BEFORE THE NEW YORK STATE
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service	)	**16-E-0060**
Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service	)	**16-G-0061**

DIRECT TESTIMONY OF AMI METRICS PANEL (DANIEL LEONHARDT AND THOMAS BOURGEOIS) ON BEHALF OF PACE ENERGY AND CLIMATE CENTER

May 27, 2016

I. INTRODUCTION AND OVERVIEW

Q. Please state your names and business addresses.

A. Daniel Leonhardt, Senior Energy Policy Associate at the Pace Energy and Climate Center ("Pace"), and Thomas Bourgeois, Deputy Director of Pace and Director of the U.S. Department of Energy's Northeast Combined Heat and Power Technical Assistance Partnership. Our business address is 78 North Broadway, White Plains, New York.

Q. What is Pace?

A. Pace is a project of the Elizabeth Haub School of Law at Pace University. As a non-partisan legal and policy think-tank, Pace develops cost-effective solutions to complex energy and climate challenges and transforms the way society supplies and consumes energy. For more than twenty-five years, Pace has been providing legal, policy, and stakeholder engagement leadership in New York, the Northeast, and other jurisdictions. Located on the campus of the Elizabeth Haub School of Law, Pace engages and leverages a strong legal faculty and student body in its work, in particular the internationally recognized Environmental Law Program and the Pace Land Use Law Center. Pace has many years of success in working with and supporting New York State Energy and Research Development Authority ("NYSERDA"), the New York Public Service Commission ("NYPSC" or "the Commission"), and the New York Department of Environmental Conservation ("NYDEC").

Q. Please summarize your background and experience.

A. **Leonhardt**: I am a Senior Energy Policy Analyst at the Pace Energy and Climate Center. I research and advocate for policy change to enable community energy and combined heat and power as well as for better energy management in the multifamily sector and the low- and moderate-income ("LMI") housing sector.

Prior to my work at Pace, I was the Assistant Director of Energy Finance and Sustainability Management for the New York City Housing Authority ("NYCHA") which owns and administers public housing for over 600,000 LMI residents in New York City. I worked on a number of energy efficiency programs targeted at the LMI community and saw firsthand the unique challenges in designing and executing energy programs in that sphere.

Prior to my work at NYCHA I worked in information technology for ten years as an engineer, consultant, and project manager for medium and large corporations. The projects I worked on included: data center design, infrastructure needs assessments, systems migration planning, disaster recovery and business continuity planning, and security and control audits for large enterprise resource planning platforms such as Systems, Applications, Products and Oracle.

I have an MBA and Masters in Information Systems from Boston University as well as a Bachelors of (Electrical) Engineering from The Cooper Union.

A. Bourgeois: I am Deputy Director of the Pace Energy and Climate Center, and Co-Director of the U.S. Department of Energy's Northeast Combined Heat and Power Technical Assistance Partnership ("Northeast CHP TAP"), covering New York and New England. I have worked at Pace for twenty-two years and have served as Co-Director of the Northeast CHP TAP since 2003.

I have advocated for methods and procedures that would better integrate distributed energy resources ("DER") as dynamic assets on the grid, thereby enhancing societal benefits from investments in clean energy in numerous reports and in testimony before utility commissions over the years.

I was a member of the Market Design Platform Technology ("MDPT") Working Group, a select committee created by the NYPSC to advise on the designs of the utilities' Distribution System Implementation Plans ("DSIP"). I participated in the Mayor's Distributed Generation ("DG") Collaborative in 2012-2013, where I co-chaired the Microgrid working group. I have been a member of NYPSC-sponsored Non-Wires Alternatives ("NWA") collaboratives with Con Edison and National Grid, and I participated in the design of NWA Guidance Principles developed by National Grid.

In 2008, I received the CHP Champion Award from the U.S. CHP Association, the national association for the CHP industry. In 2014, I received the NECHPI Award from the Northeast CHP Initiative ("NECHPI").

I earned a Master's Degree in Regional Planning, with a concentration in Economic Development Planning, from the University of North Carolina – Chapel Hill. I completed the coursework and comprehensive exams for a Ph. D. in managerial economics at Rensselaer Polytechnic Institute. I have a B.A. in economics from Union College.

Our detailed staements of qualifications are attached as Exhibit AMI-1.

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to review the proposal by Consolidated Edison Company of New York, Inc. ("the Company") relating to metrics for evaluating the Company's Advanced Metering Infrastructure ("AMI") program.

Part II focuses on the Company's proposed customer engagement, awareness, data, and reporting metrics, as well as metrics relating to low-income customers.

Part III focuses on metrics relating to DER integration and optimization.

Q. What information did you review in preparing this testimony?

A. We reviewed the Company's AMI Business Plan, AMI Panel Testimony, discovery responses, and documents relating to other relevant Commission proceedings.

