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January 10, 2014

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

CASE 13-E-0030
CASE 13-G-0031
CASE 13-S-0032

Subject: Comments on the Con Edison Storm Hardening and Resilience Report

Secretary Burgess:

On behalf of the New York University School of Law's Guarini Center for Environmental and Land Use Law and the Institute for Policy Integrity,[1] we offer the attached comments on the Con Edison Storm Hardening and Resilience Report.

The Guarini Center for Environmental and Land Use Law is a non-partisan research center at NYU School of Law focused on the development and evaluation of market-based regulatory solutions to environmental and energy issues.

The Institute for Policy Integrity is a non-partisan think tank housed at NYU School of Law and dedicated to improving the quality of government decisionmaking through advocacy and scholarship in administrative law, economics, and public policy. Policy Integrity has extensive experience advising stakeholders and government decisionmakers on the rational, balanced use of cost-benefit analysis, both in federal practice and in New York.

We are grateful for the Commission's consideration of these comments.

Sincerely,

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[1] These comments do not purport to present New York University School of Law's views, if any.

Introduction

These comments recommend that the Commission order the continuation of the Storm Hardening and Resiliency Collaborative and consider amendments to the 2014 work-plans for Working Group II and Working Group IV. In particular, we recommend that the Commission order:

- Working Group II to consider broadly how alternative business models for distributed generation ownership and adjustment to existing tariff provisions, such as the campus tariff, could provide system-wide resilience benefits.
- Working Group IV to develop explicit cost-benefit methodologies to support the work of Working Groups I and II, or in the alternative that Working Groups I and II include a specific charge to develop cost-benefit analysis methodologies.
- The Collaborative to develop a process to incorporate the expert and stakeholder participation of non-parties to the current proceedings and adjust rules of procedure to allow for broad public engagement in the proceedings.

I) The Commission Should Order Working Group II to Consider Expanded Scenarios for Distributed Generation Deployment to Maximize System-Wide Resilience Benefits.

Con Edison provides electric service to customers based on a number of regulatory and economic practices, which taken together may be called the "distribution utility business model." The distribution utility business model includes, for example, the ban on distribution utility ownership of distributed generation assets, the imposition of standby charges on some categories of distributed generation, limitations on distributed generation asset owners to sell the electricity they generate to others, and the use of volumetric prices to pay for the fixed costs of maintaining the distribution grid.

The distribution utility business model significantly influences the project economics of distributed generation development and, in turn, the cost-benefit analysis of a proposed distributed generation resource as a resiliency measure. That is, the costs of a proposed distribution generation resource as a resiliency measure will change if the current business model changes in one way or another.

We agree with recent statements from the Commission that it is now timely to examine these issues comprehensively as a part of an overall evaluation of the kinds of services retail customers would like to receive from a distribution utility. We recommend that Working Group II should be allowed sufficient scope to analyze the potential impact of various types of business model changes on distributed generation economics.

For example, a change to allow a distribution utility to own distributed generation assets at hospitals might reduce the costs of interconnection and allow more projects to advance, enhancing overall resiliency efforts. Similarly, altering campus tariff rules to allow distributed generation owners to sell to other owners of nearby buildings might allow grouping of demand and allow a hospital to include a gas station, private pharmacy, or housing development in the project.

We are concerned that the Working Group II work-plan and the narrow scope proposed by Con Edison will not adequately address the scope of proposed changes that may be considered.

II) The Commission Should Order Working Group IV to Develop an Explicit Cost-Benefit Analysis Methodology to Assess Resilience Investments.

With this Collaborative, the Commission has the opportunity to consider how ratemaking and tariff rules can shape a more resilient energy future for Con Edison customers. However, the old models of project analysis do not provide the necessary tools in the resiliency context to create a more sustainable energy future for all New Yorkers while also minimizing unnecessary costs to ratepayers. In order to effectively prioritize among the many alternative approaches to promoting resiliency going forward, PSC should extend the work-plan of Working Group IV to continue studying the application of comprehensive cost-benefit analysis in the resiliency context.

PSC should task the Working Group with exploring how to structure a comprehensive cost-benefit analysis that addresses resiliency issues and how to ensure the analysis accounts for all social costs and benefits of the potential alternatives, including externalities. As explained further below, PSC should explore using cost-benefit analysis in the resiliency context because:

- It is the most analytically sound way of prioritizing among multiple policy options in a resource-limited world that faces new and evolving challenges;
- It is supported by the statutes governing PSC and by past PSC practice; and
- Forward-looking states are increasingly turning to cost-benefit analysis to help address difficult energy planning issues, like those that arise in the resiliency realm.

A. PSC should explore using cost-benefit analysis in the resiliency context because it allows decisionmakers to correctly assess the value of projects that may not appear economic at first glance and to effectively prioritize among multiple policy options.

PSC faces numerous challenges in making resiliency decisions, and cost-benefit analysis is the optimal tool to navigate those challenges:

- First, a plethora of policy focuses and specific project designs have been proposed to promote resiliency in response to the vulnerabilities in New York's energy infrastructure exposed by Superstorm Sandy—everything from regulatory redesigns to infrastructure hardening to reducing energy demand.[2] Both government and private energy providers likely lack the resources to pursue all these avenues simultaneously and immediately, and so they will need a rational system for prioritizing their actions.

