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Date: December 21, 2015

VIA ELECTRONIC MAIL

Hon. Kathleen H. Burgess
New York Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

Re:
Case 13-E-0030 – 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
Case 15-E-0050 -- 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.

Dear Secretary Burgess:

Environmental Defense Fund hereby submits for filing its comments on Con Edison's AMI Business Plan.

Respectfully submitted,

Elizabeth B. Stein

Cc: Active Parties

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Case 13-E-0030 – 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
Case 15-E-0050 -- 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.

INITIAL COMMENTS OF ENVIRONMENTAL DEFENSE FUND REGARDING THE ADVANCED METERING INFRASTRUCTURE BUSINESS PLAN FILED BY CONSOLIDATED EDISON

DATED: December 21, 2015

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I. Introduction

Advanced Metering Infrastructure ("AMI") is a foundational component, enabling many of the goals of the REV proceeding, engaging customers and facilitating the participation of third parties in marketplace. It can also provide essential support for the decarbonization of the electric system called for in REV and in the State Energy Plan ("SEP"). While the broader universe of actions that AMI would support should be described with appropriate caveats and their benefits assessed cautiously, Con Edison's AMI deployment should identify those types of actions and outcomes that would be critical to achieving REV and SEP goals. Many of these critical actions and outcomes are not addressed in the AMI Business Plan currently before the Commission. Therefore, at this juncture we support phased, comprehensive deployment of AMI in the Con Edison service territory, subject to conditions that we describe in these comments. These conditions include:

- If Con Edison takes full advantage of its AMI system, it will help to advance REV and SEP goals. The Commission should make sure that Con Edison is prepared to do so.
- The Company should clearly state, based on rigorous analysis, the emissions reductions that the Company expects to achieve as a result of reductions in energy consumption and reductions in high-carbon energy consumption based on load responding quickly to changes in the availability of energy from intermittent renewable resources. If it is infeasible for the Company to project emissions reductions, then, at a minimum, the business plan should include kWh reduction figures (or ranges therefor) and the times of day or year when they are expected to accrue, information that could allow third parties to calculate the emissions benefits of energy reductions based on data they possess.
- Carbon emissions reduction potential should be evaluated expansively and valued based on the Social Cost of Carbon developed by the federal Interagency Working Group on the Social Cost of Carbon.
- The enhancement of customer knowledge and tools that AMI should be assessed by the Company as a benefit of AMI that supports REV goals.
- Timely access to granular customer usage data is fundamental to realizing AMI benefits. It is therefore of utmost importance that policies concerning customer and third party data access be finalized upfront.
- The Company should leverage the Open Data Access Framework ("ODAF")[1] to identify parameters and principles relevant to Customer Energy Usage Data.
- Customers should be able to share data that they choose to share with authorized third party service providers at no additional charge.

[1] Illinois Commerce Commission Docket 14-0507, Petition of the Citizens Utility Board and Environmental Defense Fund to Initiate a Proceeding to Adopt the Illinois Open Data Access Framework (August 15, 2014), available at http://www.icc.illinois.gov/docket/files.aspx?no=14-0507&docId=217753 (last visited Dec. 7, 2015).

- Con Edison should be directed to consider the infrastructure needs and costs for providing high-quality data (suitable for financial settlement purposes) early on.
- The Company should be required to make data available through means other than portals, which should greatly increase the likelihood of the public policy benefits of AMI being realized. Other means of access that should be included are Green Button Connect My Data and HAN functionality.
- The Company should be required from the outset to leverage AMI to facilitate reductions in critical peak load in areas of its system facing distribution system constraints, such as the BQDM area.
- Prior to the Commission committing to its approach to funding the deployment, the Commission should require the Company to produce a fully itemized Benefit-Cost Analysis ("BCA") report, together with all assumptions stated and workpapers, including unlocked spreadsheets. The analysis released should include 20-year timelines and annual values for each year detailing capital and O&M spending by category (meters, communications, IT, and project management), as well as details of capital and O&M savings by capability and/or benefit type.

II. Benefits of a Full AMI Deployment

The benefits outlined in Con Edison's AMI Business Plan reflect what we consider to be a conservative view of what can be accomplished through AMI deployment. It is good news that the benefits exceed the costs even when considering only a limited subset of the benefits that AMI may make possible.

That said, this exercise should not be viewed as merely making the argument for an AMI rollout under business-as-usual conditions. As further discussed in the section of these comments concerning the regulatory context, we expect Con Edison to be preparing for its compensation to be increasingly based on performance rather than on guaranteed rates of return for building capital assets. Although Track 2 decisions remain to be made in the REV proceeding, utility companies can no longer expect to be permitted to perform all cost-effective system improvements on a guaranteed rate-of-return basis. We would anticipate that the Company's opportunity to profit from its AMI deployment will be tied to high performance that leverages the maximum advantage of AMI. The opportunities created through AMI can assist in reducing critical system and distribution peak demand, stimulates customer engagement, invites third party innovation and market activity, and utilizes time-variant pricing and other incentives coupled with enabling technology to manage load and reduce costs. To develop such compensation, much more information will be needed regarding what high performance would actually look like.

A. Benefit Cost Analysis Generally

While we understand that some future actions, such as the introduction of time-variant pricing initiatives, have not been fully formulated, approved, and implemented, those actions and their potential benefits should be an integral part of the business case and BCA. Findings about these benefits could be qualified in terms of likely ranges and expressly acknowledge that achievement may be subject to actions or events beyond the Company's control, but it is essential to specify the kinds of benefits that AMI can enable, particularly benefits that will help achieve the objectives of REV and the goals set forth in the SEP. Going forward, the Company needs to adopt and pursue a strategy for assessing the magnitude of these benefits, such that such knowledge can inform the deployment and operation of the system. Understanding the possible range of benefits can also provide some basis for understanding superior performance in a transition to outcome-based ratemaking.

Indeed, in the Staff White Paper filed in Track 2 of the REV proceeding, Staff recommended "Utilities should develop TOU rate demonstration projects. Utility proposals for AMI/AMF should include a demonstration of the value of AMI/AMF for TOU rate improvements."[2] We think these recommendations are quite sound. Indeed, EDF advocated for pilots or demonstration projects evaluating time variant pricing during Con Edison's 2012 rate case, and, after the Company agreed in the settlement agreement in that case to propose a "time-sensitive rate" pilot, we offered assistance as the Company developed such a proposal. Subsequently, after the proposal was filed,[3] we evaluated the proposal and offered our critique in comments filed in that case.[4] No such pilot was ever implemented, presumably at least in part because the Company's ability to develop satisfactory pricing structures was handicapped given the state of its electric metering system. This AMI deployment finally offers the opportunity to properly study what types of time-variant prices for electric service are most effective and popular with Con Edison's customers. Unfortunately, demonstration projects to study pricing are mentioned only in passing; as a general matter, the Company does little more than allude to demonstration

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[2] Case 14-M-0101, Proceeding on Motion of the Commission to Reform the Energy Vision, "Staff White Paper for on Ratemaking and Utility Business Models" (July 28, 2015) ("Track Two White Paper") at 108 (Recommendation #18).

[3] *See* Case 13-E-0030, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Energy Company of New York, Inc. for Electric Service, Con Edison Time-sensitive Pilot Plan (Aug. 21, 2014).

[4] *See* Case 13-E-0030, *supra*, Comments of Environmental Defense Fund on Time-Sensitive Rate Pilot Plan (Nov. 6, 2014).

projects "to evaluate programs to improve customer engagement,"[5] which seem to fall well short of what is needed at this juncture.

