Temperature Trends Across IOU Planning Areas

Kelvin Ke

September 30, 2021

Data

- 1985-2021 summer (June-September) weighted daily temperature for 3 TACs
  - PGE: Oakland, San Jose, Ukiah, Red Bluff, Sacramento, Fresno
  - SCE: Burbank, Long Beach, Santa Barbara, Bakersfield, Riverside
  - SDGE: San Diego, Miramar, Santee

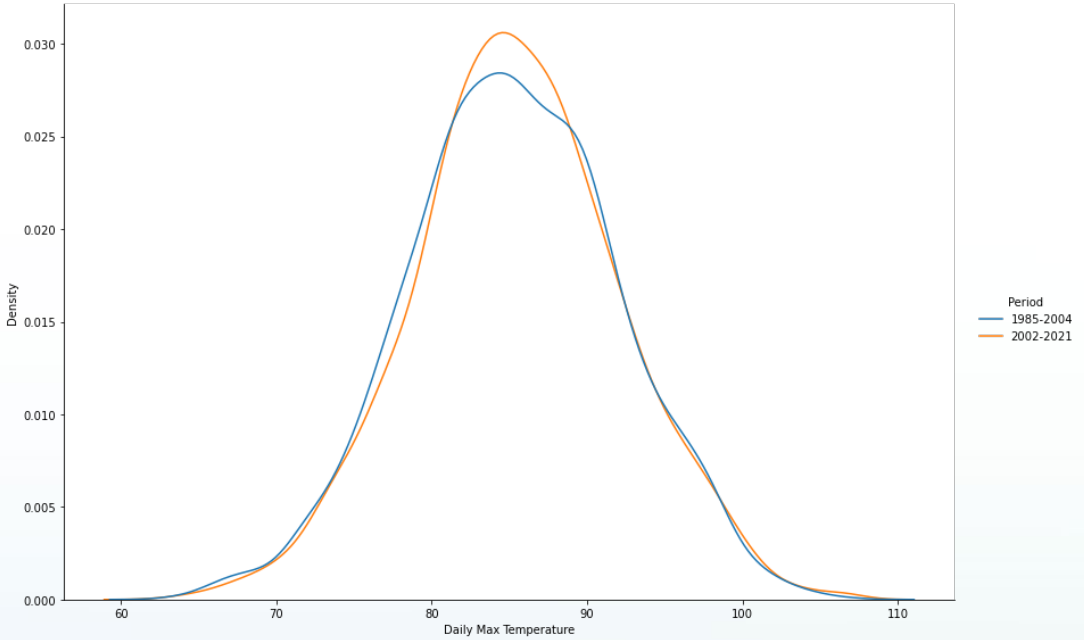
- Same weather data is used for demand forecasts

Methodology

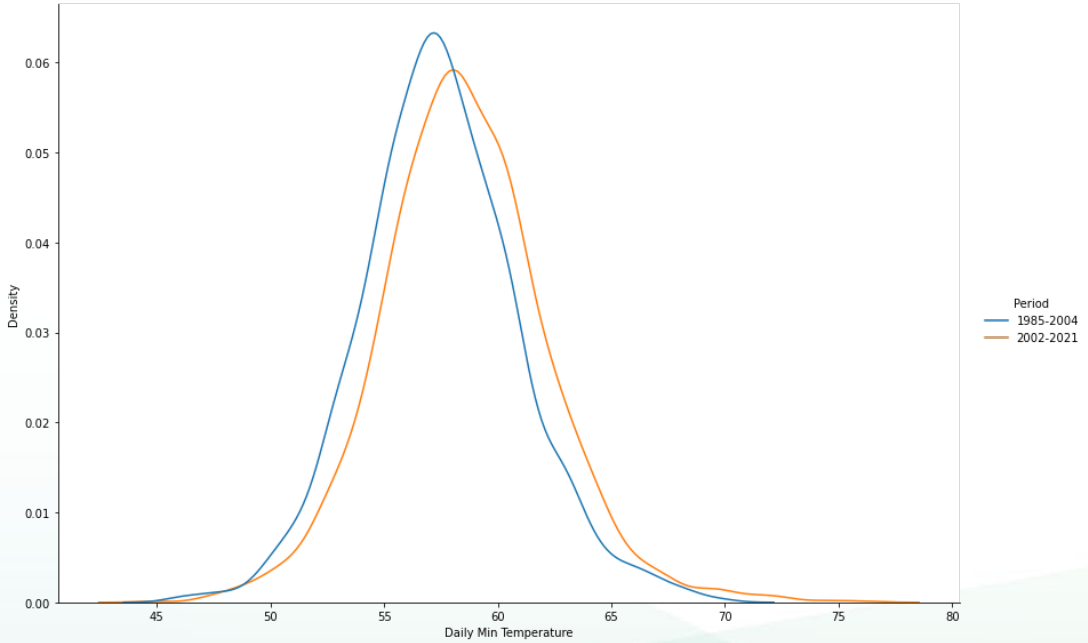
- Divide temperatures into two 20-year periods: 1985-2004, 2002-2021.
- A 30-year period is commonly used in climate change studies, but 20 years is used in this analysis to focus on recent years.
- Generate Kernel Density Estimate plots to compare the climate conditions between two periods.