- Second, some policy focuses may be incompatible, and certainly some specific project proposals will be mutually exclusive: Con Edison cannot, for example, build both a five-foot protective wall and a ten-foot protective wall at the same location. Both government and private energy providers will need a tool to choose between incompatible options.

- Third, various policy options will have significant impacts beyond the direct costs and benefits to energy providers and consumers. New York's energy, transportation, sanitation, and public safety networks are "highly interdependent,"[3] and resiliency policies will have important implications for New York's broader social welfare. For example, Superstorm Sandy caused not just property damage to energy infrastructure, lost business activity, and service interruptions for customers,[4] but also a host of negative effects due in part to lack of resiliency: public health and safety effects (like power outages at nursing homes or in crucial telecommunication, water, and lighting systems); transportation effects (like the lack of electricity to pump out subway stations); and environmental effects (like the release of untreated sewage due to powerless pumping stations).[5] PSC needs a technique to catalog and compare all of the most significant effects of various policy options, in order to advance the social welfare for all New Yorkers while minimizing unnecessary costs to ratepayers.

- Finally, energy consumers and New York citizens generally will want to understand what benefits they will receive in exchange for any rate increases or other expenses, and will want to understand why certain actions were taken while other projects were not. PSC and energy providers will need a strategy to transparently communicate all significant effects of their policy decisions to the public.

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[2] *See* CITY OF NEW YORK, A STRONGER, MORE RESILIENT NEW YORK 122-29 (2013); NYS2100 COMMISSION, RECOMMENDATIONS TO IMPROVE THE STRENGTH AND RESILIENCE OF THE EMPIRE STATE'S INFRASTRUCTURE 15 (2013).

[3] *See, e.g.*, CITY OF NEW YORK, A STRONGER, MORE RESILIENT NEW YORK, *supra* note 2, at 107.

[4] *See*, *e.g.*, Kayla Webley, *Hurricane Sandy By the Numbers: A Superstorm's Statistics, One Month Later*, TIME, Nov. 26, 2012 (reporting $25 billion in lost business activity).

[5] *See, e.g.*, CITY OF NEW YORK, A STRONGER, MORE RESILIENT NEW YORK, *supra* note 2, at ch. 1.

Due to its ability to compare alternatives and examine the full range of policy effects, cost-benefit analysis is an optimal tool for making and communicating decisions in a resource-limited world that faces competing priorities. Other types of project analysis that have been historically employed in New York's energy planning decisions cannot address these challenges as effectively or efficiently. Moreover, cost-benefit analysis is already widely used by many other government and private actors to maximize net benefits and to ensure decisions are based on reasoned analysis,[6] and cost-benefit analysis is perfectly compatible with New York's energy planning process.[7]

Defining Cost-Benefit Analysis versus Other Methodologies: Cost-benefit analysis is a systematic method of calculating and comparing the costs and benefits of different policy approaches, in order to choose the option that maximizes net benefits for society. A cost-benefit analysis involves several steps. First, decisionmakers identify costs and benefits associated with each policy alternative. Because the goal is to select the alternative that maximizes net social welfare, it is essential to account for any costs or benefits that could affect the ultimate decision, including any externalities.[8] An externality is the uncompensated benefit or cost imposed on third parties by a transaction: in other words, an effect whose cost or benefit is not internalized by the acting party. Pollution, like the untreated sewage released during Superstorm Sandy, is one classic example of an externality.[9] Once all significant impacts are cataloged, analysts quantify and monetize each effect, to the extent possible, using a common metric (like dollars) to allow comparison between various policies.[10] Established economic methodologies exist for weighing various effects, including impacts to health, safety, and the environment.[11] Once all effects are translated to a common metric, the analyst subtracts costs from benefits to find the net benefits of each approach. The decisionmaker can then select the policy options that generate the greatest net benefits to society.[12] Because cost-benefit analysis involves a detailed assessment of the anticipated outcomes of

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[6] *See generally* RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH (2008); Cass R. Sunstein, *Cognition and Cost-Benefit Analysis*, 29 J. Legal Stud. 1059, 1069-70 (2000) ("A virtue of cost-benefit analysis is that it tends to overcome people's tendency to focus on parts of problems, by requiring them to look globally at the consequences of apparently isolated actions."); *see also infra*, Section II.C, noting that other states are already applying cost-benefit techniques in the energy planning decisions, including resiliency.

[7] *See infra*, Section II.B, explaining the legal support for PSC's use of cost-benefit analysis.

[8] OFFICE OF MANAGEMENT AND BUDGET, CIRCULAR A-4 2-3 (Sept. 2003).

[9] *Cf. id.* at 4.

[10] Where quantification is not possible, the analysis should describe the likely effects qualitatively, and the decisionmaker should still consider those factors in her analysis.

[11] *See* CIRCULAR A-4, *supra* note 8, at 18-26.