In light of the need for the Company's opportunity to make money on AMI deployment to be aligned with outcomes, and in light of the current lack of clarity about the range of benefits that might be made available through AMI, the Commission and other parties should have before them documentation accounting for the full range of costs and benefits associated with a full-scale roll-out of AMI as envisioned by the Company. Such documentation should include benefits that AMI might make available or that will be less feasible without such a roll-out, even if they are not certain to arise from an AMI deployment. Indeed, the favorable outcomes that are uncertain are precisely the ones for which incentives should be required, and some of these outcomes, such as emissions reductions, are among the most important public policy purposes driving the REV initiative. We recommend that, prior to the Commission committing to its approach to funding the deployment, the Commission should require the Company to produce a fully itemized BCA report, together with all assumptions stated and workpapers, including unlocked spreadsheets in Excel format. The analysis released should include 20-year timelines and annual values for each year detailing capital and O&M spending by category (meters, communications, IT, and project management), as well as details of capital and O&M savings by capability and/or benefit type. Since the Commission's approach to BCA in the REV context has not yet been finalized, the Commission should direct the Company to ensure that the materials that are produced state clearly the assumptions about air emissions from all sources, in all years, including how those emissions are valued. Metrics and performance incentives can only be developed effectively with this more complete set of information available for examination.

B. System Benefits from AMI combined with Time-based Pricing

Documents filed in the REV proceeding and Con Edison's own filings in various proceedings (and in the Nexant report to the Company's AMI business plan) describe the growing problem of inadequate distribution capacity in many parts of Con Edison's service territory in the coming years. This capacity will be needed to accommodate critical peak demand that is growing while base load remains static. The Track One Staff Straw Proposal described a state-wide system peak that imposes enormous stress on the system while lasting only 100 hours per year.[6] Con Edison's

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[5] *See* Case 13-E-0030, *supra*, and Case 15-E-0050, 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, Con Edison Advanced Metering Infrastructure Business Plan (Oct. 16, 2015) ("AMI Business Plan") at 40.

[6] Case 14-M-0101, *supra*, "Developing the REV Market in New York: DPS Staff Straw Proposal on Track One Issues" (Aug. 22, 2014) at 9-10 ("if the 100 hours of greatest peak demand were flattened, long-term avoided

BQDM Program, which concerns a 40-48 hour per year constraint in a particular part of Con Edison's system,[7] provides a specific illustration of what this problem can mean for Con Edison and ratepayers. We understand that similar constraints are expected on the horizon for other parts of Con Edison's system.

An important goal of REV is to make the whole system more efficient than it is today and to avoid unnecessary, costly investments in capacity expansions additions. In the future, Con Edison and the other utilities/DSPs in New York State will be expected to look for non-traditional solutions to such constraints. AMI is a powerful tool to help achieve this outcome. The Nexant report, even while making use of very modest assumptions with respect to TVP deployment and deployment of enabling technology, nonetheless shows that AMI+TVP can contribute meaningfully achieving system efficiency. The Nexant report, at Table 3-1, lists avoided generation and distribution capacity costs by year for the period 2020-2039. Despite modest assumptions, the report nonetheless identifies avoided costs ranging into hundreds of millions of dollars. Table 4-2 of the Nexant report presents information about the cost-effectiveness of different TVP scenarios based on data derived from a number of highly regarded pricing pilots undertaken by other major utilities. The benefits are significant and, as with other numbers, any uncertainty is best addressed through use of a sensitivity analysis, not by omitting critical functionality from consideration.

In certain cases, the assumptions in the Nexant study appear to be unnecessarily conservative. For example, Nexant's choice of 15% as the "high" level of opt-in penetration[8] is modest in light of the most current information about other time-variant pricing roll-outs, some of which was not available at the time that Nexant performed its analysis. A June 2015 report from the U.S. Department of Energy on customer responses to time-based rates in ARRA-funded pilots found that opt-in pilots had an *average* enrollment rate of 24%, well above the "high" level for opt-in assumed by Nexant.[9] The assumptions may result in a significant understatement the potential benefits of AMI coupled with opt-in time-variant pricing. Other aspects of Nexant's

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capacity and energy savings would range between $1.2 billion and $1.7 billion per year. Merely increasing the system load factor from 55% to 56% would produce potential gross benefits of $150 million to $219 million per year").

[7] Case 14-E-0302, Petition of Consolidated Edison Company of New York, Inc. for Approval of Brooklyn/Queens Demand Management Program, Petition of Consolidated Edison Company of New York, Inc. for Approval of Brooklyn/Queens Demand Management Program (July 15, 2014) at 3.

[8] *See* AMI Business Plan at 113.

[9] *See* U.S. Department of Energy, INTERIM REPORT ON CUSTOMER ACCEPTANCE, RETENTION, AND RESPONSE TO TIME-BASED RATES FOR THE CONSUMER BEHAVIOR STUDIES (July 2015), available at https://www.smartgrid.gov/files/CBS_interim_program_impact_report_FINAL.pdf, at 55.

methodology, notably the decision not to consider energy savings,[10] are bound to compound this understatement, particularly since energy savings involve both monetary savings to consumers and other benefits, including environmental benefits. Moreover, even if energy savings were considered, the full range of system benefits considered by Con Edison in the plan would still be limited to a subset of what may be available through AMI paired with time-variant pricing, since the Nexant report omitted examination of non-residential customers[11] and deployment of technologies that enhance a customer's ability to respond to price signals that are time-sensitive.[12]

C. Informed Customer Engagement

The fact that the Nexant report does not include benefits associated with deployment of technologies by Con Edison, third party providers, or individual customers who want to take advantage of TVP options to manage load in response to pricing incentives mean that, as Nexant itself observed, the benefits Nexant identified should be viewed as a lower bound.[13] While it is useful to know that AMI deployment would be cost-effective in the Con Edison system even without customer engagement, the critical role that AMI is expected to play in the utility's transformation to a DSP means that fully describing the AMI benefits demands that an attempt be made to assess the power of AMI to engage customers. With the help of a time-differentiated price signal, AMI can play a critical role in enabling load management and energy efficiency by providing customers with information about the costs (to all ratepayers or society at large) associated with their power consumption. Even without TVP, detailed and timely usage data can improve customers' ability to identify conservation and efficiency opportunities. The Nexant study acknowledges that these pathways are not explored in its study;[14] however, given their criticality to achieving the REV objectives, their absence from the AMI Business Plan and the BCA information included therein is problematic. In recognition of the fact that "[e]nhanced customer knowledge and tools that will support effective management of the total energy bill" is one of the key objectives of the REV proceeding,[15] the enhancement of customer knowledge and tools that AMI makes possible is itself a benefit that should be assessed.

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[10] AMI Business Plan at 84.

[11] AMI Business Plan at 71.

[12] *See* AMI Business Plan at 74.

[13] AMI Business Plan at 74.

[14] *See* AMI Business Plan at 74.

[15] Case 14-M-0101, *supra*, Order Adopting Regulatory Policy Framework and Implementation Plan (issued Feb. 26, 2015) (the "Framework Order") at 4.

With respect to uncertain benefits arising from customer engagement and innovative pricing, ranges and sensitivities should be provided as comprehensively as possible, and high-achievement scenarios should be fully considered. For example, whereas Con Edison's AMI Business Plan relies primarily on a Nexant Opt-in Scenario with net benefits (including avoided capacity costs, but not energy and ancillary services costs[16]) of approximately $90 million, Nexant's study also finds that a default time-variant pricing scenario could provide approximately $430 million in net benefits,[17] even without considering energy savings or programmable technology. It is essential to include the high benefit case, because for most interested parties, the point here isn't just to make the case for installing AMI – the point is to make sure that AMI performs extremely well and supports the achievement of New York's ambitious policy goals. To that end, the Company and its regulators should keep a focus on what is achievable and what steps need to be taken to optimize outcomes. If these high-end outcomes are to be achieved, policymakers would need to ensure that any barriers to their achievement are addressed, and that the utility/DSPs have an incentive to want to achieve them.

D. Market Animation

Another goal of REV is "[m]arket animation and leverage of customer contributions" – that is, facilitating participation in the market for energy services by third party providers of demand response, energy efficiency and clean distributed energy products and services, which in turn can contribute to overall system efficiencies and emissions reductions. The Order approving the Joint Proposal extending the 2014 electric rate plan (the "Extension JP") makes it clear that this is of great interest to the Commission:

> "The Commission directs that Con Edison, in developing the business plan for and functionality of AMI consider ways in which third parties can be an active partner in realizing the totality of the benefits that can be extracted from this technology and information. For example, the Company should consider whether third party ownership of AMI meters is possible, giving attention to concerns regarding cybersecurity….The Commission also expects that the AMI business plan address third-party access to AMI meter data, as required under the Joint Proposal."[18]

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[16] *See* AMI Business Plan at 84.

