CONVERGE COVID-19 Working Groups for Public Health and Social Sciences Research

Research Agenda-Setting Paper

This paper was written to help advance convergence-oriented research in the hazards and disaster field. It highlights areas where additional research could contribute new knowledge to the response to and recovery from the pandemic and other disasters yet to come. Questions about the research topics and ethical and methodological issues highlighted here should be directed to the authors who contributed to this paper.

Working Group Name:

Electricity Usage and COVID-19

Working Group Description:

Energy and society are intricately linked. The stay-at-home orders issued to protect the population from exposure to the COVID-19 are also reshaping the way we live and work, with potentially significant and lasting impacts to how we use electricity. At the same time, keeping electricity flowing is critical to a functioning healthcare system and the broader social system. We are exploring these changes in electricity usage and what they might mean for society going forward.

Priority Research Topics and Specific Research Questions:

Priority Research Topics	Potential Research Questions
1. Change in electricity demand during the COVID-19 pandemic.	• Research Question 1: How has overall electricity demand changed over time? • Research Question 2: How have patterns of demand consumption changed (e.g., sectoral loads, daily load shapes)?
2. Drivers of electricity demand change during the COVID-19 pandemic.	• Research Question 1: What are the main drivers of electricity demand change? • Research Question 2: How do changes in electricity demand relate to COVID-related health impacts (infection rates, fatalities, etc.)? Government restrictions? Mobility changes? Media coverage? Local and regional economies?
3. Impacts of electricity demand change during the COVID-19 pandemic.	• Research Question 1: How have grid operators responded? • Research Question 2: How has demand forecasting been affected? • Research Question 3: To what extent have grid operations around the world been able to adapt to these changes? • Research Question 4: Do changes persist over time or will electricity usage go back to pre-pandemic levels?

	• Research Question 5: Will existing trends (e.g., to localized, renewable generation) continue? • Research Question 6: What do demand and energy price changes mean long-term for the mix of generation sources flowing to the grid? What do they mean for carbon emissions?
4. Impacts of the pandemic on electricity access, energy poverty, vulnerable groups.	• Research Question 1: How has the pandemic affected electricity access, energy security and energy poverty, particularly for vulnerable groups? • Research Question 2: How has the pandemic affected the impacts of electricity generation on vulnerable groups?

Ethical / Methodological Considerations:

Because electricity generation and consumption touches so many aspects of our lives, modeling the impacts of the pandemic on electricity usage and claiming causality can be difficult. Multiple aspects—weather, seasonality, sectoral mix, human behavior—come into play. Attempts must be made to adequately account for these and myriad other contextual variables. It will also be important to move beyond kilowatt-hours and explore how human behavior is changing in response to the pandemic in ways that may affect electricity usage. Many aspects of the response to the virus have exposed existing inequalities in the healthcare system; the energy sector is certainly not immune to such inequalities. We will want to pay close attention to the implications of changes in the electricity system may affect those most vulnerable to fluctuations in power availability.

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This COVID-19 Working Group effort was supported by the National Science Foundation-funded Social Science Extreme Events Research (SSEER) network and the CONVERGE facility at the Natural Hazards Center at the University of Colorado Boulder (NSF Award #1841338). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF, SSEER, or CONVERGE.