

**Before the Massachusetts Senate  
Committee on Global Warming and Climate Change**

**Hearing on Climate Resilience of Transportation and Electric Infrastructure**

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Thank you, Chair Creem, Vice Chair Barrett, Ranking Member O'Connor, and distinguished members of the committee for inviting me to participate in today's hearing.

My name is Romany Webb. I am an Associate Research Scholar at Columbia Law School and Senior Fellow at the Sabin Center for Climate Change Law. The Sabin Center is a founding member of the Initiative on Climate Risk and Resilience Law, which aims to drive legal innovation to address the consequences of climate change.<sup>1</sup>

I am the lead author of a 2020 report, jointly published by the Sabin Center and Environmental Defense Fund, titled "Climate Risk in the Electricity Sector: Legal Obligations to Advance Climate Resilience Planning by Electric Utilities."<sup>2</sup> I also co-authored a 2018 report on "Climate Change Impacts on the Bulk Power System."<sup>3</sup> Those reports inform my remarks today.

I would like to make two key points today. First, climate change poses serious risks to the electricity system, which are fundamentally different from other risks, including ordinary weather-related risks, that electric utilities have had to deal with in the past. Second, and as a result, electric utilities need new approaches to plan for and manage climate-related risks.

As recent events have clearly demonstrated, electricity infrastructure is highly vulnerable to the impacts of climate change, including more frequent and severe storms and other extreme weather events, as well as non-event based impacts, such as increasing average temperatures and changing precipitation patterns.

These concerns are not theoretical. As an example, the U.S. Energy Information Administration reports that in June 2021 Massachusetts generated over 80% of its electricity from natural gas.<sup>4</sup> Most natural gas generating plants are designed to operate at 59°F and may experience efficiency reductions of up to 1% for

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<sup>1</sup> For more information about the Initiative on Climate Risk and Resilience Law, see <https://www.icrll.org/>.

<sup>2</sup> ROMANY M. WEBB ET AL., CLIMATE RISK IN THE ELECTRICITY SECTOR: LEGAL OBLIGATIONS TO ADVANCE CLIMATE RESILIENCE PLANNING BY UTILITIES (2020), <https://perma.cc/GFK2-HFFF>.

<sup>3</sup> JUSTIN GUNDLACH AND ROMANY M. WEBB, CLIMATE CHANGE IMPACTS ON THE BULK POWER SYSTEM: ASSESSING VULNERABILITIES AND PLANNING FOR RESILIENCE (2018), <https://perma.cc/HTW5-4XME>.

<sup>4</sup> U.S. Energy Information Administration, *Massachusetts Net Electricity Generation by Source, Jun. 2021*, MASSACHUSETTS STATE PROFILE AND ENERGY ESTIMATES, <https://perma.cc/K9AS-KAWF> (last visited Sep. 23, 2021).

each 1.8°F increase in temperature.<sup>5</sup> Maximum summer temperatures in Massachusetts are projected to increase by up to 6.7°F within the next three decades.<sup>6</sup> This could have a major impact on generator efficiency and thus output. At the same time, higher temperatures will also drive up demand for electricity. And all of this will occur in the context of the broader energy transition, which will require the shrinking of the natural gas system and expanded electrification, placing added pressure on the electricity system.

As this example demonstrates, the impacts of climate change will affect the electric system in multiple, compounding ways. Other interdependent sectors, such as upstream energy production and water supply, will also be affected by climate change. This could further exacerbate effects on the electric system, increasing the potential for outages.

Electricity outages pose grave risks to public health and safety, as witnessed in Texas following Winter Storm Uri, when outages tragically contributed to dozens of deaths. A recent study found that outages during heatwaves could expose over two-thirds of the urban population in large U.S. cities to elevated risk of heat exhaustion and/or heat stroke.<sup>7</sup> Low income communities and communities of color are at greatest risk from outages, including because they often have limited ability to invest in back-up generation.

In addition to the human cost, there are also significant economic costs. For example, National Grid reported incurring over \$200 million in storm-related costs in the U.S. in the year ended March 31, 2021.<sup>8</sup> Climate change is projected to materially increase utility storm costs.<sup>9</sup> Utilities could also face new costs, for example, where climate impacts necessitate the early retirement or retrofitting of assets.<sup>10</sup> These costs will almost always be borne by the end-customer, who will also have to suffer through more frequent, widespread, and longer-lasting outages.

Effectively addressing the risks posed by climate change will require changes in electricity system planning. Electric utilities typically base planning on historic weather data which, in the age of climate change, is not a good predictor of future conditions. Electric utilities must instead use forward-looking data that reflect anticipated future climate conditions in their local area. Importantly, however, simply plugging forward-looking data into existing planning tools is not sufficient. Because climate change poses new risks to the electricity system, a new approach to planning is needed.