[17] *See* AMI Business Plan at 114.

[18] Case 13-E-0030, *supra*, Order Adopting Terms of Joint Proposal to Extend Electric Rate Plan (June 19, 2015) ("Order Adopting JP Extension") at 39-40.

The AMI Business Plan as filed appears to be only minimally concerned with engaging third party providers and focuses on benefits that are primarily internal to Con Edison's furnishing of power to customers. It is silent as to benefits other than those that accrue to the Company and customers. Worse, it proposes to adopt policies that would hinder market animation, such as failing to include Green Button Connect My Data in the plan for which it currently seeks approval (proposing to postpone that to Track Two[19] even as approval for the AMI system is sought immediately), not stating expressly that it will activate Home Area Network ("HAN") functionality as required by the Commission, and proposing to charge third parties for raw data.[20]

In the case of system data, the Framework Order provided expressly that "[r]aw data as well as planning documents should be made publicly available at no charge to market participants. Utilities may be allowed, however, to charge fees for value-added analysis."[21] Although the pricing for releasing customer usage data to authorized third parties is not addressed expressly in the Framework Order, it would be logical to apply a similar principle: Data collected in the ordinary course of business should be available to third parties that a customer has authorized on the same terms as it is available to a customer. Allowing customers to authorize multiple third parties to receive data will increase customers' ability to compare product/service offerings, and thus should be considered foundational in light of the Commission's vision of an effective retail market for DER.[22]

The aggregation of the granular energy data made available through AMI can assist system planners, third party service providers, customers, communities and others in getting a better understanding of how energy is used across certain segments/regions and how it may be managed. The aggregation of energy data at certain levels may facilitate the process of benchmarking, planning, and animation of markets for various stakeholders, which may further enable progress toward the objectives of the REV proceeding. Aggregated customer usage data prepared by the utility/DSP in the ordinary course should of course be considered "raw data… [to] be made publicly available at no charge to market participants,"[23] although data that has been prepared and packaged in a particular way to meet the particularized requirements of a market participant should be considered to incorporate "value-added analysis" and could provide the utility/DSP with a market-based earnings opportunity. In each case, where a utility/DSP is

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[19] *See* AMI Business Plan at 18.

[20] *See* AMI Business Plan at 17.

[21] Framework Order at 59.

[22] *See* Framework Order at 59-61. ("Building effective retail markets for DER will require a much smarter and technology enabled platform for mass market consumers to gain knowledge of the services available to them in the market.").

[23] Framework Order at 58.

charging third parties for data or analytics, the Commission should monitor the level of such charges; charges for any custom packaging or analytics that is made possible by specialized knowledge that the entity possesses because of its monopoly position should be just and reasonable.

Deployment of AMI can promote REV objectives by increasing the potential for third parties to become active market participants. For example, third party providers should be able to devise efficient demand response offerings that would allow customers to take advantage of the critical peak price offerings from Con Edison that would serve system-wide efficient capacity utilization and load management goals. Similarly, AMI can enable ESCOs to provide time variant pricing to deal with high peak time generation costs. As another example, interval data can promote energy efficiency at individual customer premises, by making virtual building audits and similar analyses possible on a grand scale. AMI data can also be invaluable for more reliable savings projections and post-project measurement and verification – and thus can open the door to greatly increased third-party investment in energy efficiency. As discussed further below, detailed treatment of third party access to data is missing from the AMI business plan, and should be accorded a central place in Con Edison's actual AMI system deployment. To ensure that the needs and concerns of DER providers and ESCOs are fully addressed in the planning and execution of AMI deployment, they should be represented in any working groups or other processes that shape market participants' opportunities to provide service to utility customers.

E. Environmental Benefits

The Commission in the REV proceeding has identified carbon reductions as a key objective, and the SEP released on June 25 adds much-needed specificity, by establishing a State goal of 40% reduction in state-wide greenhouse gas emissions by 2030, compared to a 1990 baseline, and 50% of its electrical energy coming from renewables in 2030. AMI deployment in conjunction with TVP and a wide array of technology offerings, could be a key enabler of marketplace programs that would allow Con Edison and its region to meet their share of these goals. In the AMI Business Plan, Con Edison evinces an appreciation for the good that AMI can do with respect to these goals, framing AMI as supporting "the broader State goal of an 80% reduction in carbon emissions by 2050."[24] The more tangible challenge is for Con Edison to show how it can most effectively use AMI to help achieve the 2030 goals. Only a small subset of potential GHG emissions reductions appear to have been included in the analysis, and for those that were included, the method for valuing the emissions is not described.

[24] AMI Business Plan at 1.

As we have discussed previously in our comments concerning the Benefit Cost Analysis Framework and Track 2 of the REV proceeding, proper valuation of greenhouse gas ("GHG") reductions is problematic since it should be based on the Social Cost of Carbon (as further discussed below) (the "SCC"), not the low RGGI price that is largely a function of the less-than-robust RGGI carbon emissions cap.

For this reason, as we explained in our comments on the Track 2 White Paper, even where utility/DSPs have taken actions that reduce the demand for allowances as described above… New York policymakers will need to take further actions to move aggressively towards compliance with the 2030 carbon reduction goal, such as by building multi-state support for a very stepped up reduction in the RGGI cap between now and 2030. As long as the emissions made possible by AMI must be *real* – which is to say, additional, beyond what today's cap-and-trade system already requires – it is proper to value them using the SCC.

Improved environmental performance is essential for REV to be considered successful, and extracting the environmental benefits that AMI can enable should be essential for an AMI rollout to be in alignment with the objectives of REV. Some of these environmental benefits are expected to be realized in the near future, can be clearly foreseen, and may be in the utility's direct control; others will be available over a longer term, are harder to forecast and harder for the utility to control, but must nonetheless be planned for to ensure they materialize. Environmental opportunities from AMI for electric customers – listed roughly from the more immediate/certain opportunities to more remote/uncertain opportunities – include decreased air emissions from reduced truck rolls; decreased air emissions from energy savings through Conversation Voltage Optimization; decreased air emissions through increased demand response, efficiency, and conservation; decreased air emissions through enhanced deployment of low-emissions DER to meet system needs; and *dramatically* decreased air emissions through very high reliance on intermittent renewable resources made possible by harnessing the fast-ramping capability of load.[25]

Although leveraging an AMI system to manage a high-variable-renewables generation fleet may seem "futuristic," note that Commissioner Acampora, at the June 17 meeting, applauded the Commission's action in approving the Extension JP despite uncertainty in brief remarks that specifically made reference to the importance of regulators not standing in the way of "futuristic

[25] California has something of a head start in preparing for high levels of renewables penetration, and as such its thinking about what will be required to grapple with this issue may be instructive. *See, e.g.*, California ISO, WHAT THE DUCK CURVE TELLS US ABOUT MANAGING A GREEN GRID, http://www.caiso.com/documents/flexibleresourceshelprenewables_fastfacts.pdf ("To ensure reliability under changing grid conditions, the ISO needs resources with ramping flexibility and the ability to start and stop multiple times per day. To ensure supply and demand match at all times, controllable resources will need the flexibility to change output levels and start and stop as dictated by real-time grid conditions. Grid ramping conditions will vary through the year") (last visited Dec. 21, 2015).

and advanced thinking and technology that would be a benefit to the state" and underlined the need for "flexibility". Since that time, events have continued to overtake us all; in light of the Governor's commitment to the Under 2 MOU and his December 2 letter directing the Department of Public Service to establish a Clean Energy Standard ("CES") to ensure that the goal of 50% renewable generation by 2030 is achieved, serious thinking about managing a high-variable-renewables generation fleet no longer seems futuristic – merely necessary.

