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Climate Change in Los Angeles County: Grid Vulnerability to Extreme Heat

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CLIMATE CHANGE IN LOS ANGELES COUNTY: GRID VULNERABILITY TO EXTREME HEAT

A Report for:

California's Fourth Climate Change Assessment

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Edmund G. Brown, Jr., Governor

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Local Temperature Change Electricity Demand Changes Electricity Supply Infrastructure

How and where might rising temperatures create bottlenecks in the Los Angeles grid?



Δ



Temperature Change



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Historical temperatures (1981-2000)



Future Scenarios

2040-2060 (RCP 4.5)

2040-2060 (RCP 8.5)



ΔTmax (°C) 1 - 1.5





Demand Change



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Building Energy Modeling







Population Change



AC Saturation & Turnover



Appliance Efficiency ک



Final report Figure 12. Composite peak demand projections for base and future period high and low scenarios.



California 4th Climate Assessment 13 September 2018





Final report Figure 12. Composite percent change projections for base and future period high and low scenarios.



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High

Percent Change

Low



Infrastructure & Supply



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Delivery Infrastructure



Substations



Transmission Lines



Generation



Final report Figure 23. Map of worst-case losses in plant capacity for composite temperatures in 2060 RCP 8.5.

Substations



Final report Figure 25. Map of worst-case losses of substation capacity for composite temperatures in 2060 RCP 8.5.

Substation Risk



Final report Figure 32. Maps of substation risks in 2060. Future substation load factors derated for composite worst-case 2060 heat waves.

Vulnerability



Final report Figure 36. Map of worst-case percent derating in lines and substations from historical heat waves overlaid with present substation load factors.

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