PG&E Summer Temperature Change

Daily Maximum Temperatures



Daily Minimum Temperatures

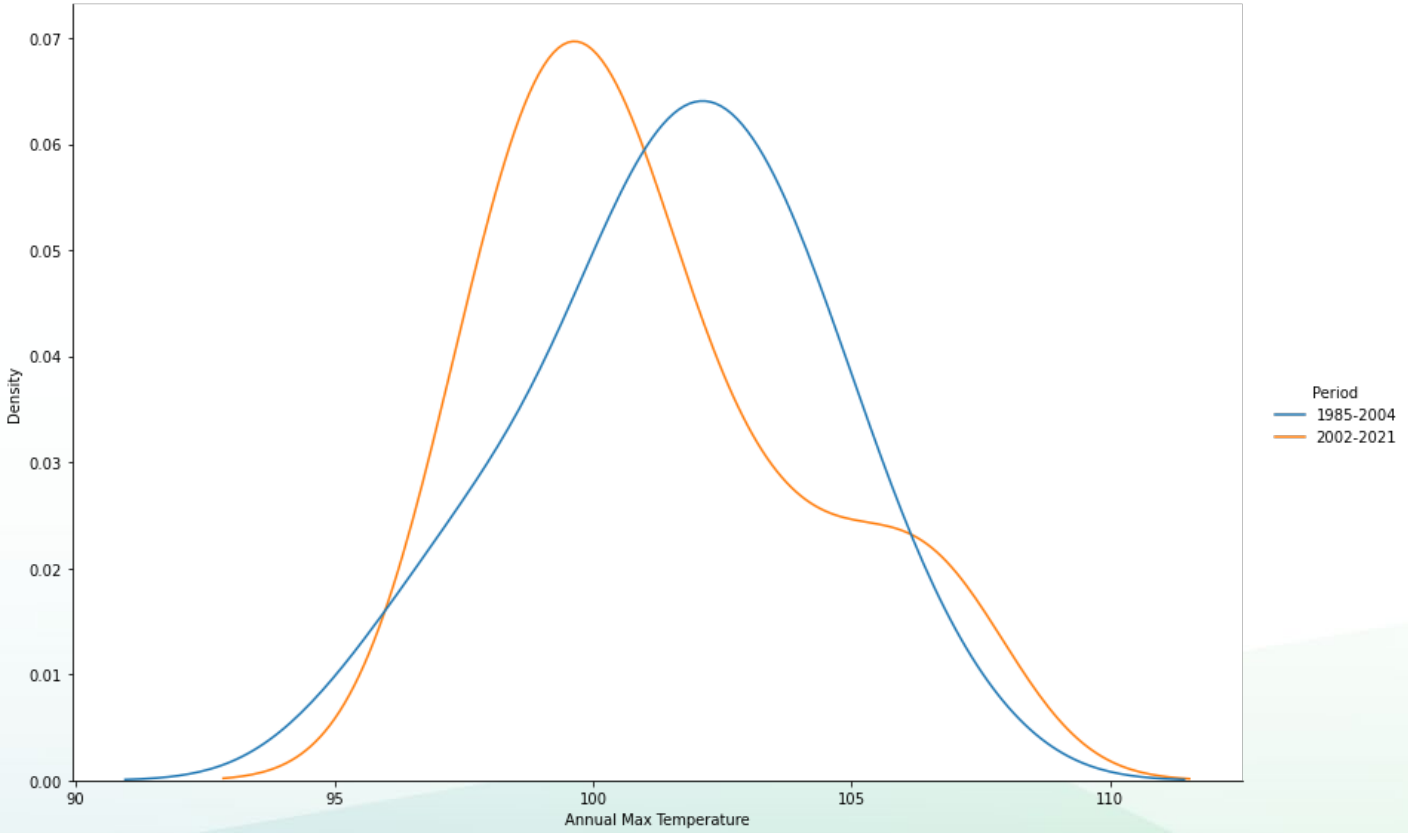


- Daily maximum temperatures remained steady in recent years, while daily minimum temperatures significantly shifted higher, which raised average temperatures.