Con Edison should therefore also conduct an analysis to see how it could use AMI to facilitate attainment of the State's 2030 renewables goal through, among other means, sound management of the intermittent nature of both DER and large-scale renewables, particularly in light of The capabilities of the system now being contemplated should include the basic functionality needed to achieve *all* of these environmental benefits once other marketplace mechanisms and technology are in place to make it possible. There is no time to lose in starting down the path to achieving GHG reductions and migrating to high levels of renewable energy, as illustrated by the ambitious, medium-term goals in the SEP and subsequent developments. At the same time, it is imperative that a system that Con Edison begins installing in 2016 not become an obstacle to meeting those needs that are somewhat more distant in time, such as harnessing load to for the purpose of managing intermittency. This is especially true now that the SEP and the Governor's direction to adopt a CES have made it clear that a high-renewables energy mix shouldn't even be that far away, through its goal of 50% renewables by 2030 and that the Commission is responsible for taking "steps to render decisions and policy that are reasonably consistent with the SEP."[26] The Commission's Order Finding Transmission Needs Driven by Public Policy Requirements, issued last week, was an important step in the right direction with respect to the transmission system, as it included the policy "to increase diversity in supply, including additional renewable resources" the policy "to reduce costs of meeting renewable resource standards," and the State Energy Plan itself as Public Policy Requirements driving transmission needs.[27] If Con Edison takes full advantage of its AMI system, it will help to advance REV and SEP goals. The Commission should make sure that Con Edison is prepared to do so.

Although references are made in the plan to emissions reductions from various sources (including Conservation Voltage Optimization ("CVO"), reduced energy use through customer

[27] Case 12-T-0502, Proceeding on Motion of the Commission to Examine Alternating Current Transmission Upgrades, Order Finding Transmission Needs Driven by Public Policy Requirements (Dec. 17, 2015) at 66-68.

behavior change, and reduced vehicle emissions[28]), the Business Case Benefits Summary[29] alludes to CO2 reductions only in the context of CVO, where a bundled dollar figure reflecting energy savings, fuel, and CO2 reductions is provided (but without any breakdown).[30] With respect to CO2 reductions associated with CVO enabled by AMI (which is really the only electric energy reduction that appears to have been thoroughly explored), the AMI Business Plan observes that:

> "the AMI system can be leveraged to reduce energy usage across the Company's service territory by approximately 1.5% on average, decreasing associated fuel use for committed generation resources. This results in an environmental impact of 1.9% fewer total CO2 emissions due to the reduction of power generated by fossil fuel plants annually across the Company's service territory and a 1% total reduction in New York State. This equates to 229,125 metric tons and 368,821 metric tons of CO2 across the Company's service territory and New York State, respectively."[31]

Furthermore, the AMI Business Plan identifies two other sources of reduced emissions related to avoided truck rolls: "Removing 481 metric tons carbon dioxide equivalent (CO2e)" from avoided meter reading and "25.4 metric tons CO2e" from avoided service calls (page 13). Therefore, the Company has identified total annual emissions reductions to be 368,821+481+25.4 =369,327.4 tons. Having established the total tons of reductions from CVO and avoided truck rolls, we can then monetize that benefit. We propose using the dollar value for the benefit of avoiding a ton of carbon established in May 2013 by an interagency Working Group of the U.S. federal government published a technical support document specifying values for carbon.[32] The federal Interagency Working Group's Social Cost of Carbon ("SCC"), while imperfect (we would hope to see it revised upward over time), may be a good starting point for this exercise.

The values described above are largely attributable to the energy savings available from CVO – the potentially much larger savings available from other applications of AMI need to be included as well. The Company should clearly state, based on rigorous analysis, the emissions reductions

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[28] AMI Business Plan at 11.

[29] AMI Business Plan at pages 50-51 (Table 5).

[30] *See* AMI Business Plan at 50-51 (Table 5).

[31] AMI Business Plan at 12.

[32] Interagency Working Group on Social Cost of Carbon, United States Government, TECHNICAL SUPPORT DOCUMENT: TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS – UNDER EXECUTIVE ORDER 12866 (May 2013), available at https://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf (last visited Dec. 21, 2015) ("SCC Technical Support Document").

that the Company expects to achieve as a result of reductions in energy consumption and reductions in high-carbon energy consumption based on load responding quickly to changes in the availability of energy from intermittent renewable resources. If it is infeasible for the Company to project emissions reductions, then, at a minimum, the business plan should include kWh reduction figures (or ranges therefor) and the times of day or year when they are expected to accrue, information that could allow third parties to calculate the emissions benefits of energy reductions based on data they possess. The Company should provide this information to parties as soon as possible so that estimated emissions reductions data will be available for consideration as decisions about metrics, funding, and incentives are made in connection with the Company's AMI proposal.

While AMI deployment by itself could not achieve these environment goals, it is a key information, communication and measurement tool to achieving these ends. Thus, Con Edison should describe in basic terms the initiatives that the Company could undertake over the next 15 years that would support actions to achieve the goals of the State Energy Plan, and support third parties' efforts to engage in practices conducive to achieving these goals. Con Edison's description of such initiatives should address how AMI can facilitate the design and implementation of those initiatives and an assignment of a share of the resulting environmental benefits to its AMI investments. To the extent that Con Edison's knowledge is incomplete, it would be useful to provide what is known so that other parties can add value through additional analysis. Against the backdrop of REV, the SEP, and now the CES and other more recent developments, the many environmental benefits that are somewhat attenuated and not described – such as the as-yet unquantified emissions reductions through reduced peaks and increased renewables integration (for which AMI is useful or even essential but not by itself sufficient) – should play a key role in determining the magnitude of the Company's earnings opportunity if the AMI deployment is approved.

EDF recommends that the Company's analysis assign reduced CO2 emissions the Social Cost of Carbon (beginning with $43[33] and increasing each year thereafter), as recommended by the Interagency Working Group.[34] As noted above, it is the responsibility of policymakers to ensure that reductions are real (either outside of RGGI or additional vis-à-vis RGGI, and thus not illusory). The steps needed to conduct this analysis can be found in Appendix A to these comments, and we also attach, as Appendix B, an Excel sheet that shows our calculations. Following these steps, we calculate the emissions reductions benefits to be $335,787,547 for the 3% discount rate average scenario and increasing to $1,023,375,676 for the 3% discount rate 95th

[33] The SCC value for 2020, the first year carbon reduction benefits of AMI would start, is $43 in 2007 dollars (see SCC Technical Support Document at 18).

[34] *See* SCC Technical Support Document.

percentile.[35] Importantly, while this value includes the emissions reductions benefits from CVO and avoided truck rolls, the AMI business case states that the GHG benefits from CVO *alone* only equals $54 million (page 52). While the AMI Business Plan does not describe the steps taken to calculate the GHG reduction benefits, given the large discrepancy between the number reported by Con Edison and the number we calculated using the SCC, this $54 million is unlikely to represent the avoided social cost associated with emissions, and thus the benefits that can accrue to society from implementing AMI.

III. Components of and Complements to an AMI-Based Marketplace Capable of Realizing the Potential Benefits

The AMI Business Plan does not go as far as it should (and as required by the Commission) in spelling out how third parties can participate in the energy marketplace and potentially in the AMI deployment itself. The need to expressly contemplate third party participation in the electric sector (including the REV markets) and lay the groundwork for it, is a major focus of the Commission's order approving the Extension JP ("The Commission directs that Con Edison, in developing the business plan for and functionality of AMI consider ways in which third parties can be an active partner in realizing the totality of the benefits that can be extracted from this technology and information.[36]).

A. Meter Data Access

Providing customers with convenient and timely access to their energy consumption data in short intervals empowers them to find ways to lower their utility bills. As further described above, it is also essential to fostering a more efficient and cleaner electricity system, capable of integrating distributed energy resources, including intermittent renewables and storage in all its forms (including electric vehicles). Timely interval data can also spur the development and adoption of innovative technologies, products, and services designed to support consumers in managing energy consumption and expenditures. The far-reaching benefits of AMI, including its environmental benefits, all demand policies that ensure that both customers and non-utility market participants have convenient, authorized access to granular data in a standardized, usable form.