Q. Have you reviewed the Company's Supplemental AMI Panel Testimony?

A. Yes. We find the Company's proposed metrics are a reasonable start at measuring some of the AMI program's benefits, but there are additional necessary metrics. Below, we provide several recommendations to strengthen the Company's proposed metrics, and suggest a number of additional metrics that should be included to ensure that the Commission is able to fully and accurately determine the benefits derived from the AMI program.

II. METRICS RELATING TO CUSTOMER ENGAGEMENT, DATA ACCESS, AND LMI CUSTOMERS

Q. Please summarize your testimony relating to metrics for the Company's AMI project.

A. The AMI project is going to be a very positive improvement to the electricity and gas infrastructure managed by the Company. However, additional types of data gathering should be conducted, tracked, and regularly reported - beyond those currently set out by the Company - and reporting on such data should be more frequent. We recommend adding additional metrics to measure and track the Company's customer outreach, education, and customer training on AMI; the number and percentage of AMI supporting home area network and building area network devices; energy usage reductions of customers who use the Online Portal; additional metrics to measure the training about,

and effectiveness of, AMI meters in reducing energy usage (including for low-income and low-usage customers); more frequent reporting; and number of customers who are sharing their energy use information with third parties via Green Button Connect. Thomas Bourgeois will recommend additional metrics on the integration of and effectiveness of AMI meters in promoting DER. This will provide better visibility into the effectiveness of the new systems, and related outreach, to achieve stated goals.

Q. Does the Company propose any customer engagement metrics?

A. Yes. The Company proposes four metrics to measure customer engagement, which include the number of customers with an AMI meter who log on to the Online Portal. To optimize this metric, the Company should measure and report not only the absolute number of customers who log on, but also the frequency of their usage (*e.g.*, a histogram of how many customers log on weekly, monthly, quarterly, etc.). This will allow the Company to course-correct its customer awareness and education efforts with as little delay as possible if there is insufficient engagement with the portal. This should include a monthly report on:

1. The total number of registrations over the previous month, as well as the overall total of registrations to date; and
2. Aggregated statistics, including how frequently customers log into the system after their initial registration.

These metrics would complement and expand upon the Company's proposal to measure the number of customers who log onto the Online Portal, and would provide a more accurate test of customer engagement with the Portal.

Q. Does the Company propose any other customer engagement metrics?

A. Yes. The Company proposes a metric to measure the number of AMI-metered customers who have access to near real-time data, once such capability is enabled. Specifically, the proposed metric is "the number of customers who, after some degree of maturity of the implementation of the communication backbone and roll-out of AMI meters, have access to near real-time data following AMI meter installation."[1] The Company proposes that real time access to customer data will only be available through the Portal, which is not planned to be developed until 2017 or 2018.[2] This represents an unnecessary delay and restriction to customer data access. The Portal's development should be accelerated to grant customers online access to real time data about their energy usage and costs as soon as practicable after the meters are installed and operational (i.e., with the delay, if any, measured in days, and not weeks or months). In addition, as discussed below, customers should have access to their interval meter data at, or near, real-time on all common web-enabled devices.

When discussing the roll-out schedule, and why Staten Island and Westchester are the first areas for AMI deployment, the Company states in their AMI Panel testimony that "[t]his will allow the Company to test that the business processes, information systems and deployment tools are operating properly . . . ."[3] The deployment of customer access to real-time data should occur at the same time as meters are deployed to Staten Island and Westchester (i.e. the initial deployment areas), so that the Portal can be tested along with all of the other AMI system's components.

[1] Supp. AMI Panel Test. 5:1-3.
[2] Supp. AMI Panel Test. 12.
[3] AMI Panel Test. 46:2-4.

Q. How should customer data be made available to customers?

A. Customers should have access to their interval meter data on a real-time basis. In addition to providing access to this data through the Online Portal, such access should also be made available and programmed to be rendered (at the same time the AMI meters are installed) on all common web-enabled devices: computers, tablets, and smart phones. Additionally, such data should be easily and readily accessible to third-party DER providers as they will represent the bulk of DER-provided resources allowed under the Reforming the Energy Vision ("REV") proceeding. We support the Company's proposal to use Green Button Connect for this third-party access.

Q. Does the Company propose any metrics to measure customer awareness of AMI?

A. Yes. The Company proposes several metrics, including the number of targeted energy presentations to customer groups and representatives, the use of surveys of AMI features and benefits to measure customer knowledge, and the number of AMI community outreach events. Such customer awareness initiatives should also be reported as a timeline overlaid with customer enrollments on, and ongoing engagement with, the website. Measuring engagement and action, and not just passive receipt of information, would provide a measure of the outreach strategy's actual impact on customer engagement with the Online Portal and allow the Company to course-correct as needed.