[12] Decisionmakers may also balance economic efficiency with other goals, like distributional fairness.

alternatives, it also assists decisionmakers in communicating to the public and stakeholders why a particular outcome was selected.[13]

By contrast, the types of project analyses historically used in New York's energy planning decisions are less comprehensive in their assessment of effects, fail to compare alternatives in a way that is useful for prioritizing actions with the greatest net benefits, and cannot communicate information to the public as fully or as transparently. For example, "traditionally, [supply-side] capital investment decisions have been based on the most cost-effective manner to reduce risk on the power systems."[14] This engineering-based approach typically focuses on the ratio between the direct costs and the projected risk reductions of individual alternatives, without considering the full societal costs and benefits of each option or comparing the net benefits across a full range of alternatives. Similarly, in evaluating demand-side resources, like in the energy efficiency context, PSC and Con Edison have used a ratio-based approach called the Total Resource Cost ("TRC") test. This approach measures only a subset of costs and benefits that accrue to the utility and its customers (so ignoring social externalities), and calculates the ratio of costs to benefits.[15]

Such ratio-based approaches can play a role in helping to screen out individual projects as uneconomic. However, in a resource-constrained context where a choice is required between mutually exclusive alternatives, a ratio-based technique cannot help decisionmakers select the policy option that will deliver the most net benefits to society. To take a very simplified example, spending $1 to get $10 in benefits has a much higher benefit-to-cost ratio (10:1) than spending $1 million to get $3 million in benefits (3:1); yet from the perspective of net benefits, the $2 million netted by the second project is clearly a much better deal than the $9 total offered by the first alternative. A more detailed example is offered below.

Additionally, while New York currently uses different ratio-based tests to assess either demand-side resources or supply-side capital investments separately, an effective approach to resiliency will require a strategy that involves both demand- and supply-side approaches. Because cost-benefit analysis employs the common metric of dollars to evaluate different alternatives, it would allow the PSC to effectively compare demand-side resiliency approaches with supply-side resiliency approaches and select the portfolio of options that maximizes net benefits to New Yorkers.

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[13] CIRCULAR A-4, *supra* note 8, at 2 ("[G]ood regulatory analysis is designed to inform the public.").

[14] PSC 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.*, *Con Edison's Storm Hardening and Resiliency Collaborative Report*, Filing No. 445, App. F at 118 [hereinafter *Collaborative Report*].

[15] *See, e.g.*, PSC Case 07-M-0548, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard*, *Order Establishing Energy Efficiency Portfolio Standard and Approving Programs*, Filing No. 228, at 58 (June 23, 2008).

An Example of the Advantages of Cost-Benefit Analysis: A simple example will demonstrate why a comprehensive cost-benefit analysis is preferable to a truncated, ratio-based analysis. Assume a utility could undertake one of two mutually exclusive projects to improve grid resiliency. The utility could spend $900,000 fortifying an existing substation to better resist flooding, which would result in a projected reduction in risk of 2 million expected event customer-hours.[16] Alternatively, the utility could spend $5 million relocating the substation to a less-flood-prone location, which would result in a projected reduction in risk of 10 million expected event customer-hours. Further assume for now that reducing the risk of each expected event customer-hour generates the same benefit of $1. Under a ratio-based analysis, it would appear at first glance as though fortifying the substation is the preferable alternative. The fortification would provide a risk reduction of 2.2 expected event customer-hours per dollar spent, whereas the relocation would provide a risk reduction of only 2 expected event customer-hours per dollar spent. However, the net benefits of the relocation, which total $5 million ([10 million customer-hours * $1 in benefits] – [$5 million in costs]), are substantially larger than the net benefits of fortification, which total just $1.1 million (2 million * $1 – $900,000). By following a ratio-based approach, decisionmakers would have chosen the less efficient alternative and lost millions of dollars in social welfare.

Moreover, cost-benefit analysis could compare the different effects on social externalities of those two alternative projects in ways that the TRC test or capital investment test would not. For example, suppose the risk reduction of 10 million expected event customer-hours generated by the relocation represents better protection against long-term service interruptions, while the fortification may help avoid only shorter-term interruptions. Given that a major interruption, as seen during Superstorm Sandy, may be more likely than a short-term outage to impose negative externalities on public safety, health, and the environment, the net benefits of relocation versus fortification could be even greater—a difference that would be important not just for decisionmakers to weigh but also to communicate to the public.

Similarly, a fortification like a protecting wall could produce important ancillary effects—both positive and negative. Perhaps the substation is near other essential infrastructure that the same wall could also protect from flooding. Or, conversely, suppose the wall would redirect water to other vulnerable infrastructure, like a subway, and so increase the countervailing risk of flooding elsewhere. Major ancillary impacts like these are undeniably relevant to choosing between various project alternatives, yet only a thorough cost-benefit analysis would capture and evaluate these

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[16] This is the unit of risk used in the Collaborative Report; it combines the likelihood of weather damage to particular infrastructure with the expected duration of the outage and the size of the affected population.

effects; other project analysis techniques, as historically applied, would miss these significant elements, and so would fail to maximize social welfare for New York and its energy customers.

B. The statutes and case law governing PSC, as well as prior PSC orders and policies, support using cost-benefit analysis in the resiliency context.