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[35] The decision of whether to use the average or 95th percentile is discussed in more detail in the Appendix; however, the federal EPA has observed that it's "very likely that [SCC] underestimates" the damage (*see* Intergovernmental Panel on Climate Change, CLIMATE CHANGE 2007: SYNTHESIS REPORT (Nov. 2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf, at 69), prudence might dictate relying on higher values.

[36] Order Adopting JP Extension at 39.

EDF commends the Company for valuing the importance of access to data in the Plan, and for proposing to leverage state of the art technologies and services to support customer engagement. For example, the AMI Business Plan describes how easy access to granular energy usage data is fundamental to providing AMI related benefits to the customer and to building a foundation for the REV objectives of creating a more customer-centric and efficient electric system that enables a greater penetration of clean energy, EE, and DER: "Most importantly, the Company finds AMI is critical to support our customers' expectations of understanding their energy use and having ready access to data reflecting their usage. This business case considers smart meter and AMI communications a fundamental step towards enabling new options for the Company's customers, resulting in REV-related benefits.…"[37]

Many of the roles that non-utility businesses presently play in the marketplace, or could play in future REV marketplaces, could be performed more effectively with the benefit of prompt access to meter data, both system data and individual customer data. A non-exhaustive list of such roles would include (1) selling electricity to retail customers, (2) energy management, (3) providing demand response, and (4) selling/marketing energy storage and distributed renewable energy generation. It is self-evident that more detailed and timely information about energy consumption could enhance third parties' performance of such services. The Commission has made it clear that, if Con Edison is to be permitted to move forward with AMI at this time, it should do so with an eye toward meeting the needs of these parties ("The Commission also expects that the AMI business plan address third-party access to AMI meter data, as required under the Joint Proposal."[38]). This means that, in effect, market animation will be a key rationale for any approval to move forward with AMI at this time, and providing the ability to accomplish that will be in effect a litmus test for whether Con Edison's plan is acceptable to the Commission.

As the electric system is transforming into an increasingly dynamic ecosystem, the challenge to engage and inform electric customers so that they actively participate in this new environment is enormous. The Company therefore should be required to eliminate as many data access barriers as practical, and further to devise a comprehensive data access plan that includes data needs anticipated by future DSP market participants.

The experience of AMI deployment across the country has shown that failure to resolve customer and third-party data access issues upfront can lead to many of the anticipated AMI benefits and innovations being unrealized for many years. Changing course post-deployment can result in unnecessary delays, add costs, and lead stakeholders to question the value of AMI. New York now has the unique opportunity to get AMI deployment right from the start, build on

[37] AMI Preliminary Business Plan at 15.

[38] Order Adopting JP Extension at 40.

the valuable lessons learned in leading states, and take advantage of widely adopted national standards and principles for data sharing (as detailed below), which were not available to first movers when they began their deployments.

As a starting point, the Open Data Access Framework ("ODAF"),[39] originally developed by EDF and the Citizens Utilities Board ("CUB") for use in Illinois can provides a good reference point. The ODAF can be used to identify and develop parameters and metrics around access to Consumer Energy Usage Data ("CEUD"). The ODAF is appended as Appendix C and lays out principles and issues related to customer and third-party access to CEUD. Specifically, the ODAF addresses issues such as types of data, third party authorization and access, data format, methods of delivery, timeliness, billing quality data, data security, national standards, and customer charges. This framework could usefully supplement certain requirements included in the NYPSC AMI Minimal Functional Requirements, which are included at Appendix A of the Company's AMI Business Plan.[40] In accordance with the framework, EDF suggests that Staff recommend that customers have access to their electric usage data including consumption data, power data, and pricing data in an industry-standard or web-standard machine-readable format in as short intervals as possible, with 15-minute intervals recommended, in near real time.

1. Timeliness of Data Availability

Timely access to customer usage data is essential to achieving the changes in demand envisioned in the AMI Business Plan. For customers to benefit from new dynamic pricing options and demand response programs as well as new energy management services and products offered by third-parties, customers need to be able to see their data as quickly as practicable in order to respond quickly to changes in the price of electricity.[41]

Given the criticality of providing customers with timely access to their energy consumption, all customers should have access to their energy usage data in near real time. We are concerned that any customers that are excluded from having timely access to price and consumption data will in effect be denied a crucial benefit of AMI. As the AMI Business Plan points out, "AMI communications network and smart meter deployment provides the foundation to meet our

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[39] Illinois Commerce Commission Docket 14-0507, Petition of the Citizens Utility Board and Environmental Defense Fund to Initiate a Proceeding to Adopt the Illinois Open Data Access Framework (August 15, 2014), available at http://www.icc.illinois.gov/docket/files.aspx?no=14-0507&docId=217753 (last visited Dec. 7, 2015).

[40] AMI Business Plan at 64.

[41] An analysis performed by American Council for an Energy Efficiency Economy indicates that rapid feedback about energy usage can enable savings on average of 3.8% across large populations. *See* BEN FOSTER AND SUSAN MAZUR-STOMMEN, RESULTS FROM RECENT REAL-TIME FEEDBACK STUDIES (American Council for an Energy Efficient Economy Research Report B12) (2012).

customers' current and future needs, facilitate retail access programs, and build the smart grid of the future envisioned by the Commission in the REV proceeding."[42] Not allowing *all* consumers to enjoy the benefits from AMI would violate the fundamental rationale for investing in full-scale AMI deployment.

2. Type and Quality of Data

EDF commends the Company for recognizing the importance of conveniently providing granular data to the customer. [43] However, the provided "roadmap" does not provide sufficient detail on the type and quality of data to be made available. In order for the customer to be able to benefit from the various functionalities afforded by AMI, EDF recommends that customers have access to their electric usage data including consumption data (kWh), power data, pricing and rate data in a machine-readable format.

As noted in the AMI Business Plan, future requirements for meter data will go beyond those required for monthly billing purposes.[44] The Plan states an intention to "[e]nable both proactive and passive consumers to participate in REV and New York State Independent System Operator (NYISO) markets without the barriers to entry associated with cost and/or time to upgrade metering and communications."[45]

If utilities, third-party innovators and entrepreneurs are to expand services such as demand response and energy efficiency solutions to utility customers, high quality meter data, will presumably be required by the DSP and/or NYISO for financial settlement purposes. EDF recommends that the Company evaluate early on the validating, editing and estimation needs and frequency thereof, as well as related costs for providing data that meets the wide array of market functions intended by the Plan and REV.

3. Means of Access to Data

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[42] AMI Business Plan at 14.

[43] AMI Business Plan at 17 ("customers will have access to 15-minute interval data, rather than monthly usage data").

[44] AMI Business Plan at 5.

[45] AMI Business Plan at 14.

EDF commends the Company for acknowledging the importance of presenting meter data effectively to the customer.[46] EDF further applauds the Company's efforts to utilize state of the art digital technologies to raise customer awareness and help translate meter data into compelling and actionable information.[47] However, a portal should not be the sole means for data access. While portals may provide an opportunity for improved customer participation and experimentation in data presentation, the experience of AMI deployments across the country has raised doubts about the ability of portals to engage customers and about their value in general. For example, Texas, a smart grid pioneer, has over seven million smart meters in place, but as of 2013 less than 1% of customers have ever logged on to the data portal which provides access to electric usage.[48] Similarly, out of the 1.167 million residential customers able to access the Ameren's web portal in Illinois, only 560 customers accessed the site in 2014.[49] And in California, the Public Utilities Commission made the case that the reduction in energy consumption via a HAN [50] is projected to be more than three times the reduction achieved by customers accessing only a web portal to monitor their usage."[51] These examples are typical: A recent report by the U.S. Department of Energy summarizing the lessons learned by several Smart Grid Investment Grant (SGIG) projects deploying AMI concluded that "[m]any utilities deploying smart meters with web portals have experienced difficulties attracting customers to access and use their web portals, and the ultimate value of these tools is still an open question."[52]

Based on the well-documented poor performance of user portals, it is clear that relying solely on utility portals to engage customers in new electricity markets would not be a recipe for success. To that end, the Company should be required to make data available through other means, which

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[46] AMI Business Plan at 8.

[47] AMI Business Plan at 7-9.