Q. Do you support the proposed customer awareness metrics?

A. Yes, but they should go further. We recommend adding additional metrics to measure and track the Company's customer outreach, education, and customer training on AMI, through digital and print means, as well as through in-person events. This is extremely important to ensure effective customer use of the new meters.

Q. What additional metrics do you propose?

A. The Company should track the number and percentage of AMI-supporting home-and building-area network devices. The Company should also report on the number of customers, segmented by customer class, who are sharing their energy use information with third parties via Green Button Connect. The Company should measure the total number of customers, as well as the total number of low-income customers, who attend the above-described "targeted energy presentations," "community outreach events," and other customer engagement efforts. The Company should also report on the effectiveness of the AMI Customer Portal and meters in leading to a reduction of customer electricity usage. This report should show data on variables such as: (1) comparison of energy usage before and after the customer's initial enrollment with the Portal, and (2) the extent to which frequency of Portal use correlates with further/ongoing consumption reductions. The report should also compare these data against customers in the same service class who do not make use of the Portal after their advanced meters are installed.

Q. Does the Company propose any metrics related to low-income customers?

A. Yes. The Company proposes to measure "the number of identifiable low income customers to whom the Company sends energy saving messaging (messages regarding their energy savings tools, personalized usage and or savings tips)."[4] We strongly support the inclusion of metrics to measure low-income customer engagement in, and benefits from, the AMI program.We strongly support the inclusion of metrics to measure low-income customer engagement in, and benefits from, the AMI program, and we are

[4] Supp. AMI Panel Test. 4:21-23.

encouraged by the additional opportunities for serving LMI customers that the AMI project represents.

Q. What, if any, other low-income customer engagement metrics should the Company propose?

A. The Commission recommended tracking low-income users of the Online Portal in the AMI Business Plan Order. By itself, tracking the percentage of low-income customers who are targeted with energy savings messaging is likely insufficient to measure the number of low-income customers who actually engage in, and take advantage of, the AMI program and its benefits. As described above, the Company proposes to measure the number of customers who log into the customer engagement Portal. We recommend that the Company include a separate line item in all of their reporting to show the number of low-income customers who log into the Portal. This line item reporting of LMI customers as a separate group should also appear in all other customer-relevant AMI metrics the Company reports, including those we have mentioned earlier in this testimony. For example, when showing a breakdown of customers by frequency of their Portal use after enrollment, data for LMI customers would be separately reported.

Q. Did the Commission recommend any additional low-income customer metrics?

A. Yes. The Commission also recommended that the Company adopt metrics to measure progress with low-income customer programs, including energy efficiency programs.

Q. Did the Company propose metrics to measure progress on low-income customer programs?

A. No, but they should. The Company does recognize the opportunities AMI provides to help low-income customers manage their energy usage and costs.[5] Metrics to measure such impacts are critical to ensuring that low-income customers are engaging in, and benefitting from, the programs and services enabled or enhanced by the Company's AMI rollout. Low-income customers are typically underserved by clean energy and energy efficiency programs. They also experience the highest "household energy burden" among customer classes. Low-income customers should have the benefit of the Company's AMI investments. We recommend the reporting of AMI enrollment by customers as well as reporting on whether and how their usage decreases after enrollment.

Q. How frequently does the Company propose to report on the AMI metrics?

A. The Company proposes quarterly and annual reports, depending on the data gathering required. We recommend that the Company report on all AMI customer engagement metrics, including the additional ones we have proposed, on a monthly basis. The data should be kept indefinitely to allow for historical comparisons. The amount and types of data recorded should be as large as possible, even if data sharing specifics for third parties have not yet been fully evaluated. Appropriate procedures and controls will have to be put in place in order to ensure that data, whether relating to customer use, DER attributes, or grid performance, are adequately protected. However, the absence of protocols for sharing customer data at this time should not preclude gathering that data for purposes of monitoring program success.

[5] AMI Panel Test. 31:20-23.

More frequent reporting will provide the Company with an opportunity to course-correct, with as little delay as possible, if any aspect of the AMI program requires modification. This will also help the NYPSC to monitor the Company's progress towards established milestones and overall goals. Reports should be produced as soon as practical after the necessary data are compiled. The data being captured and reported are, by their very nature, digitally native and so a monthly reporting frequency should not be burdensome.

III. METRICS RELATING TO DER AND TIME-VARIANT PRICING

Q. Has the Company proposed any metrics relating to the benefits of DG integration and optimization?

A. Yes. The Company proposed "DG Integration" metrics, including a measurement of the number of DERs with AMI meters, and a measurement of the interconnection timeline for solar photovoltaic ("PV") systems. These metrics represent a good start on measuring DG integration and optimization, but focus only on a very small portion of the topic overall. The Company discusses potential manpower and capital expense savings gained by not having to install a new meter for customers who install on-site solar PV panels. This scope can and should be greatly expanded. In addition, the Company's proposed metric for the reduction in PV interconnection time should be expanded to include additional DERs, such as rooftop wind.