In addition to being the most analytically sound way to prioritize policy options in a resource-limited world, comprehensive cost-benefit analysis of resiliency is the optimal way for PSC to fulfill its statutory duties of promoting the public interest and preserving environmental values. Several of PSC's past orders have begun to pave the way toward cost-benefit analysis, by highlighting the importance of incorporating social externalities into project analysis. PSC should expand on these precedents and more fully explore the role of cost-benefit analysis in resiliency planning.

Statutes and Case Law: PSC's enabling statutes—as well as statutory interpretations by the courts and by PSC itself—mandate that PSC promote the public interest, which includes promoting public health and environmental preservation. New York Public Service Law Section 5 states that PSC "*shall encourage* all persons and corporations subject to its jurisdiction to formulate and carry out long-range programs . . . for the performance of their public service responsibilities with economy, *efficiency*, and care for the public safety, the preservation of environmental values and the conservation of natural resources."[17] In economics, "efficiency" is defined as maximizing net social welfare—the goal of cost-benefit analysis.[18]

The mandatory term "shall" is also telling, and courts have recognized that these factors have "become an avowed legislative policy";[19] in particular, this section confers PSC with authority to promote energy conservation and public health.[20] Though PSC has discretion in meeting these goals, its determinations must "bear[ ] a reasonable relationship to the purpose of the enabling legislation."[21] As Section 5(2) demonstrates, the enabling legislation includes goals of promoting the public interest and preserving environmental values. Any project that PSC approves should

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[17] N.Y. Pub. Serv. Law § 5(2) (McKinney) (emphasis added); *see also id.* § 66 (1-a) ("[PSC] *shall* . . . examine or investigate the methods employed . . . in manufacturing, distributing and supplying gas or electricity . . . and [has] *power to order* such reasonable improvements as will *best promote the public interest*, *preserve the public health* and protect those using such gas or electricity.") (emphasis added).

[18] *See*, *e.g.*, N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 850 (2008) ("[E]fficiency: the property of society getting the most it can from its scarce resources.").

[19] *See Multiple Intervenors v. PSC*, 166 A.D.2d 140, 143-44 (N.Y. App. Div. 1991) (citations omitted).

[20] *Id.*; *see also* PSC Case 12-E-0503, *Proceeding on Motion of the Commission to Review Generation Retirement Contingency Plans*, *Order Accepting IPEC Reliability Contingency Plans, Establishing Cost Allocation And Recovery, And Denying Requests For Rehearing*, Filing No. 210, at 15 (Nov. 4, 2013) (also interpreting Section 5(2)).

[21] *Multiple Intervenors*, 166 A.D.2d at 144 (1991).

therefore be reasonably related to these goals. Cost-benefit analysis is better suited to evaluate these environmental and health externalities than other techniques for project assessment.

PSC has acknowledged that the environmental and health goals of Section 5(2) are mandatory. In 2007 proceedings to establish long-term electric infrastructure plans, PSC stated that its decision to begin the planning process was based on its "obligations" under the Public Service Law, which "requires" PSC to "ensure safe and *adequate service* at just and reasonable rates, *preserve environmental values*, *conserve natural resources*, . . . and *care for the public safety*.[22] PSC defined "adequate service" as "service that is *reliable*, *environmentally compatible* and *sustainable*."[23] Due to this obligation, PSC found that "matters such as . . . environmental externalities, energy efficiency, environmental justice, . . . economic development, . . . global warming emissions, . . . and other issues critical to the public interest may be considered."[24] Many of these matters are classic social externalities, and a comprehensive cost-benefit analysis would take them into account.

Moreover, PSC's mandate to promote the public interest applies specifically in the resiliency context. New York Public Service Law Section 30 states that it is "the *policy of this state* that the *continued provision* of all or any part of such gas, electric and steam service to all residential customers without unreasonable qualifications or lengthy delays is necessary for *the preservation of the health and general welfare and is in the public interest*."[25] Energy resiliency is the "continued provision" of electric service during adverse conditions, such as extreme weather events or cyber-attacks. Thus, the statute declares that resiliency is not only a policy of the state, but that it is also "necessary for the preservation of the health and general welfare and is in the public interest." In a resource-limited world, PSC and private energy providers cannot invest in all possible resiliency measures. In order to choose resiliency measures that best promote the public interest, PSC should use a thorough cost-benefit analysis. Such analysis allows PSC to compare alternatives, maximize net benefits to society, and thereby most effectively promote the public interest.[26]

Prior PSC Precedents on Measuring Social Externalities: Con Edison suggests in its report that a broad and comprehensive cost-benefit analysis for resiliency projects would be a brand-new undertaking, since "[t]raditionally, capital investment decisions have been based on the most cost

[22] PSC Case 07-E-1507, *Proceeding to Establish a Long-Range Electric Resource Plan and Infrastructure Planning Process*, *Order Initiating Electricity Reliability and Infrastructure Planning*, Filing No. 5, at 5 (Dec. 24, 2007) (emphasis added).

[23] *Id.* at 5 n.11. (emphasis added)

[24] *Id.* at 5-6.

[25] N.Y. Pub. Serv. Law § 30 (McKinney) (emphasis added).