[48] THE SOUTH-CENTRAL PARTNERSHIP FOR ENERGY EFFICIENCY AS A RESOURCE, AN UPDATE ON SMART ENERGY IN Texas (July 2014), available at https://eepartnership.files.wordpress.com/2014/07/update-on-smart-energy-in-texas1.pdf.

[49] Ameren Illinois Advanced Metering Infrastructure (AMI) Annual Update (April 2015) at 23, available at http://www.icc.illinois.gov/downloads/public/2015%20AIC%20AMI%20Plan%20Update.pdf (last visited Dec. 10, 2015).

[50] HANs are discussed in further detail below.

[51] California Public Utilities Commission, Resolution E-4527, Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric (Sept. 27, 2012), available at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M028/K949/28949960.PDF (last visited Dec. 10, 2015).

[52] U.S. DEPARTMENT OF ENERGY, SMART GRID INVESTMENT GRANT PROGRAM. CUSTOMER PARTICIPATION IN THE SMART GRID - LESSONS LEARNED (Sept. 2014) at 14, available at http://energy.gov/sites/prod/files/2014/10/f18/SG-CustParticipation-Sept2014.pdf (last visited Dec. 10, 2015).

should greatly increase the likelihood of the public policy benefits of AMI being realized. Such other means should better address the needs of third party market participants to make immediate use of data in real time as it becomes available. Although the cost and security concerns associated with implementing automated and authorized data access for third-parties to CEUD remain to be fully addressed by separate Staff inquiries, the importance of third parties being able to "quickly develop market-based DER products and services"[53] based on data standardized energy data is critical, and has been underscored on multiple occasions in the Extension JP,[54] the Framework Order, the DSIP guidance[55] and the Market Design and Platform Technology (MDPT) working group.[56]

Green Button Connect My Data is responsive to these needs. Green Button Connect was developed by the U.S. Department of Energy and is a nationally recognized standard based on existing industry-led data exchange standards and privacy protocols. Green Button Connect allows utility customers to have convenient and secure access to their energy bill account and energy usage information.[57] A defining feature of the Green Button Connect functionality is that it automates transfer of customer data to authorized third parties based on affirmative (opt-in) customer consent.[58] Having been adopted by leading utilities, third party vendors, and developers in California[59] and Washington, D.C.,[60] and being presently under consideration for

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[53] Framework Order at 53-4.

[54] Order Adopting JP Extension at 39.

[55] Case 14-M-0101, *supra*, "Staff Proposal Distributed System Implementation Plan Guidance" (released Oct. 15, 2015) ("DSIP Guidance Proposal") at 17-18.

[56] MDPT Final Report, p.70.

[57] The Green Button initiative was created with the support of the White House, the Department of Energy (DOE), National Institute of Standards and Technology (NIST), the Smart Grid Interoperability Panel (SGIP), and the Utility Communications Architecture International Users Group (UCAIug). The Green Button Connect My Data standards are based on the North American Energy Standards Board (NAESB) Energy Services Provider Interface (ESPI) standard. More information is available at U.S. DEPARTMENT OF ENERGY, GREEN BUTTON, http://energy.gov/data/green-button.

[58] More information is available at DEPARTMENT OF ENERGY, GREEN BUTTON, http://energy.gov/data/green-button.

[59] *See* PACIFIC GAS & ELECTRIC, HOW TO SHARE YOUR DATA WITH A COMPANY, http://www.pge.com/en/myhome/addservices/sharemydata/company/index.page (last visited Dec. 7, 2015); SOUTH CALIFORNIA EDISON, ANNUAL UPDATE – SMART GRID (Oct. 1, 2015), http://www.cpuc.ca.gov/NR/rdonlyres/4D12996D-81EC-4561-A411-7D4D01937E36/0/SmartGrid_SCEAnnualReport2015.pdf (last visited Dec. 7, 2015).

[60] *See* PEPCO, 2014 CORPORATE SOCIAL RESPONSIBILITY REPORT, https://www.pepco.com/uploadedFiles/wwwpepcocom/Content/Page_Content/2015/May/Pepco_CSR.Report_2014_o.pdf (last visited Dec. 7, 2015).

adoption in Illinois,[61] it amounts to an emerging national standard. The adoption of Green Button Connect has also quickly spread outside the U.S. For example, London Hydro, based in Ontario, Canada, is currently piloting Green Button Connect My Data.[62] The Enel Group, one of Europe's largest utilities, has recently announced that it will make Green Button Connect My Data energy available to its customers in Italy.[63] As such, Green Button Connect My Data should be considered as the most basic functionality for any AMI system. Therefore, Con Edison should provide an estimate of the costs and benefits of implementing Green Button Connect My Data functionality.

In addition to Green Button Connect My Data, Con Edison should take the obvious step of activating the HAN functionality of its meters. Han functionality is included in the list of NYPSC AMI Minimal Functional Requirements set forth at Appendix A of the AMI Business Plan. One of the stated system requirements is the ability for customers to connect with the home area network ("HAN") "to provide direct or customer-activated load control."[64] However, the body of the plan does not make any reference to the HAN or HAN connectivity. Considering HANs is important because they are the only on-premises mechanisms customers have for connecting AMI with their home energy management devices (e.g., advanced thermostats, in-home displays, etc.) and clean distributed energy resources (e.g., solar panels).[65] More importantly, HAN capability allows consumers to see meter information in real time, and this may provide an alternative solution for at least some customers and applications if the Company is unable to provide backhaul data on a timely basis from the outset. Enabling customers to purchase energy management products of their choosing and connecting them to the AMI would appear to be a basic utility service. Smart meters at large are equipped with HAN capability and HAN activation does not, to our knowledge, impose additional costs on the utility. Therefore, the Company should be directed to include HAN connectivity in its AMI deployment.

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[61] *See* Illinois Commerce Commission Docket 15-0073 ComEd, Verified Initial Comments of Commonwealth Edison Company (filed on March 3, 2015), http://www.icc.illinois.gov/downloads/public/edocket/399103.pdf (last visited Dec. 7, 2015).

[62] London Hydro, https://www.londonhydro.com/site/#!/residential/content?page=educateme (last visited Dec. 14, 2015).

[63] Enel Group, Enel First European Utility to Join Global Green Button Alliance, available at http://enel.ru/en/events_and_news/news/15111/ (last accessed Dec. 15, 2015).

[64] AMI Business Plan at 64 (Appendix A).

[65] Department of Energy. COMMUNICATIONS REQUIREMENTS OF SMART GRID TECHNOLOGIES (October 5, 2010), available at http://energy.gov/sites/prod/files/gcprod/documents/Smart_Grid_Communications_Requirements_Report_10-05-2010.pdf (last visited Dec. 10, 2015).

Finally, the approach to meter data access provided for in any AMI deployment needs to be capable of balancing privacy concerns and access to data by customers and authorized third parties. In the filed AMI Business Plan, no approach to this critical balancing is specified. The Company should propose such an approach and explain how its proposed approach will be consistent with this need for balancing; absent a Company proposal, the Commission could impose an approach unilaterally.

B. Billing Systems and Other System Upgrades

One essential opportunity for third party participation is the opportunity for third party electric retailers to use time-differentiated consumption data to offer commodity price structures that allow customers to avoid the highest wholesale prices. At the June 17 Commission meeting at which the Commissioners voted to approve the Extension JP, several commissioners emphasized the importance of laying the groundwork for third party participation and/or for more sophisticated pricing structures. Most notably, Commission Sayre, though declaring his skepticism that benefits will exceed costs, stated:

> "[T]he *potential* for benefits, in terms of energy efficiency, outage management, optional money-saving rate structures, consumer information, and consumer engagement – all of these benefits are greater than they ever have been before, and they're all fully consistent with our goals in the REV proceeding."

