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**Testimony from Yury Dvorkin, Assistant Professor of Electrical and Computer Engineering at the New York University Tandon School of Engineering**

before

**The New York City Council Committees on Consumer Affairs, Environmental Protection, Health, and Resiliency and Waterfronts Joint Oversight Hearing on Consolidated Edison's Summer Preparations and the City's Cooling Needs**

*May 26, 2020*

Good Morning Chairpersons Brannan, Cohen, Constantinades, Levine and all Council Members present. Thank you for the opportunity to testify today at this important oversight hearing regarding **Consolidated Edison's summer preparations and the City's cooling needs**. I am pleased to share with you and your constituents my experience as a professor and power engineering and smart grid researcher. I hope my insights prove valuable as we move towards a more efficient, reliable, sustainable and equitable electricity supply in New York City, especially during and beyond COVID-19 and the strain it has put on our public and private resources. I would also like to acknowledge the National Science Foundation (NSF) for supporting my ongoing research at New York University's Tandon School of Engineering, aimed at better understanding the effects of the COVID-19 outbreak on New York City's infrastructure systems and its ability to provide critical services<sup>1</sup>.

This year, in addition to the usual challenges associated with running a major urban electric power distribution system, Consolidated Edison faces additional barriers and uncertainty imposed by the ongoing COVID-19 pandemic. In Summer 2020, the most significant of these will be social distancing norms and restrictions that can slow down the emergency response and thus increase outage durations<sup>2</sup>. **Consolidated Edison must** revisit its protocols and practices to make sure that social distancing norms practiced by employees do not postpone scheduled maintenance and repairs, nor delay emergency response plans. Meanwhile, the uncertainty arises from two factors:

(i) Lack of accurate demand forecasting tools: Preliminary analyses carried out for the NYISO's system reveals that demand forecast errors have surged in the aftermath of stay-at-home orders. This data-driven analysis indicates that demand forecasting tools that largely use historical electricity consumption data cannot produce accurate forecasts for

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<sup>1</sup> We gratefully acknowledge the NSF Award No. ECCS-2029158 "RAPID: RETrofitting REsiliency Against COVID-19! (RETREAT COVID-19!)" [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=2029158&HistoricalAwards=false](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2029158&HistoricalAwards=false)

<sup>2</sup> As of April 23, 2020, more than 350 Consolidated Edison's employees were tested positively for COVID-19, in part due to a lack of personal protective equipment at early stages of the outbreak. <https://www.utilitydive.com/news/coned-covid-19-cases-grow-past-350-as-utilities-forced-to-adjust-pre-pandem/576606/>

this summer because consumption patterns have changed (e.g., shifts from the commercial to residential sector.)

(ii) Projected increases in residential demand: Due to stay-at-home orders, residential demand has changed its typical cyclic daily profile and, in many cases, has increased. Furthermore, the Mayor's current heatwave plan includes the installation of 74,000 additional air condition units for low-income senior citizens. These units, while providing necessary relief to a vulnerable population group, may further raise the electricity demand and cause additional stress on Consolidated Edison's distribution system.

Given these two factors, it may be difficult to impossible for Consolidated Edison to accurately predict how electricity demand in their system will change in Summer 2020 and when, where and what the actual demand peak will be. Furthermore, one must be aware that demand reductions in one part of the system (e.g., in the commercial sector) does not necessarily enhance the ability to serve increased demand in another part of the system (e.g., in the residential sector) due to various network limits (e.g., voltage and power flow) on the ability to transfer power from one part of the system to another. **Consolidated Edison must**, therefore, must proactively analyze the impact of increased demand and reduced accuracy of demand forecasting tools on their system, including the available transmission capacity to exchange power between different parts of the system.

Electric power distribution infrastructure operated by Consolidated Edison is a complex engineering system and its reliability cannot be 100% guaranteed, despite the best efforts of engineers, managers, and planners. This is of particular importance in Summer 2020, when a large number of people with COVID-19 symptoms will likely not be hospitalized and therefore remain homebound. Hence, it is important to "what-if" every possible contingency and pre-emptively plan for mitigation and corrective actions. **Consolidated Edison must** make this planning transparent and open for public comment and evaluation. One possible approach to ensure transparency and increase Consolidated Edison's preparedness 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, etc.)

