Fact Sheet

The Issue

As California enters its fourth year of a record breaking drought, with accompanying increased temperatures, reduced snowpack and more frequent wildfires, the impacts of what climate change has in store for the region is evident. For the past decade, California has led the U.S. in climate change mitigation strategies, with the passage of AB 32, mandating GHG reductions to 1990 levels by 2020. More recently, Governor Brown has called for a decrease in greenhouse gas emissions by 40% under 1990 levels by 2030. At a more local level, Los Angeles County region is identifying important climate and sustainability strategies, including conducting community GHG inventories for every city within the County, developing a County Climate Action Plan, and creating a Framework for climate action for local governments. Because it is such a vast and geographically diverse region, the impacts of climate change will be experienced differently across neighborhoods. Until recently however, understanding the localized effects of climate change and the impacts on communities has been difficult to assess. The Los Angeles region has prioritized research to provide regionally relevant climate projections (Hall, 2012). Research predicts the Los Angeles region will be warmer by 3-5 °F annually by mid-century, and will have an increase in the number of “extreme heat days” varying regionally, with some cities experiencing up to 5-6 times their current levels. What is still unknown however, and what remains to be studied, is how these increases in temperature will affect the electric grid.

At present, Southern California Edison and other California utilities are developing plans to upgrade the grid to integrate a greater share of renewables and move towards distributed generation. However, it is important to take into consideration that these heat events will have differential effects on communities and the electricity system: already vulnerable communities will be more sensitive to the health risks and financial strains of increased heat, neighborhoods that historically have not needed air conditioning may increase installations, and power outages may occur as peak demand for energy use strains the capacity of the existing electricity grid. If left unaddressed, this can have major consequences on the economy, local government’s resources to respond, and people’s livelihoods and well-being.

Project Description

This project will develop a sophisticated and in depth description of future demand, grid response, and vulnerability due to increased (and prolonged) heat events in Southern California Edison territory under current and future climate scenarios. It will enable innovative grid management and operation strategies and will identify adaptation guidance. Building on Dr. Hall’s climate modeling work in Los Angeles County, researchers will identify extreme heat events, develop statistical regressions and modeling to evaluate how consumption and demand has varied and the impacts to the grid across SCE territory based on temperature changes.
They will evaluate how these heat incidences lead to strain on stations and sub-stations, and whether they trigger peaker plant generation (which causes greater GHG emissions, in-basin air pollution, and other related impacts). Researchers will then use this analysis paired with future climate scenarios to predict increase in energy demand and identify future grid vulnerabilities under increased heat events. Ultimately, this research will prepare utilities, the State, and local governments to better prepare for the here-to-unknown (but inevitable) strain resulting from the demand in increased electricity consumption due to heat events caused by climate change.

The project requires a multi-disciplinary team with unique skill sets, including those of climate scientists, energy experts, urban planners, geo-spatial experts, and civil engineers. The project will provide:

- Downscaled global climate models of future extreme heat events in Los Angeles County
- A report on the expected electricity demand increases due to average temperature increases and extreme heat events under different climate scenarios.
- A report of grid vulnerability, with suggestions for adaptation to guide future planning and investment
- GIS map visualizations of research findings and analysis, which will enhance local governments and SCE’s public outreach and stakeholder engagement. The map and accompanying data will comply with PUC privacy guidelines and will be made available to the public.
- Coordinated outreach and education public displays that protect privacy, (and potentially more classified documents for the IOUs and the CEC)

**Anticipated Benefits for California**

This project will contribute to increasing the grid’s efficiency, reliability, and resilience, by assessing the vulnerability to extreme heat events of the current electricity system, including of critical substations and transmission lines. This analysis will allow the research team to assess where potential problem spots can be found across Los Angeles County. As a result, policymakers and utilities alike will be able to adopt mitigation and resilience strategies and target investments in the grid, leading to increased safety for ratepayers. Additionally, this project will serve to help identify those communities most affected by climate change-related heat events and will help to formulate effective and targeted responses. As a result, this research can help guide investments in electricity infrastructure, distributed generation and renewables and help utilities develop further energy conservation and efficiency programs. All of these efforts contribute to meeting the state’s ambitious energy savings and greenhouse gas emission goals. Furthermore, this project may lead to decreasing costs for ratepayers, by providing utilities and policymakers with information on where to make smart investments such that they may develop cost-effective models for transitioning to a more resilient grid.

**Project Specifics**

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