[26] Section 30 further emphasizes that as PSC maximizes general welfare through resiliency projects, it should also focus on the impact to "residential customers," thus giving PSC guidance on distributional concerns.

effective manner to reduce risk on the power systems."[27] Nevertheless, PSC's past practices in fact lay much of the necessary groundwork for adopting a comprehensive cost-benefit analysis.

As mentioned above, PSC has utilized a ratio-based screening test, called Total Resource Cost ("TRC"), to evaluate energy-efficiency and other projects. Though TRC is not sufficient to analyze projects in the resiliency context, its application in recent PSC orders begins to lay important groundwork for future cost-benefit analyses that will account for broader externalities. For example, in several documents PSC instructed those conducting project analyses and TRC tests to evaluate social externalities, such as the environmental and safety benefits of grid modernization (including hard-to-quantify benefits),[28] and the monetized benefits of greenhouse gas reductions from energy efficiency proposals.[29] In one order, PSC determined that Con Edison's analysis of competitive metering infrastructure was "insufficiently rigorous to produce reliable estimates of net benefits" because it did not include a societal perspective.[30] More generally, PSC sometimes discusses the need for project analysis to "reflect real resources that are saved or incurred *by society*."[31] PSC staff have reviewed the criticisms of traditional TRC test and highlighted the advantages of an approach that would more broadly assess social externalities, including environmental effects and hard-to-quantify benefits;[32] PSC has left the door open to such an expansion at the appropriate time.[33]

With the new challenges presented by resiliency planning, the increasing use of cost-benefit analysis in other states,[34] and the growing availability of cutting-edge techniques and off-the-shelf

[27] *Collaborative Report*, *supra* note 14, App.F at 118.

[28] PSC Case 10-E-0285, *Proceeding on Motion of the Commission to Consider Regulatory Policies Regarding Smart Grid Systems and the Modernization of the Electric Grid*, *Smart Grid Policy Statement*, Filing No. 79, at 51 (Aug. 19, 2011)

[29] PSC Case 07-M-0548, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard*, *Order Establishing Energy Efficiency Portfolio Standard and Approving Programs*, Filing No. 228, App.3 at 2 (June 23, 2008). Though the recommended value of $15 per ton of carbon dioxide reductions is, as discussed *infra* n.35, too low, its inclusion in the TRC test is still a positive step.

[30] PSC Case 00-E-0165, *In the Matter of Competitive Metering*, *Order Requiring Filing of Supplemental Plan*, Filing No. 33, at 15-16, Dec. 19, 2007.

[31] *E.g.*, PSC,Case 04-E-0572, *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*, *Order on Demand Management Action Plan*, Filing No. 31, at 30 (March 16, 2006).

[32] PSC Case 07-M-0548, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard*, *Energy Efficiency Portfolio Standard Program Review White Paper*, Filing No. 987, at 27-28 (July 8, 2011).

[33] PSC Case 07-M-0548, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard*, *Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule*, Filing No. 1142, at 6 (Oct. 25, 2011).

[34] *See infra* Section II.C.

valuations of key social externalities,[35] the time is now ripe for PSC to build on its precedents of expanding the TRC test, and to ultimately move toward a cost-benefit test for resiliency.

C. Forward-thinking states are increasingly turning to cost-benefit analysis as a tool for assessing resiliency projects.

Other states[36] are already recognizing the need to engage in comparative cost-benefit analysis when assessing resiliency projects. A primary stakeholder in the Massachusetts Grid Modernization Working Group argued that the state "should adopt a standardized cost-benefit framework" that "include[d] comparative cost-benefit assessments of alternative approaches . . . to grid modernization investments."[37] Maryland's Grid Resiliency Task Force also acknowledges that a cost-benefit analysis is necessary to answer "questions of how far and which improvements to select" when improving grid resiliency.[38] Likewise, New Jersey is planning to utilize cost-benefit analysis to assess its electric utilities' proposals to harden the state's energy systems.[39] As these states recognize, cost-benefit analysis is the best way to choose among alternatives and, therefore, to achieve maximum grid resiliency. PSC should consider following their example.

PSC can look to the ratio-based TRC tests used in the energy efficiency context as a starting point to develop a comparative cost-benefit analysis for resiliency projects. This framework already quantifies some costs and benefits of energy proposals on a case-by-case basis. In that sense, the test is "a good, flexible starting point" for considering grid modernization investments.[40] To tailor the test to the grid resiliency context, PSC and Con Edison would need to make three modifications. First, they would need to expand the scope of costs and benefits considered, including those effects

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[35] *See*, *e.g.*, Interagency Working Group on Social Cost of Carbon, *Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis* (2013) (calculating the benefits of greenhouse gas reductions at $43 per ton).

[36] In addition to the states listed below, several Gulf States also began taking preliminary steps toward cost-benefit analyses of resiliency in the wake of Hurricane Katrina, but these analyses remain less developed. *See, e.g.*, RICHARD BROWN, QUANTA TECHNOLOGY, COST-BENEFIT ANALYSIS OF THE DEPLOYMENT OF UTILITY INFRASTRUCTURE UPGRADES AND STORM HARDENING PROGRAMS, PUBLIC UTILITY COMMISSION OF TEXAS, PROJECT NO. 36375 (2009); Theodore Kury, Public Utility Research Center, Evidence-Driven Utility Policy with Regard to Storm Hardening Activities: A Model for the Cost-Benefit Analysis of Underground Electric Distribution Lines (2010).