Demonstrating how AMI can advance these benefits is essential, and should be part of the AMI deployment from the outset – hence Staff's critically important recommendation, already discussed above, that "[u]tilities should develop TOU rate demonstration projects. Utility proposals for AMI/AMF should include a demonstration of the value of AMI/AMF for TOU rate improvements."[66]Ensuring that the opportunity for sophisticated pricing of energy services by the utility and third parties is actually made available requires both that the AMI system provide the necessary functionality *and* that any complementary changes to the utility's billing system be made. All AMI, communication, or meter data system functionality necessary to make this future a reality should be specifically called out in the AMI business plan, and the costs of such attributes should be included in the cost-benefit analysis. To the extent that certain system upgrades and functionality are outside the scope of the AMI proposal because they relate to non-AMI systems, but are necessary for the benefits of the AMI are to be realized (including without limitation plans for billing system upgrades needed to allow third parties to offer time-differentiated commodity pricing), plans for those upgrades should nonetheless be described in detail in the proposal (or reference should be made to where they can be found). If they are not

[66] Track Two White Paper at 108 (Recommendation #18).

currently being planned for and/or their costs have not been determined, that should be expressly stated in the business plan.

IV. Performance Metrics

The Company did not incorporate in its proposal performance metrics to evaluate the progress and success of the indicated operational, environmental, and societal benefits (e.g., reliability of electricity service, costs reductions associated with operating the electric grid, customer satisfaction/engagement etc.), annual milestones and metrics for measuring progress are essential to ensuring that if the AMI deployment is approved and the Company moves forward with it as proposed, it will be rewarded for achieving the results that the Commission and society require from this significant upgrade of the system. As a starting point, EDF recommends that the Company develop metrics that evaluate how the AMI related investments contribute to the REV objectives, e.g., renewable energy deployment and reduction in greenhouse gas emissions. For reference, we recommend perusal of some metrics developed by Commonwealth Edison Illinois ("Com Ed", Citizens Utility Board ("CUB"), Environmental Law & Policy Center, and EDF in connection with an AMI deployment in Illinois.[67] While these metrics currently do not include a tracker for a reduction in GHG emissions as enabled by AMI, ComEd is working with EDF, CUB and others to refine ways to measure how AMI enabled GHG emissions reductions.[68] In addition to GHG metrics, metrics should also address customer access as well as metrics that evaluate the progress and success of the CVO-enabled operational and environmental benefits (e.g., reliability of electric service and cost reductions associated with operating the electric grid).

V. Regulatory Context

A. AMI and REV

AMI is a critical enabler of REV objectives and DSP functionality. It is nearly impossible to imagine a utility performing the system optimization and market-making functions that REV

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[67] Commonwealth Edison Company, SMART GRID ADVANCED METERING ANNUAL IMPLEMENTATION PROGRESS REPORT (April 1, 2013), available at http://www.icc.illinois.gov/downloads/public/edocket/356251.pdf (last visited Dec.14, 2015) ("SG Progress Report"), at 19-32.

[68] SG Progress Report at 24.

envisions the DSP performing without the system visibility and communications capability that AMI can provide. However, AMI alone will not make the DSP grow into its optimization role..

For example, the AMI Business Plan highlights CVO as an AMI-enabled opportunity, and counts the energy and emissions reductions benefits associated with CVO as AMI benefits. We appreciate that AMI can facilitate this practice. However, we note also that the Commission has identified automated voltage and reactive power control as essential DSP functions,[69] and that Staff recommended in its DSIP Guidance Proposal that initial DSIPs should include a description of "plans to implement [CVO][70] in the near-term, and over the long-term and how third parties can interact and provide [CVO] services."[71] In our Initial Comments to the DSIP Guidance Proposal, we encouraged Staff to provide more direction to utilities regarding the development of [CVO] implementation plans so that stakeholders are able to conduct simple analyses and establish their positions on investment proposals. Specifically, we recommended that:

Utilities should provide information on the current state of adoption of CVO in their service territories, e.g., the total number of circuits with voltage optimization and what the percentage of voltage optimization-enabled circuits is compared to all utility circuits in the service territory.

Relying on best practices in modeling and engineering methods, utilities should be directed to conduct a feasibility study of implementing CVO on their respective distribution systems in order to identify costs and benefits and to identify the priority order in which CVO should be undertaken. The study should enable utilities and stakeholders to evaluate to what extent the implementation of CVO throughout its service territory would provide lower energy usage and peak demand as well as defer capital investments. More specifically, the feasibility study should yield findings including but not limited to the number of CVO viable feeders, viable feeder criteria, the cost-effectiveness of CVO for viable feeders, average voltage reduction, levelized cost of energy savings ($/kWh), estimated total CVO costs, estimated peak demand reductions, estimated annual energy savings per year, estimated net changes in line losses, estimated carbon emission reductions, and estimated capital investment deferment.[72]

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[69] Framework Order at 32.

[70] In the quoted document, the quoted phrase is "VVO," not "CVO". Volt/VAR Optimization ("VVO") and Conservation Voltage Reduction ("CVO") are related practices in which enhanced visibility and control of the electric system is used to realize a broad range of benefits, including energy conservation and emissions reduction. Because they are often used interchangeably, in these comments we use the term "CVO" to describe both practices.

[71] Case 14-M-0101, *supra*, "Staff Proposal Distributed System Implementation Plan Guidance" (released October 15, 2015) ("DSIP Guidance Proposal"), at 16-17.

[72] By way of example one of Illinois's largest utilities, Commonwealth Edison Company ("ComEd") completed a feasibility study on the potential of VVO within Chicago and northern Illinois found that "cost-effective energy savings of as much as 1900 GWh-yr, equal to approximately 2% of ComEd's retail sales, at a cost of approximately

Utilities should incorporate in their CVO plans quarterly or annual performance metrics in order to evaluate the progress and success of the CVO enabled operational, environmental, and societal benefits, e.g., reliability of electricity service, costs reductions associated with operating the electric grid, etc.

Although AMI may be a critical enabler of CVO in Con Edison's system, adoption of a REV Business Plan should not take the place of a sound REV methodology that keeps attention on CVO irrespective of how AMI deployment progresses.

B. Paying for Advanced Metering Infrastructure

Although the current rate plan, which includes the one-year extension, has already established a revenue requirement which includes a 9.0% rate of return, and the first year of AMI deployment is expected to take place under that construct, most of the AMI roll-out, if it occurs, will presumably take place in a outcomes-based regime, as contemplated by REV. Therefore, we anticipate that the Commission will employ performance-based metrics and/or other potential incentive structures to ensure that the value of an AMI deployment is optimized from a customer value and public policy standpoint. In such a ratemaking environment, we would expect that although a utility/DSP may be entitled to collect approved costs from ratepayers, it is not necessarily the case that the utility/DSP will be entitled to a particular level of profit over and above such recovery. Instead, profits may vary considerably based on performance, with rates of return that are considerably higher or lower than a traditional guaranteed rate of return being possible outcomes.

We anticipate that the Commission's own priorities for allowing the utility to profit on its AMI installation will include, at a minimum, DER integration and market animation. We recommend that the performance of Con Ed's AMI roll-out be evaluated and that the Company have an opportunity to earn based on, among other thing, demonstrated successful installation of key identified capabilities and environmental performance. To develop appropriate rewards, the Commission should require the Company to provide ranges of possibilities rather than rely on "conservative" estimates for everything; superior environmental outcomes, rather than being treated as a surprise ancillary benefit of AMI, should be presented as an outcome to be sought, and for which the Company could be handsomely compensated if it is achieved. Although the Company has provided minimal information in its AMI Business Plan about the environmental

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$0.0185/kWh." Commonwealth Edison Company, VOLTAGE OPTIMIZATION FEASIBILITY STUDY FINAL REPORT (March 9, 2015), available at http://www.icc.illinois.gov/downloads/public/edocket/402264.pdf as part of Illinois Commerce Commission Docket 15-0284, available at https://www.icc.illinois.gov/docket/files.aspx?no=15-0284&docId=227803 (last visited Dec. 7, 2015).

benefits that AMI might help achieve, the Commission can direct Staff and the Company to continue to develop these values for purposes of designing appropriate incentives.

