State of Illinois  
Illinois Commerce Commission

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| THE CITIZENS UTILITY BOARD  and  THE ENVIRONMENTAL DEFENSE FUND  Proceeding to Adopt a GHG Metric for Smart Grid Advanced Metering Infrastructure Deployment Plans pursuant to Section 16-108.6 of the Public Utilities Act | :  :  :  :  :  :  : | No. 14-0555 |

**STIPULATION TO DISMISS PROCEEDING   
AS TO COMMONWEALTH EDISON COMPANY**

Commonwealth Edison Company (“ComEd”), the Citizens Utility Board (“CUB”), and the Environmental Defense Fund (“EDF”), by their respective counsel, hereby enter into this stipulation to dismiss the above-referenced proceeding as to ComEd, including all relief sought against ComEd (“Stipulation to Dismiss”).

I.

1. Whereas, CUB and EDF filed a Petition requesting the Commission to initiate a proceeding to adopt a metric for measuring reductions in greenhouse gas (“GHG”) emissions (“GHG Metric”) associated with Smart Grid Advanced Metering Infrastructure Deployment Plans (“AMI Plans”) filed pursuant to Section 16-108.6 of the Public Utilities Act (the “PUA”), 220 ILCS 5/1-101 et seq. 220 ILCS 5/16-108.6.
2. Whereas, on November 5, 2014, ComEd filed a Verified Motion to Stay the Proceeding, requesting that the Commission stay this proceeding through April 1, 2015 – the statutory deadline for ComEd to submit its 2015 Annual Implementation Progress Report (“AIPR”) and proposed updates to its Smart Grid AMI Deployment Plan (“AMI Plan”) – so as to allow the planned submission through the AIPR process of an updated “milestones and metrics” to measure the impact of AMI deployment on GHG emissions.
3. Whereas, on December 5, 2014, the Administrative Law Judge (“ALJ”) issued a Notice of ALJ Ruling and Notice of Continuance of Hearing granting ComEd’s Motion to Stay the Proceeding.
4. Whereas, on April 1, 2015, ComEd submitted its 2015 AIPR, including an updated “milestones and metrics” to measure the impact of AMI deployment on GHG emissions. Specifically, Attachment 1 to ComEd’s 2015 AIPR stated as follows:

Metric: 9

Metric Description: Reduction in Greenhouse Gas Emissions enabled by smart grid and the success of AMI deployment in enabling consumer benefits from the smart grid.

ComEd is working with CUB and EDF to develop a practical measure of Greenhouse Gas (GHG) emissions attributable to smart grid functions enabled by AMI deployment and AMI related investments by exploring the capability of calculating GHG emissions reductions realized through items such as the following:

A. Enabling Energy Efficiency and conservation   
B. Reducing peak load and creating a flatter load profile   
C. Creating a more predictable load profile   
D. Enabling customer Demand-side management and Demand Response   
E. Enabling the integration of clean, renewable generation sources   
F. Reducing technical electricity losses

ComEd Proposed Changes to Metric

ComEd proposes to modify the metric described in prior Reports and would begin reporting this revised and updated metric in the 2016 AMI Implementation Progress Report (AIPR).

For vehicle GHG emissions, ComEd proposes to refine the calculation by creating a three (3) year average GHG vehicle emission associated with meter reading vehicles for use as a baseline. The definition and use of such a baseline will better reflect changes in the fleet over the meter deployment period. Under the new metric, ComEd will compute the previous year’s GHG emissions associated with meter reading vehicles at each fleet center that had AMI meter deployment that year or in a prior year. The metric will be based on a comparison of the most recent year’s value to its baseline value, with the emission factors from the Climate Registry used by Exelon Corporation.

For aggregate load GHG emissions, ComEd will calculate the estimated load differences between those customers with AMI meters and those without AMI meters and any associated impact on GHG emissions. ComEd will report the results of this analysis in the 2016 AIPR.

ComEd will also calculate the estimated load differences between those customers with AMI and without AMI meters by community where deployment has taken place. These load differences will include total load reduction, and to the extent data availability and reliability permits, load shifting and conservation effects. Based on these differences in load by geographic area or customer program, the associated change in GHG emissions will be estimated. ComEd will report the results of this analysis in the 2016 AIPR.