[37] RAAB ASSOCIATES, LTD. & SYNAPSE ENERGY ECONOMICS, INC., MASSACHUSETTS ELECTRIC GRID MODERNIZATION STAKEHOLDER WORKING GROUP PROCESS 87 (July 2013) [hereinafter MASSACHUSETTS ELECTRIC GRID MODERNIZATION WORKING GROUP].

[38] MARYLAND GRID RESILIENCY TASK FORCE, WEATHERING THE STORM 86 (Sept. 2012).

[39] *Discussion Points for FY2013-14 Budget*, NEW JERSEY BOARD OF PUBLIC UTILITIES 4 (Apr. 1, 2013), *available at* www.njleg.state.nj.us/legislativepub/budget_2014/BPU_response.pdf. New Jersey has begun working with experts and utilities on appropriate models for these analyses. *See, e.g.*, Frank A. Felder, Center for Energy, Economic and Environmental Policy, Analyzing the Reliability and Resiliency of New Jersey's Urban Energy Systems in Response to Climate Change, Presentation at DIMACS/CCICADA Workshop on Urban Planning for Climate Events (Sept. 23-24, 2013), *available at* http://dimacs.rutgers.edu/Workshops/Urban/ Slides/Felder.pdf; Rebuttal Testimony of Dr. Peter S. Fox-Penner, *In the Matter of the Petition of Public Service Electric and Gas Company Approval of the Energy Strong Program*, New Jersey Board of Public Utilities, Docket No. EO13020155 and GO13020156 (Nov. 27, 2013), *available at* http://www.pseg.com/family/pseandg/tariffs/reg_filings/pdf/rebuttal_testimony_fox-penner.pdf.

[40] MASSACHUSETTS ELECTRIC GRID MODERNIZATION STAKEHOLDER WORKING GROUP PROCESS, *supra* note 37, at 90.

unique to grid resiliency. Second, they would need to calculate the results of the evaluation as net benefits instead of as a ratio. Finally, they would need to use the tests to evaluate multiple projects at once in order to facilitate comparison.

Even the first step alone—considering the full range of costs and benefits, including externalities—would significantly improve the analysis. To properly evaluate the full range of effects, PSC and Con Edison would need to include benefits unique to grid resiliency in their evaluation. As explained above, grid resiliency means continued service in times of adverse conditions; it also means the ability to bounce back after outages quickly. The benefits of a resilient grid include increased public safety during extreme weather events, less untreated sewage pouring into bodies of water during service outages, and enhanced ability to defend against cyber-attacks, among others.[41] These benefits are in addition to both the direct and indirect benefits (avoided negative externalities) specific to the type of intervention chosen. For example, if Con Edison decided to use combined heat and power, the analysis would also need to include direct benefits such as avoided line losses, wholesale price impacts, improved utility system reliability, and distribution power quality, as well as externalities such as reduced greenhouse gas and air quality benefits.[42]

As explained above, it is essential for any cost-benefit analysis to include as many significant societal externalities as possible in order to accurately reflect the true costs and benefits of a project. If the PSC decides to use its ratio-based screening tests as a jumping off point toward moving to a full cost-benefit analysis, a first step could be to expand its TRC or to adopt the Societal Cost Test ("SCT").[43] As the table in Appendix A shows, many states have already expanded their screening tests to consider a fuller range of externalities in the energy efficiency context, and several have begun doing so in the resiliency context. For example, for energy efficiency projects, Rhode Island monetizes various externalities, including health and safety benefits, improved comfort (thermal and noise reduction), property value benefits, and other societal impacts in its project assessments.[44] Massachusetts, the highest ranking state for energy efficiency according to

[41] EXEC. OFFICE OF THE PRESIDENT, ECONOMIC BENEFITS OF INCREASING ELECTRIC GRID RESILIENCE TO WEATHER OUTAGES 23-24 (Aug. 2013); DEPT. OF ENERGY & ENVTL. PROTECTION AGENCY, COMBINED HEAT AND POWER: A CLEAN ENERGY SOLUTION 8, 11 (Aug. 2012); John Manuel, *The Long Road to Recovery: Environmental Health Impacts of Hurricane Sandy*, 121 ENVTL. HEALTH PERSPECTIVES A157 (2013).

[42] SYNAPSE ENERGY ECONOMICS, INC. ET AL., DEPLOYMENT OF DISTRIBUTED GENERATION FOR GRID SUPPORT AND DISTRIBUTION SYSTEM INFRASTRUCTURE 1 (February 2011).

[43] TIM WOOLF ET AL., SYNAPSE ENERGY ECONOMICS, INC., ENERGY EFFICIENCY COST-EFFECTIVENESS SCREENING IN THE NORTHEAST AND MID-ATLANTIC 39 (October 2013) [hereinafter SYNAPSE NORTHEAST].