Our 2020 report – *Climate Risk in the Electricity Sector* – recommends that electric utilities engage in a process of climate resilience planning that is specifically designed to identify and address climate-related risks. The process involves two key steps. First, each utility must conduct a climate vulnerability assessment, using forward-looking climate projections to identify where and under what conditions their assets are at risk from the impacts of climate change, how those risks will manifest, and what the consequences will be for

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<sup>5</sup> JAYANT SATHAYE ET AL., ESTIMATING RISK TO CALIFORNIA ENERGY INFRASTRUCTURE FROM PROJECTED CLIMATE CHANGE 9-50 (2011), <https://perma.cc/EX2M-8828>.

<sup>6</sup> *Rising Temperatures*, MASSACHUSETTS CLIMATE CHANGE CLEARINGHOUSE, <https://perma.cc/9OMS-BCKE> (last visited Sep. 30, 2021).

<sup>7</sup> Brian Stone Jr. et al., *Compound Climate and Infrastructure Events: How Electric Grid Failure Alters Heat Wave Risk*, 55 ENVIRON. SCI. TECHNOL. 6857 (2021).

<sup>8</sup> NATIONAL GRID, ANNUAL REPORTS AND ACCOUNTS 2020/21 256 (2021), <https://perma.cc/9ESR-VV27>.

<sup>9</sup> Sarah Brody et al., *Why, and How, Utilities Should Start to Manage Climate-Change Risk*, MCKINSEY & CO. INSIGHTS (Apr. 24, 2019), <http://perma.cc/R84Q-YKMY>.

<sup>10</sup> Charles Fant et al., *Climate Change Impacts and Costs to U.S. Electricity Transmission and Distribution Infrastructure*, 195 ENERGY 7 (2020), <https://perma.cc/QN2J-D4VQ>.

system operation. Second, based on the findings of vulnerability assessment, each utility must also develop a climate resilience plan that identifies and evaluates measures to reduce the risk to vulnerable assets.

Although the Massachusetts Department of Public Utilities could take a variety of actions to spur climate resilience planning, current DPU regulations do not expressly require it. There is a requirement for electric utilities to prepare emergency response plans<sup>11</sup> but those plans focus on short-term measures to prepare for, and respond to, one-off events. It is imperative that utilities also engage in a separate process of climate resilience planning, wherein they examine the full range of risks posed by climate change, including non-event based risks, over the short-, medium-, and long-term.

To date, utilities in Massachusetts have not engaged in regular, comprehensive climate resilience planning. Where they have considered climate-related risks, many utilities have focused on issues associated with the energy transition, and paid little attention to the consequences of climate change. For example, much of Eversource's 2018 "climate adaptation plan" focused on actions the utility is taking to reduce its greenhouse gas emissions, with only a cursory discussion of its exposure to physical risks from climate change.<sup>12</sup> The plan described some climate impacts expected to occur in Eversource's service territory, but did so in extremely general terms, and did not provide or even reference specific climate projections. Additionally, while the plan identified five asset categories at high risks from climate change, only one was the subject of a detailed quantitative exposure assessment.

This is a common problem among electric utilities. As detailed in our 2020 report, several utilities have based their climate resilience plans on historic weather data, which does not reflect future climate impacts. Others have focused on just one or a few climate impacts or only studied risks to one or a few types of assets. These utilities are, in the words of the U.S. Department of Energy, likely "underestimating [their] vulnerability to future climate change impacts."<sup>13</sup> This, in turn, exposes utility customers to increased risks and costs.

To sum up: climate change poses significant and growing risks to electricity systems. To protect their customers, electric utilities must prepare for climate-related risks by developing and regularly updating climate vulnerability assessments and resilience plans. Thank you.

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<sup>11</sup> 220 MASS. CODE REGS. § 19.04.

<sup>12</sup> NSTAR Electric Company d/b/a Eversource Energy, Performance Metrics for the Performance-Based Rating Mechanism Compliance Filings Submitted to Massachusetts Department of Public Utilities, Appendix B (Mar. 1, 2018).

<sup>13</sup> U.S. DEP'T OF ENERGY, A REVIEW OF CLIMATE CHANGE VULNERABILITY ASSESSMENTS: CURRENT PRACTICES AND LESSONS LEARNED FROM DOE'S PARTNERSHIP FOR ENERGY SECTOR CLIMATE RESILIENCE 12 (2016), <https://perma.cc/5EKK-T9GA>.