ComEd will continue to explore and analyze other elements identified as contributors to the GHG emissions for inclusion in future reporting including (a) other operational elements related to AMI deployment such as avoided vehicle emissions related to outage management and remote meter functionality and (b) GHG emissions related to reduction in line losses related to metric 20.

1. Whereas, CUB and EDF have continued to work with ComEd to identify and define certain details of the methodology to implement the updated GHG emission metric and milestone.
2. Whereas, ComEd has committed to work in good faith toward presenting in its 2016 AIPR and proposed AMI Plan update filing revised and enhanced GHG metrics that include estimates of:
3. **Operations**: In consultation with parties including but not limited to CUB and EDF, ComEd will also work toward developing a meaningful and reliable measure of reductions in GHG emissions attributable to operational changes made possible by AMI deployment, including:
   1. Reduced vehicle use
   2. Line loss reductions as it relates to voltage optimization or other similar programs or investments
4. **Program-specific reductions (bottom-up)**: In consultation with parties including but not limited to CUB and EDF, ComEd will measure changes in GHG emissions attributable to changes in customer demand and energy use attributable to specific demand-reducing or -modifying, efficiency, and other programs enabled by AMI deployment, on a program-by-program basis, using a time-based calculation of marginal emissions data, including but not limited to:
   1. Peak-Time Savings
   2. Residential Real-Time Pricing Program
   3. Any new AMI-enabled programs or rate structures that become available

**BOTTOM-UP APPROACH**

A comprehensive approach focusing on “when” energy is used may identify GHG emissions reductions enabled by smart grid technology investments.

ComEd will calculate the annual marginal emissions changes due to changes in load on a program-by-program basis for appropriate time intervals.

ΔGHG(B) =

*Where*

*Δ Marginal Emissions* t = ([Change in load for program participants in time interval t] \* [Marginal Emissions Rate for time interval t])

*T = number of periods of time interval t in one year*

Change in load for program participants – For each program, ComEd will develop a measurement of load shape change on an hourly level for the times in which the program has impacted hourly load. The hourly load change for program participants will be expressed as a total load change (kWh) for each hour (8,760) in the program year, or for the hours in which the program impacted hourly load.

Marginal Emission Rate – Based on the publicly available data, two methods for determining marginal emissions rates and applying them to this approach have been identified. Recognizing the limitations of each method, the parties agree that ComEd will apply both, though neither CUB and EDF nor ComEd support both methods. These will continue to be developed amongst the parties in good faith, working together to improve or replace them as better methods and additional public information become available. For any AIPR reporting GHG Metrics reflecting these alternate marginal emission derivation methods, ComEd will also include a detailed explanation of the limitations of each approach (e.g., CUB and EDF approach (Method 2 below) includes estimates of emission rates by fuel-type and the ComEd approach (Method 1 below) is not hourly.

* 1. Method 1: Available Emissions Data Method

Locational Marginal Pricing (“LMP”) is a calculation of the price of electricity based on the marginal energy generating unit (“EGU”) in a particular five-minute interval. While the LMP data are publicly available, the information about the specific EGU is not released by PJM Interconnection, L.L.C. (“PJM”) given the sensitivity and confidentiality of the information.

However, PJM calculates weighted average marginal emissions rates for peak and off-peak hours in each month using the five-minute interval data. The most recent report describing these methods and data for 2012-2014 was released on August 21, 2015[[1]](#footnote-1), and PJM has committed to release updated reports on an annual basis. Under this method, ComEd will determine the marginal emissions rates based on these data unless and until more granular marginal emissions rates data from PJM becomes publicly available.