[44] *Id.* at 46, 57-58.

ACEEE,[45] also applies an expansive cost test for energy efficiency and has considered adopting a similar test for resiliency. The state's test uses a societal discount rate and monetizes various health, safety, and environmental benefits in its analyses[46]—both hallmarks of cost-benefit methodology.[47]

The SCT uses similar inputs to the TRC, but defines those inputs "with a broader societal point of view."[48] In that sense, "[i]t goes beyond the TRC test,"[49] and many of the most progressive states are either using or considering adopting the SCT for energy efficiency. Arizona, Iowa, Maryland, Michigan, Minnesota, New Jersey, Oregon, and Vermont—all states that ACEEE ranks in the top third of energy efficient states—use the SCT in project evaluation.[50] Moreover, California, the second most-energy efficient state, is considering adopting the SCT.[51] As other energy progressive states move toward including more externalities in their analyses of potential projects, New York should also ensure that the full range of externalities is incorporated into its resiliency analyses, either through a comprehensive cost-benefit analysis or through the interim use of an expanded TRC or SCT.

These practices of forward-thinking states demonstrate that it is appropriate and possible to apply cost-benefit analysis to the resiliency context. PSC should recognize this and work with Con Edison to develop a comprehensive cost-benefit analysis framework to use in the resiliency context.

III) The Collaborative Should Develop a Process to Manage Increased Workflow and Public Involvement.

The Collaborative has worked effectively during 2013 due to the clear guidance of a committed Administrative Law Judge and the dedication of the parties. In 2014, it is anticipated that the work-plans will involve the working groups in more detailed and nuanced examination of the issues addressed in the Report and will have more direct interest to parties outside of the current rate case and Collaborative. As a result, we recommend the following specific improvements to support the 2014 Collaborative process:

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[45] See the American Council for an Energy-Efficiency Economy's State Scorecard, http://aceee.org/state-policy/scorecard (last visited Jan. 8, 2014).

[46] Synapse Northeast, *supra* note 43, at 43, 57-58; Elizabeth Daykin, et al., Picking a Standard: Implications of Differing TRC Requirements, The Cadmus Group 2 (Dec. 15, 2010).

[47] *See generally* Circular A-4, *supra* note 8.

[48] California Public Utilities Commission, California Standard Practice Manual 19 (Oct. 2001) [hereinafter California Standard Practice Manual].

[49] *Id.*

[50] ACEEE, *State Energy Efficiency Policy Database* (2013), *available at* http://aceee.org/sector/state-policy.

[51] California Public Utilities Commission, Overview of Societal Cost Test Proposal 2 (Jun. 6, 2013).

1) Designate an appropriate DPS staff person to act as a secretary for the Collaborative process;
2) Maintain a public website to host all Collaborative documents and submissions;
3) Establish a process to incorporate non-party participation into the Collaborative process;
4) Consider whether future reports and Working Group summaries will be the product of Con Edison or of the Collaborative, and, if the latter, how will they be compiled.

For reference, the Massachusetts Department of Public Utility just completed an effective Grid Modernization Stakeholder Collaborative administered by Raab Associates.[52]

Conclusion

New York's energy system will face tremendous challenges over the coming years. Not only will the system face external threats such as climate change and security risks, but it will also face significant change from within, as evolving technologies make distributed generation, demand response, and alternative energy service utility models more prevalent. The Commission currently has the opportunity to carefully and thoughtfully shape a more resilient, efficient, and sustainable energy future for New York. Because of its ability to compare a range of alternatives—both supply-side and demand-side—for furthering resiliency in a resource-limited world, cost-benefit analysis is an important tool for PSC to have in its arsenal for addressing the complex issues involved in promoting resiliency. In order to ensure that it is prepared to conduct the necessary analysis, as well as to satisfy its statutory obligations and stay at the cutting edge of forward-looking states on these issues, PSC should extend the charter of Working Group IV to continue studying the application of comprehensive cost-benefit analysis in the resiliency context. PSC should instruct the working group to explore the issues of how to structure a comprehensive cost-benefit analysis in the resiliency context and how to ensure that all social costs and benefits of the potential alternatives—including externalities—are accounted for in the analysis.

PSC should further order Working Group II to consider broadly how alternative business models for distributed generation ownership and adjustments to tariff provisions could provide system-wide resilience benefits, and should develop a process to encourage and incorporate the participation of non-party experts and stakeholders, as well as the broader public.

[52] See: http://magrid.raabassociates.org.