PG&E Summer Temperature Change

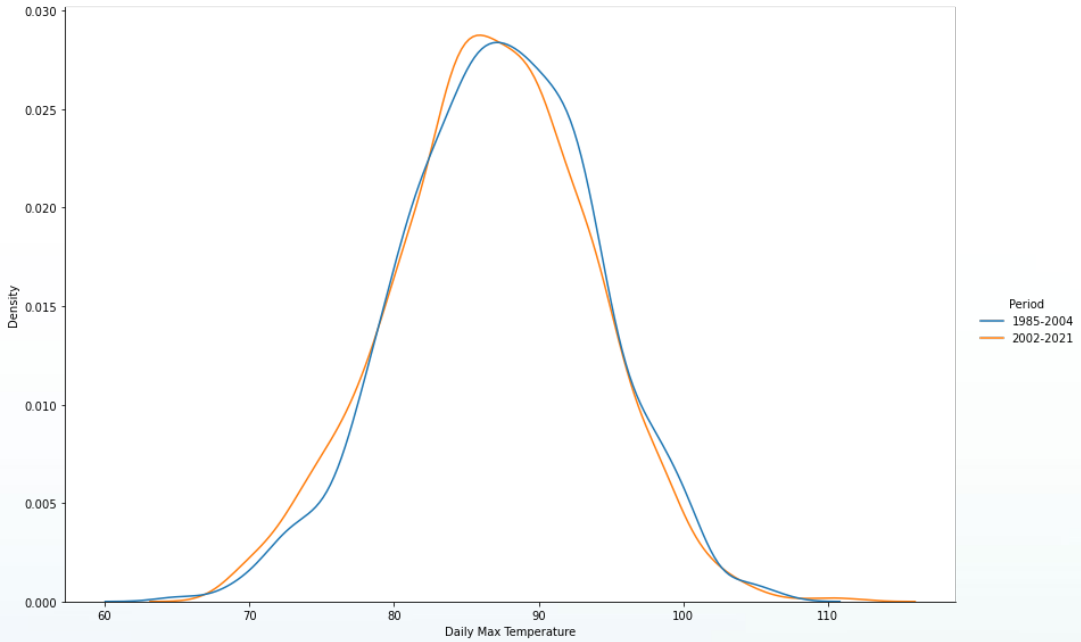
- Annual maximum temperature indicate the most extreme event of the years.
- The right tail of the plot indicate the chance of more extreme events and temperature has increased.