Q. Are there any additional DG-related benefits that the Company should track?

A. Yes. As the Company recognizes in its AMI Panel Testimony, the benefits of AMI extend to enabling demand response, time-variant pricing ("TVP"), third-party-provider

services, and conservation voltage optimization (for which the Company has proposed a metric).[6] In addition, the AMI rollout will enable the Company's Distributed System Platform ("DSP") functionality.[7] DSP functionality will include the utilization of DERs for system planning and system operations.[8] The Company should regularly track and report the full customer and distribution system benefits of the AMI program, including the AMI-enabled benefits discussed in the Company's AMI business plan and AMI panel testimony as well as how the AMI investment is advancing the utilization of DERs for system planning and operations. Several additional metrics should be captured and these should be reported monthly, on an ongoing basis, and report data kept indefinitely to allow for comparison to prior periods. The metrics that characterize the state of markets for DER, and provide information on the robustness of the market for DER and AMI's role in facilitating these developments, should include but not be limited to:

- The number, size, and installation date of DER systems interconnected;
- Which distributed energy resources/services have been provided by third parties and which by the Company;
- The type and number of AMI-enabled energy-reducing resources/services that have been provided by third parties and, separately listed, by the Company;
- Minimum, maximum, and average length of time to interconnect DER systems by size and type;

[6] AMI Panel Test. 28:9 to 29:5, 32:23-24, 33:8-16.
[7] AMI Panel Test. 36:23 to 37:3.
[8] Order Adopting Distributed System Implementation Plan Guidance at 14, Proceeding on Mot. of the Comm'n in Regard to REV, Case 14-M-0101, (Apr. 20, 2016) ("As the utilities transition to the DSP role, they will also facilitate and coordinate DER integration into grid operations. To perform these functions, the utilities will need tools to observe/monitor and coordinate/control the distribution system.").

- The number, and total capacity (in megawatts), of DER systems participating in regulation services programs;
- The number, and total capacity (in megawatts), of DER systems participating in voltage support programs; and
- The number of circuits and total connected residential, commercial, and industrial load on circuits where DER installations are constrained by fault current concerns.

Q. Has the Company proposed any metrics relating to TVP or other innovative rate designs that could be enabled by the AMI program?

A. No. As the Company begins to develop new rate designs enabled by the AMI program, such as time-of-use ("TOU") or other TVP tariffs, the Company should adopt a metric to measure the number of customers who adopt a TOU or other TVP tariff. In this regard, we support the direct AMI Metrics Testimony of Mina Badtke-Berkow, on behalf of Environmental Defense Fund, who proposes that this metric be "expressed as a number and percentage of customers in each delivery class" who adopt the TVP tariff.[9]

Q. Are there any additional actions the Company should take to measure and report on DER integration and optimization?

A. Yes. Because the Company's investment in AMI is fundamental to the REV goal of enabling a variety of new grid markets and grid capabilities that will permit DERs to play a far greater role in system planning and operation, we propose that the Company include in its quarterly and monthly reports details on how AMI is fostering new functionality that enables the utilization of DERs to improve grid operations and lower total system

[9] Direct testimony of Mina Badtke-Berkow Environmental defense fund page 11:7-8

costs. These reports should provide information on the following issues (and any other AMI-enabled and REV-related benefits):

- How has the AMI investment to date improved the transparency of the grid system in a manner that facilitates the ability of third parties to identify opportunities to provide grid operations and planning services?
- How has the AMI investment to date affected the system's capability to host significantly increasing amounts of DERs?
- How has the AMI investment to date affected certain constrained zones where DERs cannot interconnect without incurring either higher costs or using and inverter-based interconnection method that lowers efficiency and increases cost?
- How has the AMI investment to date enabled a host of new services that could be provided by DERs to improve the operations of the existing system (*e.g.*, how does it enable DERs to act as dynamic assets serving the grid)?
- What has been the effect to date of the AMI investment in speeding interconnection time and lowering interconnection costs?
- What new markets for DER have been made possible due to the AMI investment to date?
- How many transactions have taken place in new markets that have been made possible by the AMI investment made to date?
- What have been the total payments to DERs in each of the markets made possible by the AMI investments made to date, in the current year, and in the prior year?

Q. Does this conclude your testimony?

A. Yes.

Certificate of Service

The undersigned certifies that a true and correct copy of the foregoing document was served via electronic mail on all parties to the proceeding on this 27th day of May, 2016, with the exception of the following party, who was served via U.S. First Class mail, postage prepaid:

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