* 1. Method 2: Estimated Generation Data Method

While the specific data about EGUs determining LMP for a given interval is not available to the public, they are available to PJM’s Independent Market Monitor. Using these data, Monitoring Analytics, “the Independent Market Monitor for PJM under a long-term contract”[[2]](#footnote-2), has developed a regular report that summarizes the fuel type of marginal or jointly marginal units in the PJM Real-Time Energy Market for each hour. The share of each fuel in each hour is calculated based on the number of five minute intervals that a unit burning each fuel type is marginal or jointly marginal.[[3]](#footnote-3)

Under this method, CUB and EDF propose that ComEd use these data to generate a weighting for different marginal fuels in a given hour. Specifically, CUB/EDF propose ComEd estimate the hourly emission rate for each hour (8,760) in the program year using the Marginal Fuel Posting data made publicly-available by the PJM Market Monitor, the Average Heat Rate by Energy Source data published by the U.S. Energy Information Administration (EIA),[[4]](#footnote-4) and the Carbon Dioxide Uncontrolled Emissions Factor data (lbs CO2/million BTU) published by the U.S. Energy Information Administration (EIA).[[5]](#footnote-5) The PJM Market Monitor’s Marginal Fuel Posting identifies the share of each fuel in each hour, and is calculated based on the number of five minute intervals that a unit burning each fuel type is marginal or jointly marginal. The EIA’s Average Heat Rate by Energy Source data provides the annual average BTU per kWh by fuel source and prime mover. The weight for each fuel is then multiplied by the EIA’s published emission factor (lbs CO2 / million BTU) for each fuel type, based on data from EIA and EPA, yielding an estimated weighted average marginal emission rate by hour.

1. **System-wide reductions (top-down)**: ComEd will measure overall changes in GHG emissions attributable to changes in customer demand and energy use enabled by AMI deployment, using a time-based calculation and available marginal emissions data as described in §6b, with the understanding that such measurement may be complex, difficult, and require extrapolation in advance of widespread AMI meter deployment and with the understanding that available generation dispatch data may be subject to limitations, including those of Regional Transmission Organizations.

**TOP-DOWN APPROACH**

A comprehensive approach focusing on “when” energy is used may identify GHG emissions reductions enabled by smart grid technology investments.

ComEd will calculate the annual marginal emissions changes due to changes in load for smart meter customers versus non-smart meter customers.

Δ GHG(T) =

*Where*

**Approach 1:** Δ *Marginal Emissions* t = ([Smart Meter Load/customer in time interval t] – [Non-Smart Meter Load/customer in time interval t]) \* [Marginal Emissions Rate for time interval t] \* # of Smart Meter customers

**Approach 2:** *Δ Marginal Emissions t* = ([Year y Smart Meter Load/customer in time t] – [Year y - 1 Non Smart Meter Load/ same customer in time t]) \* [Marginal Emissions Rate in time t] \* # of Smart Meter customers

*t = time interval*

*T = number of periods of time interval t in one year*

Marginal Emission Rate –The methods and challenges for determining and applying the marginal emissions rate in this context are the same as previously described in §6b for the bottom-up approach.

Approach 1:

Smart Meter Load – ComEd will develop an average load per customer (kWh) for customers with smart meters for each hour (8,760) in the calendar year and will account for line losses as included in the rates in effect at the time of the usage.

Non-Smart Meter Load – ComEd will develop an average load per customer (kWh) for customers that do not have smart meters for each hour (8,760) in the calendar year. This number will not include hourly load data that is considered impractical and will account for line losses as included in the rates in effect at the time of the usage.

Approach 2:

Smart Meter Load – ComEd will develop an average load per customer (kWh) for customers with smart meters within a specific time period in a calendar year and will account for line losses as included in the rates in effect at the time of the usage.

Non-Smart Meter Load – ComEd will develop an average load per customer (kWh) for the same customers who had non-smart interval meters for each hour within the same specific time period in the previous calendar year. This number will not include hourly load data that is considered impractical and will account for line losses as included in the rates in effect at the time of the usage.

Geographic Bias – For the duration of the AMI deployment period, ComEd may conduct random sampling of smart meter load and non-smart meter load to report on whether there is any geographic bias in the data and the extent of the bias.

To the extent that ComEd accounts for geographic differences, it will consult with stakeholders to determine the best approach to account for the geographic differences of the smart meter deployment for each annual period and for changes in smart meter deployment throughout the year.

