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before

**The New York City Council Committees on Consumer Affairs, Environmental Protection
& Resiliency and Waterfronts Joint Oversight Hearing on the Consolidated Edison
Summer 2019 Service Outages**

September 4, 2019

Chairman Brannan, Constantinades and Espinal and fellow Council Members, thank you for the opportunity to submit my testimony today on this important oversight hearing regarding large-scale power outages in Consolidated Edison's service territory that happened in summer 2019. I am pleased to share my experience as a power engineering and smart grid researcher and professor with you and your constituents, so we can move towards a more efficient, reliable, sustainable and equitable electricity supply in New York City.

The electric power sector entered into a period of dramatic transformation a decade ago. Since then, constantly improving computation, communication, and control technologies in combination with next-generation distributed energy resources – renewables, energy storage, demand-side management, electric vehicles, microgrids, etc – have been shown to advance efficiency, sustainability, reliability and resiliency of electric power supply. **On the other hand, the practical implementation of these new smart grid technologies and resources, with a few notable exceptions such as Consolidated Edison's Brooklyn–Queens Demand Management program, lags far behind due to a variety of factors, most of which are non-technological and can be addressed via innovative policy and regulatory solutions.** Nothing illustrates this point better than wide-spread outages in Manhattan and Brooklyn this summer. Today, **my objective is to provide an overview of these much-needed policy and regulatory solutions that, in my opinion, can improve current electricity supply practices, help ensure reliable and affordable electricity supply, and harness the full potential of emerging smart grid technologies and distributed energy resources, which are currently being underused.**

Reliability and affordability of electricity supply always come together. That is, one can ensure a high level of reliability at an unbearable cost, which unavoidably would be passed down to consumers (in our case, to ordinary New Yorkers, some of whom already struggle with a fairly high cost of living in one of the most expensive places in the world), or one can cheaply operate an unreliable power system. The art of being an electric power utility is in constantly managing risks (e.g. imposed by outages) and costs of mitigating these risks. **The challenge of trading off between risks and costs is that it is impossible, even with the best intentions in mind, to guarantee 100% reliability of complex engineering systems, e.g. urban power grid infrastructure.** Regardless of financial allowances, maintenance and retrofit efforts, investments programs and budgets, power outages are unavoidable and, in the light of aging infrastructure and growing adversarial effects of climate change (e.g. storms, heat waves, etc), it is likely that such outages will occur in the not so distant future with a greater frequency and at a larger scale. **Hence, the conclusion of foremost importance is that an electric power utility should not be judged solely based on its ability to prevent such outages, but also on its ability to swiftly restore electricity supply following a large outage.**

Despite their presence in Consolidated Edison's service territory, smart grid technologies and distributed energy resources have contributed little to none to supply restoration during this summer's outages in Manhattan and Brooklyn. In my opinion, the underlying reasons that must be dealt with sooner rather than later are:

1. Resiliency is not incentivized: **Resiliency, i.e. the ability of a power grid to withstand and, if need be, recover from an infrequent, large-scale outage, is not explicitly accounted for in current rate design practices.** In other words, there is no economic incentive to enhance resiliency of the system and it is not sufficient to provide means for post-outage recovery. The current practice, named Electric Service Reliability Performance Mechanism, penalizes Consolidated Edison for large outages. But the enforced penalty does not adequately reflect the actual value of lost (electric) load and varying resiliency preferences of electricity consumers. For example, under the current practice, Consolidated Edison accrued only a \$5 million charge for the outage in Manhattan on July 13, 2019, that affected ~72,000 customers¹ (the number of affected people on

¹ <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B2D45013-ADA7-4CCF-8896-B854834BD2DB}>

customer premises is estimated at ~200,000, i.e. the penalty is ~\$25 per affected person on customer premises, which is relatively low to this area with a large number of residential, commercial and retail customers²). Notably, although customers affected by this outage were located in six distribution networks, the current practice imposed the \$5 million penalty charge for supply interruptions only in three out of six affected distribution networks. Under such circumstances, forcibly curtailing electricity supply to selective groups of customers may appear more cost-effective, rather than investing in resiliency solutions, which are often capital intensive. Adequately internalizing resiliency of the power grid and resiliency preferences of electricity customers in the current rate design practice will provide **economic incentives for the utility and ratepayers to leverage emerging smart grid technologies and distributed energy resources** to prevent negative societal impacts of large power outages, should they occur.

2. There is no competitive, level-playing field for electricity delivery from alternative (third-party) electricity suppliers (e.g. Energy Service Companies): **The current regulatory framework limits the ability of alternative electricity suppliers** (e.g. aggregators of distributed energy resources or demand response) to compete in electricity delivery on a par with Con Edison. As a result, this cements the monopolistic role of Con Edison and limits competition in the area of electricity distribution. As a result, in the current regulatory framework customers are limited in their choices of electricity supplier (or multiple suppliers) and cannot choose a provider (or multiple providers) that best fit their resiliency preferences. There is no magic pill to instantly create a level-playing field for all potential (virtual or physical) electricity providers, but supply competition can be enhanced by (i) **introducing high-fidelity electricity pricing** (e.g. DLMPs that recognize locational, temporal, stochastic and behavioral attributes of electricity production, distribution and consumption) and (ii) **removing delivery-motivated entry barriers for third-party electricity suppliers and for increasing customer-end autonomy** (e.g. interconnection costs, regulation overburden, utility's information privilege).

² <https://pubs.naruc.org/pub.cfm?id=539BA54E-2354-D714-5116-111FF504C6B8>

3. Consolidated Edison needs to engage with local communities: **Community needs and means, which vary significantly across New York City, must be accounted for while planning for a further deployment of smart grid technologies and distributed energy resources.** Currently, this deployment is extremely capital intensive and, therefore, current long-term grid expansion and modernization practices are grid-centric and mainly focus on cost recovery, while neglecting important social justice factors. These factors are of particular importance in such a socially diverse urban area as NYC and, therefore, current practices must be revisited to ensure equitable access to the resiliency benefits provided by smart grid technologies and distributed energy resources. **This can be achieved by means of city-wide community outreach led by Consolidated Edison to explore a broad range of local sensitivities characterizing electricity supply patterns and resiliency needs of various socio-demographic groups.** The outcomes of this outreach must then be incorporated in grid expansion and modernization practices to avoid socially unjust outcomes.

4. Consolidated Edison should become more accountable and transparent to experts and the public: Since large-scale outages in complex engineering systems are inevitable, **Consolidated Edison must be kept accountable for their actions during both normal operations, as well as before, during, and after small and large outages.** This requires transparency in reporting the process and results of investigating every outage, as well as being transparent for continuous, rather than ad-hoc, audits by stakeholders and domain professionals. One possible approach to ensure a high quality of such audits is to **create a panel of rotating experts from a broad range of professionals and researchers with relevant expertise** (e.g. from leading academic institutions, US DOE National Laboratories, professional organizations) and community activists to systematically review Consolidated Edison's performance with the best public interest in mind.

Taken together, these four recommendations will not guarantee that there will be no events comparable to the outages of this last summer, but they will help ensure that adversarial effects of such outages are reduced.

Thank you for the opportunity to share my experience and recommendations and I would be happy to answer any questions the Committee may have. Should you need any follow up, please feel free to contact me (dvorkin@nyu.edu) or Associate Dean for Communications and Public Affairs Sayar Lonial (sayar.lonial@nyu.edu).