APPENDIX A: Externalities Considered in Peer States' Energy Project Analyses

<table>
<tr><th>State</th><th>ACEEE Rank</th><th>Uses SCT?</th><th>Externalities Currently Quantified or Monetized</th><th>Application of Methodology to Resiliency</th></tr>
<tr><td>MA</td><td>1</td><td>No</td><td>Uses “modified" TRC
Applies a societal discount rate (typical of SCT)[53]
Includes the following non-energy benefits:[54]
- Health and safety (includes reduced environmental and safety costs, such as those for changes in waste stream or disposal of ozone-depleting chemicals)
- Comfort
- Property values
- Low-income impacts</td><td>Looks at applying cost-effectiveness screening to grid modernization programs and proposes three approaches. One approach includes societal benefits:[55]
- Improved reliability
- Avoided greenhouse gas emissions and other environmental externalities
Recommends using TRC/SCT as a starting point for evaluating modernization programs[56]</td></tr>
<tr><td>CA</td><td>2</td><td>Under consideration</td><td>Uses “modified” TRC; considering adopting SCT
Includes environmental benefits and “market transformation benefits” of promoting new technologies[57]
In its low-income efficiency programs, it also includes:[58]
- Water and sewer savings
- Fewer shutoffs, calls to utility, reconnects
- Property value benefits
- Fewer fires
- Reduced moving costs
- Fewer illnesses and lost days from work/school
- Comfort and noise benefits</td><td></td></tr>
</table>

OR	4	Yes	Non-energy benefits included if they are significant and there is a practical way to calculate them[59]	
RI	6	No	Uses expanded TRC, which includes: health and safety benefits, comfort benefits, property value benefits, and societal impacts[60]	
VT	7	Yes	Applies a 15% adder to benefits to capture externalities, including health and safety, comfort, property value, and low-income impacts[61] Applies a 10% reduction in costs to account for risk diversification benefits of energy efficiency programs[62] Considers greenhouse gas benefits of $80/ton[63]	
MD	9	Yes (as a secondary test)	Uses SCT and an expanded TRC, which include impacts on the environment.[64]	Considering using cost-benefit analysis to assess resiliency grid modernization projects Proposes using willingness-to-pay/accept tests to calculate externality costs[65]
NJ	12	Yes	Includes the value of avoided environmental or social externalities for assessing what can be achieved under the state's Energy Master Plan[66]	Using cost-benefit analysis to assess grid hardening proposals[67]
CO	16	No	Uses "modified" TRC Includes a 10% adder to benefits to capture societal benefits[68]	

[53] DAYKIN, *supra* note 46, at 2.
[54] SYNAPSE NORTHEAST, *supra* note 46, at 43.
[55] MASSACHUSETTS ELECTRIC GRID MODERNIZATION WORKING GROUP, *supra* note 37, at 90.
[56] *Id.*
[57] JOSEPH F. WEIDMAN ET AL., INTERSTATE RENEWABLE ENERGY COUNCIL, 12,000 MW OF RENEWABLE DISTRIBUTED GENERATION BY 2020 8 (Jul. 2012).
[58] TIM WOOLF ET AL., SYNAPSE ENERGY ECONOMICS, INC. ENERGY EFFICIENCY COST-EFFECTIVENESS SCREENING 25 (Nov. 2012) [hereinafter SYNAPSE ENERGY EFFICIENCY OVERVIEW].
[59] *Id.* at 26; ENERGY TRUST OF OREGON, 4.06.00-P COST-EFFECTIVENESS POLICY AND GENERAL METHODOLOGY, 3 (DEC. 16, 2011).
[60] SYNAPSE NORTHEAST, *supra* note 46, at 46.
[61] GDS ASSOCIATES, INC., VERMONT ELECTRIC ENERGY EFFICIENCY POTENTIAL STUDY, VERMONT DEPARTMENT OF PUBLIC SERVICE 14-15 (Jan. 2007); BLAIR HAMILTON, EFFICIENCY VERMONT, COST-EFFECTIVENESS SCREENING 2 (June 25, 2009). The GDS report is a technical report prepared for the Vermont Department of Public Service.
[62] GDS, *supra* note 61; Hamilton, *supra* note 61; SYNAPSE ENERGY EFFICIENCY OVERVIEW, *supra* note 58, at 26.
[63] SYNAPSE ENERGY EFFICIENCY OVERVIEW, *supra* note 58, at 26.
[64] State Energy Efficiency Policy Database: Maryland, American Council for an Energy-Efficiency Economy (Aug. 21, 2013), http://aceee.org/sector/state-policy/maryland; Maryland Public Utilities Code § 7-211(i)(1).
[65] MARYLAND GRID RESILIENCY TASK FORCE, *supra* note 38, at 86-87. This report summarizes the findings and recommendations by the Grid Resiliency Task Force convened by Governor O'Malley in 2012 to address the potential impacts of climate change on Maryland.
[66] NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS, INC., AN ENERGY EFFICIENCY STRATEGY FOR NEW JERSEY 171 (Mar. 2009). *But see* NEW JERSEY MASTER ENERGY PLAN 68 (Dec. 2011) (recommending against using societal benefits). The Energy Efficiency Strategy report was commissioned by the New Jersey Board of Public Utilities to help achieve Master Plan goals by 2020. The Master Energy Plan was prepared by Governor Christie's administration to document its strategic vision for energy in New Jersey.
[67] NEW JERSEY BOARD OF PUBLIC UTILITIES, *supra* note 39, at 4.
[68] JEFF ACKERMANN, COLORADO PUBLIC UTILITIES COMMISSION, ELECTRIC DSM PLANNING AND DESIGN: THE COLORADO REGULATORY EXPERIENCE 32 (May 2010); SYNAPSE ENERGY EFFICIENCY OVERVIEW, *supra* note 58, at 25.