenced by ComEd

[45] ComEd Response to AG Data Request G 6.26 Attach 1, page 5; ComEd Exhibit 8.0 at 11:216.
[46] ComEd Response to AG Data Request 18.02_Attach 1 (Confidential and Proprietary).
[47] AG Exhibit 2.5 at Page 4 (2016 FRU 0002666).
[48] ComEd Exhibit 8.0 at 10:208-209.

witness Brinkman.[49] [50] While Ms. Brinkman testified that ComEd is focused on three domains – customer, grid, and business support functions – AG Exhibit 2.4, the Exelon IEEE presentation, classifies all BI/DA initiatives as falling within these three categories.[51] The documents produced by ComEd do not identify any comprehensive plans or specific strategies for utilizing data for grid operations or business support functions specifically for ComEd.

- We continue to recommend that the Commission require the Company to develop a comprehensive, long-term plan to identify BI/DA solutions that fully utilize the extensive data enabled by both the installation of smart meters and modern distribution infrastructure. We expect that such solutions would result in net benefits to customers.
- We recommend that the Commission require the Company to provide updates on the progress of BI/DA efforts for the five identified domains and report on its investigation and adoption of data analytics solutions.

Q. WHAT ARE THE FIVE DOMAINS IDENTIFIED BY THE COMPANY?

A. The five domains identified in Company and Exelon documents are:[52]

- AMI
- Grid (T&D)
- Smart Energy Services
- Customer Experience
- Business Support

[49] ComEd Exhibit 8.0 at 10-11; ComEd Response to AG Data Request 18.02.
[50] ComEd Response to AG Data Request 18.02_Attach 1 (Confidential); ComEd Ex. 8.01 at 10-11.
[51] ComEd Exhibit 8.0 at 11:222-223; AG Exhibit 2.4 at Page 5 (2016 FRU 0002450).
[52] www.resourcecenter.ieee-pes.org/pes/product/conference-videos-and-slides/PESSLI1236; See also AG 6.26_Attach 1, AG Ex. 2.4 at 2016 FRU 0002450.

ComEd identified the Exelon RFP related to only one of the five domains (smart energy services) as a ComEd effort.[53] Additionally, the Company continues to represent that the presentation provided in response to AG 6.26 is the only study and/or memo produced by the Company on data management applications for customer, grid, and business support functions.[54,55]

Q. HAS THE COMPANY PROVIDED YOU WITH NEW INFORMATION REGARDING ITS EFFORTS IN BI/DA?

A. Yes, the Company has provided two additional pieces of analysis that were not provided before the filing of our direct testimony. Specifically, the Company provided:

- A Forrester Research evaluation of Exelon's Business Information/Data Analytics vendor responses, conducted in March 2016.[56]
- An Exelon RFP for Exelon's smart energy services provider from the fall of September 2015.[57]

Q. DOES THE NEW INFORMATION DESCRIBE A COMED BI/DA STRATEGY?

A. No. Both of these documents appear to be Exelon documents. They are not specifically for ComEd, but rather address the Exelon Utilities.

Q. HAS THE COMPANY QUANTIFIED HOW THE FIVE DOMAINS WOULD BENEFIT RATEPAYERS?

A. No, the additional documents provided by the Company after the filing of its rebuttal testimony do not provide an examination of the benefits proposed by the McKinsey report provided as AG Exhibit 2.9. The Company has not provided information to

[53] ComEd Response to AG Data Request 18.02.
[54] ComEd Response to AG Data Request 18.03; See also ComEd Exhibit 8.0 at 10-11:202-217 & 12:253-256.
[55] ComEd Response to AG Data Request 18.05.
[56] ComEd Response to AG Data Request 18.01_Attach 1 (Confidential and Proprietary).
[57] ComEd Response to AG Data Request 18.02_Attach 1 (Confidential and Proprietary).

suggest how the five domains identified in IEEE presentation could be applied to address the benefits described in the McKinsey report or to utilize the data available to ComEd as a result of its network modernization.

Q. WHAT DO YOU RECOMMEND?

A. We recommend that the Commission require ComEd to provide information regarding the development of a long-term plan to fully utilize the extensive data that is becoming available due to the installation of smart meters and modern distribution infrastructure. The Commission should require the Company to provide a progress report on how it is proceeding with the remaining four domains (AMI, Grid, Customer Experience, and Business Support) and how Opower's services as the Smart Energy Services domain vendor will benefit customers.[58] As part of the report, the Commission should also require the Company to provide information as to how all five domains will interact and the steps taken by ComEd both independently of Exelon and as an Exelon Utility in order to ensure that the Company's work in BI/DA will provide tangible net benefits to customers and to ensure that the ongoing work is comprehensive and not piecemeal.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[58] ComEd Response to AG Data Request 18.02.