Annual Maximum Temperatures

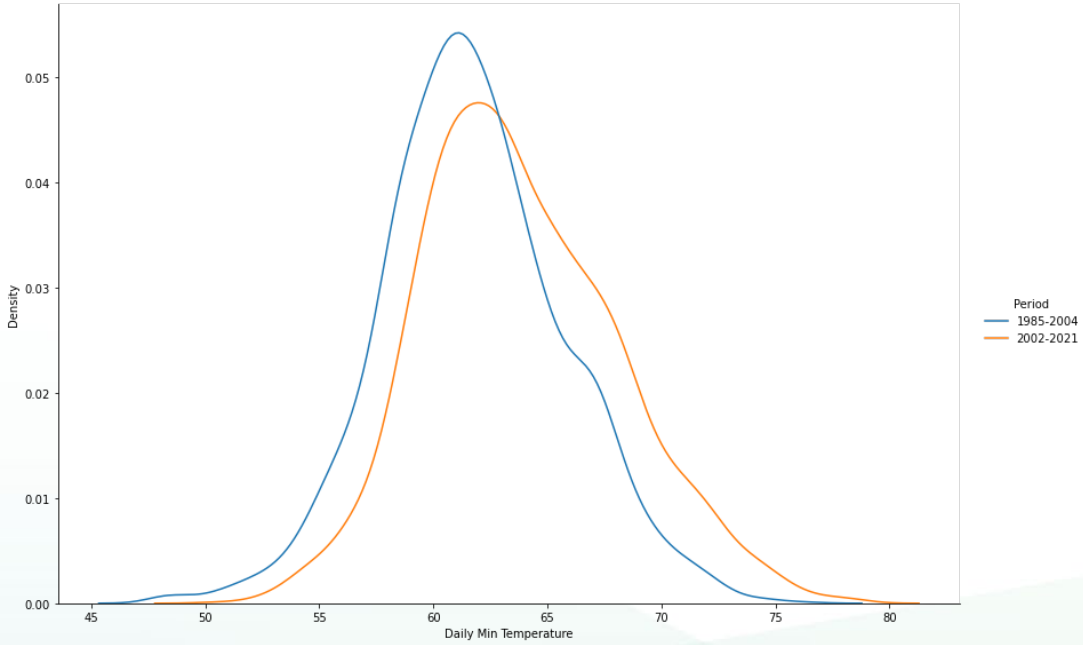


SCE Summer Temperature Change

Daily Maximum Temperatures



Daily Minimum Temperatures

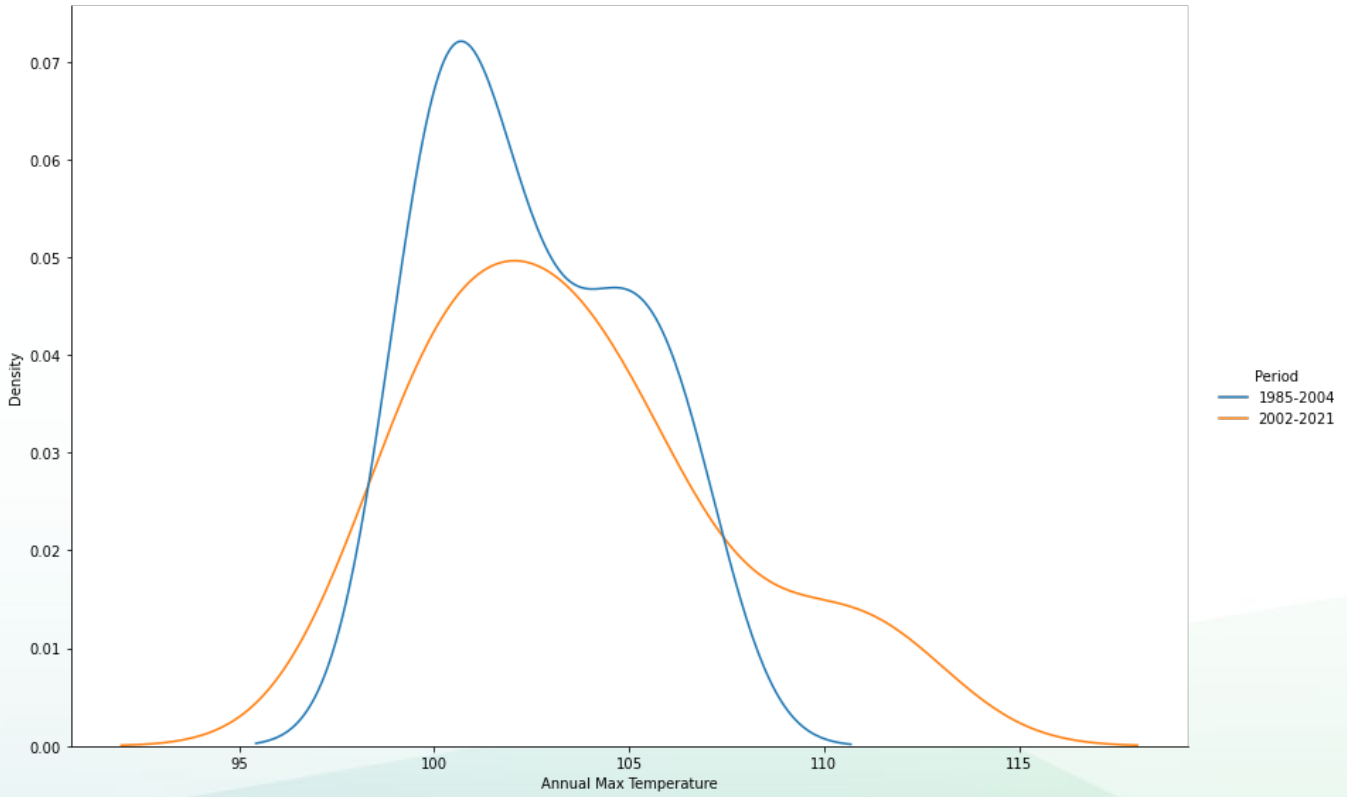


- Similar trend as PG&E, but daily minimum temperatures shifted much higher.