During Deployment – ComEd will calculate the year-to-year marginal emissions changes due to load shifting for all smart meter load for a level of time (t) to be determined based on available data.

1. **Changes in aggregate load shape attributable to AMI deployment**: The Parties understand that ComEd will not propose and they will not argue that ComEd should propose a metric that attempts to measure or predict the effect of these load shape changes, or of AMI deployment in general, on generation retirement or construction or on the fuel mix of the generators serving load in the ComEd zone. ComEd will, however, provide aggregate load shape data to parties interested in conducting such studies, and will not object to reasonable efforts of such parties to obtain related publicly available data from PJM, with the understanding that no study results or processes are attributed to ComEd.
2. **Understanding and commitments contingent on the availability of data and subject to analysis of methodologies and approaches using actual data**: The parties understand that the commitments and understandings set forth in this Stipulation with respect to the revised and enhanced GHG metrics are contingent on the availability of data in the form and format contemplated (e.g., hourly load and emission data is publicly available for the program, group, time, and/or geographic area contemplated). The parties also understand that ComEd has not had the opportunity to fully test or analyze the methodologies, approaches, and underlying assumptions reflected in this Stipulation using actual data. Where data is not available, or where testing or analysis using actual data reveal a better methodology or approach may be available or that significant issues exist with respect to the methodologies, approaches, or assumptions reflected in this Stipulation, ComEd, CUB, and EDF commit to consult with each other in good faith regarding ComEd’s development of alternatives to the methodologies, approaches, assumptions, and estimates for the GHG metrics reflected in this Stipulation.
3. Whereas, ComEd, CUB, and EDF have committed to consult with each other, prior to the filing of ComEd’s 2016 AIPR and proposed AMI plan update, on the progress of implementing the GHG metric. The Parties intend through these meetings and discussions that ComEd will openly report on its progress and that CUB and EDF will provide constructive comment and suggestions consistent with Section 6. ComEd will not exclude CUB or EDF’s designated consultants or representatives from such presentations, meetings, and consultations, subject to appropriate protections for confidentiality.
4. Whereas, ComEd, CUB, and EDF agree that nothing in this Stipulation shall affect ComEd’s obligation to present its 2016 AIPR and proposed AMI plan update information to the Smart Grid Advisory Council as required by law.
5. Whereas, in consideration of the above-described developments, understandings and commitments, ComEd, CUB, and EDF desire to dismiss the above-referenced proceeding as to ComEd, including all relief sought against ComEd.

II.

1. NOW THEREFORE, in consideration of the mutual agreements and covenants contained herein, ComEd, CUB, and EDF stipulate and agree to dismissal of the above-referenced proceeding as to ComEd, including all relief sought against ComEd.

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| Dated: March 14, 2016 | Commonwealth Edison Company  By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  One of its Attorneys |
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1. PJM, 2012-2014 CO2, SO2 and NOX Emission Rates (August 21, 2015) available at http://www.pjm.com/~/media/documents/reports/20150821-2014-emissions-report.ashx. [↑](#footnote-ref-1)
2. Monitoring Analytics, http://www.monitoringanalytics.com/home/index.shtml (last viewed October 28, 2015). [↑](#footnote-ref-2)
3. Monitoring Analytics – Marginal Fuel Posting, http://www.monitoringanalytics.com/data/marginal\_fuel.shtml (last viewed November 3, 2015). [↑](#footnote-ref-3)
4. http://www.eia.gov/electricity/annual/html/epa\_08\_02.html. [↑](#footnote-ref-4)
5. <https://www.eia.gov/electricity/annual/html/epa_a_03.html>, which compiles data from two sources: 1. Energy Information Administration, Office of Integrated Analysis and Forecasting, Voluntary Reporting of Greenhouse Gases Program, Table of Fuel and Energy Source: Codes and Emission Coefficients; available at: <http://www.eia.doe.gov/oiaf/1605/coefficients.html>; and 2. U.S. Environmental Protection Agency, AP 42, Fifth Edition (Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources); available at: http://www.epa.gov/ttn/chief/ap42/. [↑](#footnote-ref-5)