As the Mayor recently announced, Consolidated Edison has been involved in implementing the City's heatwave plan, which includes 60 portable generators for emergency deployment in case of outages. Although this backup capacity can be used as a corrective measure to compensate power losses in some local outages, it can hardly be enough to deal with large-scale power outages. For example, last year's outages in Manhattan, Staten Island, Brooklyn, and Queens affected over 100,000 customers in total, and revealed that full recovery of electricity supply under normal circumstances (i.e., without the social distancing that Consolidated Edison's repair crews will have to follow) takes from several hours to several days. While hardly acceptable in normal circumstances, should similar outages occur this year, they will imperil electricity-vulnerable (electricity-dependent) New Yorkers who do not have access to alternative electricity supply. (In general, electricity-vulnerable population groups include children and youth<sup>3</sup>, citizens with pre-

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<sup>3</sup>See for details here:

[https://journals.sagepub.com/doi/full/10.1177/0009922813482762?casa\\_token=ieDjR8ajLkQAA%3AP5eQr0JT0LyqK1ahg-7NzN-hVuUJ116Wb\\_6wXLfZ4smfRDOhLiS87qUWSerSulY7h6itBtoEqzI-](https://journals.sagepub.com/doi/full/10.1177/0009922813482762?casa_token=ieDjR8ajLkQAA%3AP5eQr0JT0LyqK1ahg-7NzN-hVuUJ116Wb_6wXLfZ4smfRDOhLiS87qUWSerSulY7h6itBtoEqzI-)

existing health conditions<sup>4</sup>, and senior citizens<sup>5</sup>, especially from underrepresented groups.) Without thoroughly accounting for the needs of electricity-vulnerable populations groups in planning for contingency, it is impossible to balance the customer equity across the Consolidated Edison's service territory, which is among core principles in the current rate making practice in the State of New York<sup>6</sup>.

In order to further promote equity and social justice in urban resiliency planning, **Consolidated Edison must** proactively prepare to address the needs of these vulnerable population groups, in part by engaging with local communities to better understand their needs. This can be done by surveying existing customers while respecting their privacy (e.g., using regular mail and online billing) a project that can be expedited via city-wide community outreach led by Consolidated Edison to explore a broad range of local sensitivities characterizing electricity supply patterns and the resiliency needs of various socio-demographic groups. Based on this survey, **Consolidated Edison must** be prepared to immediately assist its customers from vulnerable population groups as soon as any power outage is reported. The outcomes of this outreach must then be incorporated in their pre-emptive planning for mitigation and corrective actions.

Taken together, these recommendations will not guarantee that there will be no events comparable to the outages of last summer, but they will help ensure that the adverse impacts of such outages are reduced, especially on vulnerable population groups.

Thank you for the opportunity to share my experience and recommendations. I would be happy to answer any questions the Committees may have. Should you have any additional questions, please feel free to contact me ([yvd204@nyu.edu](mailto:yvd204@nyu.edu)) or Associate Dean for Communications and Public Affairs Sayar Lonial, ([sayar.lonial@nyu.edu](mailto:sayar.lonial@nyu.edu)).

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<sup>4</sup> See for details here:

[https://journals.sagepub.com/doi/full/10.1177/0009922813482762?casa\\_token=ieDjR8ajLkQAAAAA%3AP5eQr0JT0LyqK1ahg-7NzN-hVuUJ116Wb\\_6wXLfZ4smfRDOhLiS87qUWSerSulY7h6itBtoEqzI-](https://journals.sagepub.com/doi/full/10.1177/0009922813482762?casa_token=ieDjR8ajLkQAAAAA%3AP5eQr0JT0LyqK1ahg-7NzN-hVuUJ116Wb_6wXLfZ4smfRDOhLiS87qUWSerSulY7h6itBtoEqzI-)

<sup>5</sup> See for details here: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5007208/>

<sup>6</sup> See for details here: [file:///Users/yurydvorkin/Downloads/%7BA0BF2F42-82A1-4ED0-AE6D-D7E38F8D655D%7D%20\(1\).pdf](file:///Users/yurydvorkin/Downloads/%7BA0BF2F42-82A1-4ED0-AE6D-D7E38F8D655D%7D%20(1).pdf)