VI. Phasing of AMI Deployment

As discussed above, a key benefit of AMI is the potential to leverage customer engagement, sophisticated pricing for electric service, and load management technologies to address and reduce critical peaks at the bulk system level as well as at the distribution system or network level. The plan describes expansion of demand management programs as an important application of AMI.[73] However, a larger question that the plan does not directly address is the ability of this proposed investment by the Con Edison in a more effective platform to enable the Company to avoid traditional distribution system investments, as the Staff White Paper on Ratemaking and Utility Business Models contemplates.[74]

Given the need to avoid traditional and distribution system investments, it would be appropriate for the Commission to require, as a condition its approval of Con Edison's AMI deployment, that Con Edison demonstrate its ability to use the AMI system, together with other measures, to maintain power reliability while avoiding or deferring investments in the distribution system that would otherwise be used in the near term. Con Edison should demonstrate this capability by using AMI to address critical peaks in areas with significant load growth and/or distribution system constraints, such as the BQDM area, and thus avoid or defer "traditional" investments in additional feeder, substation or related capacity. Unfortunately, the early start in Staten Island and Westchester, compounded by the late start for deployment in Queens[75] contemplated in the AMI Business Plan suggests that this may not be the Company's intention. In light of the significant capacity needs that are projected for that area and the broad functionality that the Company is proposing for its AMI system, Con Edison should be required to use AMI in the BQDM area and similar areas to manage peak demand through demand response, innovative pricing, energy efficiency, distributed energy, and energy storage, and to make AMI functionality available to third parties proposing to use commodity pricing and/or DER to further manage these peaks. Therefore, while it may make sense for Con Edison to proceed with AMI deployment in Staten Island and Westchester during Phase 1, as contemplated in the AMI Business Plan, the Company should be required to proceed with AMI deployment in both the Brooklyn and Queens portions of the BQDM area and similar areas as soon as feasible.

In the case of the BQDM areas, given all of the work that Con Edison and other parties are putting into the development of a strong BQDM program, all such parties should have the

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[73] *See* AMI Business Plan at 48-49.

[74] *See* at Track Two White Paper at 39 and Appendix D.

[75] *See* AMI Business Plan at 25.

opportunity to build on and take advantage of a state-of-the-art platform to expand their initiatives. The intense attention to that area would facilitate an early demonstration of the full range of AMI benefits in the real world. At the same time, early deployment in the BQDM area would support time-variant pricing, demand charges, and other pricing incentives (some of which might be developed and offered by non-utility market participants) as tools, coupled with enabling technologies, to achieve the kinds of results that REV envisions. Although the Company may be reluctant to rely on as-yet unproven innovations to deliver load reductions that are critically needed, incremental peak reductions (above what is needed) could still contribute materially to long-term savings, as the Company has not thus far presented a set of solutions that avoids (rather than merely defers) the very expensive distribution system upgrade that is anticipated. For this reason, the BQDM area should also be given serious consideration when Con Edison is finally required to undertake serious pilots of AMI-enabled time-variant pricing structures.

"Market animation," which is both more urgent and more developed in the BQDM area than elsewhere, provides another reason to prioritize the BQDM area in the deployment of an AMI system. Adding AMI functionality to an area where large numbers of non-utility parties are already focused on providing solutions would offer an early, real-world opportunity for third party data access and fees for analytics and other custom support provided by the Company in its capacity as DSP to be developed in a manner that both provides Con Edison with "market-based earnings" opportunities and also assures that arrangements with third parties are fair and reasonable.

In the event that the BQDM area no longer represents the area of the system with the most urgent need for capacity expansion and/or peak reductions at the time of AMI deployment, we urge the Commission to consider this approach in whatever area is then the most urgently constrained, provided that the area selected should be of comparable size and load diversity to the BQDM area.

VII. Conclusion

Environmental Defense Fund thanks the Company for its thoughtful and in many respects promising proposal for AMI deployment. The fact that AMI appears so beneficial even with conservative assumptions that do not allow full consideration of an animated marketplace and environmental benefits, as discussed here, gives us reason to be optimistic that a well-designed AMI deployment could significantly advance New York's urgent environmental policy objectives by harnessing market forces in an efficient, market-based manner. By approving deployment subject to conditions that maximize the opportunity to achieve the benefits that AMI

can enable, the Commission can significantly advance the public policy goals of REV and the State Energy Plan.

Respectfully Submitted,

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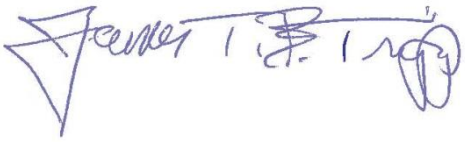

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Appendix A

Calculating the Benefits Associated with Avoided Emissions using the Social Cost of Carbon

The Interagency Working Group on the Social Cost of Carbon has provided estimates for the social cost of each ton of emissions. Table 1 presents the Social Cost of Carbon values as presented on the EPA website (highlighted for each five years). [76]

Table 1: Social Cost of Carbon

Social Cost of CO_2, 2015-2050 [a] (in 2011 Dollars)				
	Discount Rate and Statistic			
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile**
2015	$12	$39	$61	$116
2020	$13	$46	$68	$137
2025	$15	$50	$74	$153
2030	$17	$55	$80	$170
2035	$20	$60	$85	$187
2040	$22	$65	$92	$204
2045	$26	$70	$98	$220
2050	$28	$76	$104	$235

[a] The SCC values are dollar-year and emissions-year specific.

Each column presents the Social Cost of Carbon in a particular year, in each case presented in 2011 dollars. As is evident, the values increase over time, reflecting the fact that damages increase over time (making it more difficult and costly to avoid emissions in future years). The Commission's preference as to discount rate will determine which column should be used. Academic and scientific consensus holds that the values determined under the 3% are the most robust when discounting future carbon emissions or avoided emissions. The average values (e.g., the columns defined as "3% average") were determined by estimating multiple models and taking the average results; however, if the Commission believes there is a lot of uncertainty and

[76] http://www.epa.gov/climatechange/EPAactivities/economics/scc.html.In addition, a table with the yearly values in 2007 dollars can be found here: https://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf, page 18.

is risk averse, taking the 95th percentile (i.e., the fourth column in Table 1) of the 3% values may be warranted.[77]

When using the SCC values to value avoided emissions, several steps need to be taken. First, it is necessary to convert the future SCC values into present day values using a GDP deflator[78]. Second, multiply the emissions in each future year by the corresponding value in that year. Third, apply the discount rate that matches how the SCC value was calculated; thus, if the Commission chooses the 3% values, then the future emissions should be discounted by 3% (*not* by the WACC or any other financial discount rate used for discounting future costs and benefits). Finally, sum up the present value of emission benefits across all relevant years.[79]

In the case of emissions reductions anticipated from CVO and avoided truck rolls, using the conservative average 3% discount rate values as a lower bound, and applying it to 369,327.4 million tons of annual carbon savings for twenty years beginning in 2020, this method gives us a discounted minimum value of approximately $336 million. At the 95th percentile of the 3% discount rate, the result would be approximately $1.02 billion. Because the federal EPA has observed that it is "very likely that [SCC] underestimates" the damage,[80] prudence might dictate relying on higher values. Even with conservative assumptions and counting only avoided truck rolls and CVO-related emissions reductions, these values representing avoided harm to society are not inconsequential. Given that AMI will likely produce a much larger amount of avoided emissions through consumer behavior (affected by pricing and demand response), these figures represent a lower bound of the environmental benefits provided by AMI.

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[77] This SCC value is calculated in a different way than the average – rather than averaging over all the results of the different model calculate tons, this column utilizes the value that is greater than 95% of all the other calculated values.

[78] In the attached Excel sheet, we use the 2007 dollar table that separates out the values by each year rather than for each five years. Thus, we have to convert 2007 dollars into 2015 dollars by multiplying the 2007 dollars by the following: 2015 Deflator Index/2007 Deflator Index. This inflates the 2007 dollars into 2015 dollars.

[79] https://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf at 14.

[80] http://www.epa.gov/climatechange/EPAactivities/economics/scc.html

Appendix B

Social Cost of Carbon Spreadsheet

(standalone Excel spreadsheet)

Appendix C

Open Data Access Framework

(standalone pdf)