SCE Summer Temperature Change

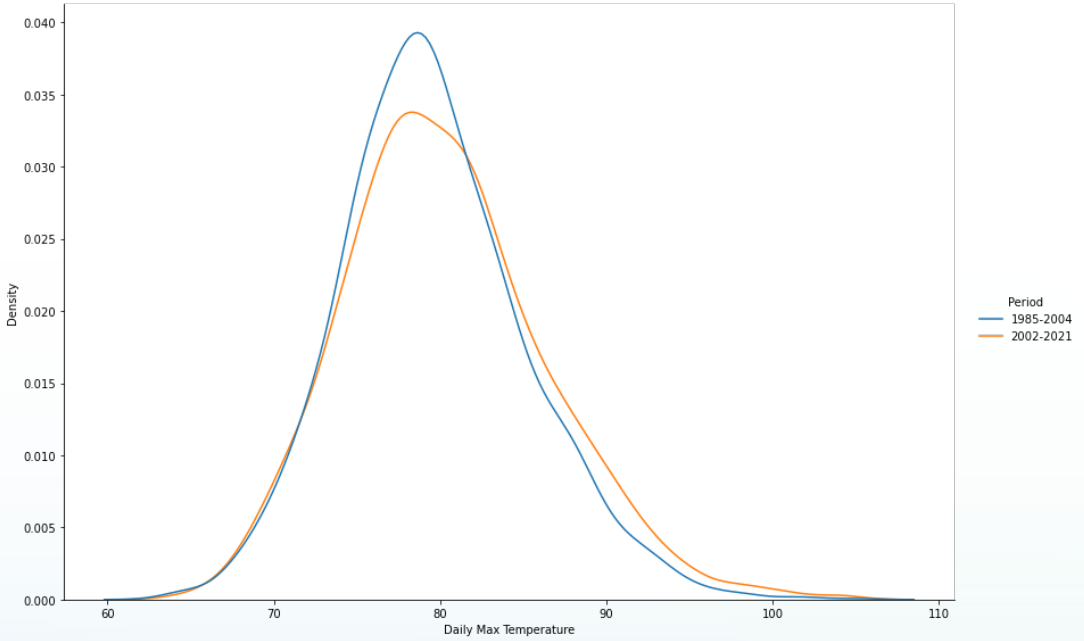
- A more extreme event (>110 Degree day) occurs more frequently
- The median of the distribution is shifting slightly rightward.

Annual Maximum Temperatures

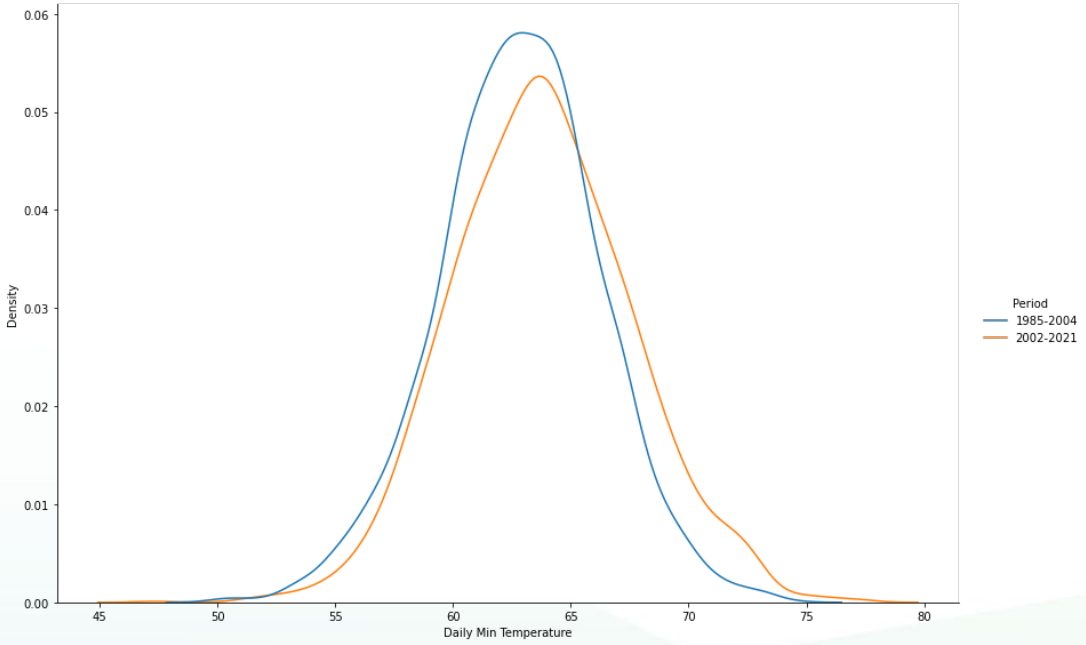


SDG&E Summer Temperature Change

Daily Maximum Temperatures



Daily Minimum Temperatures

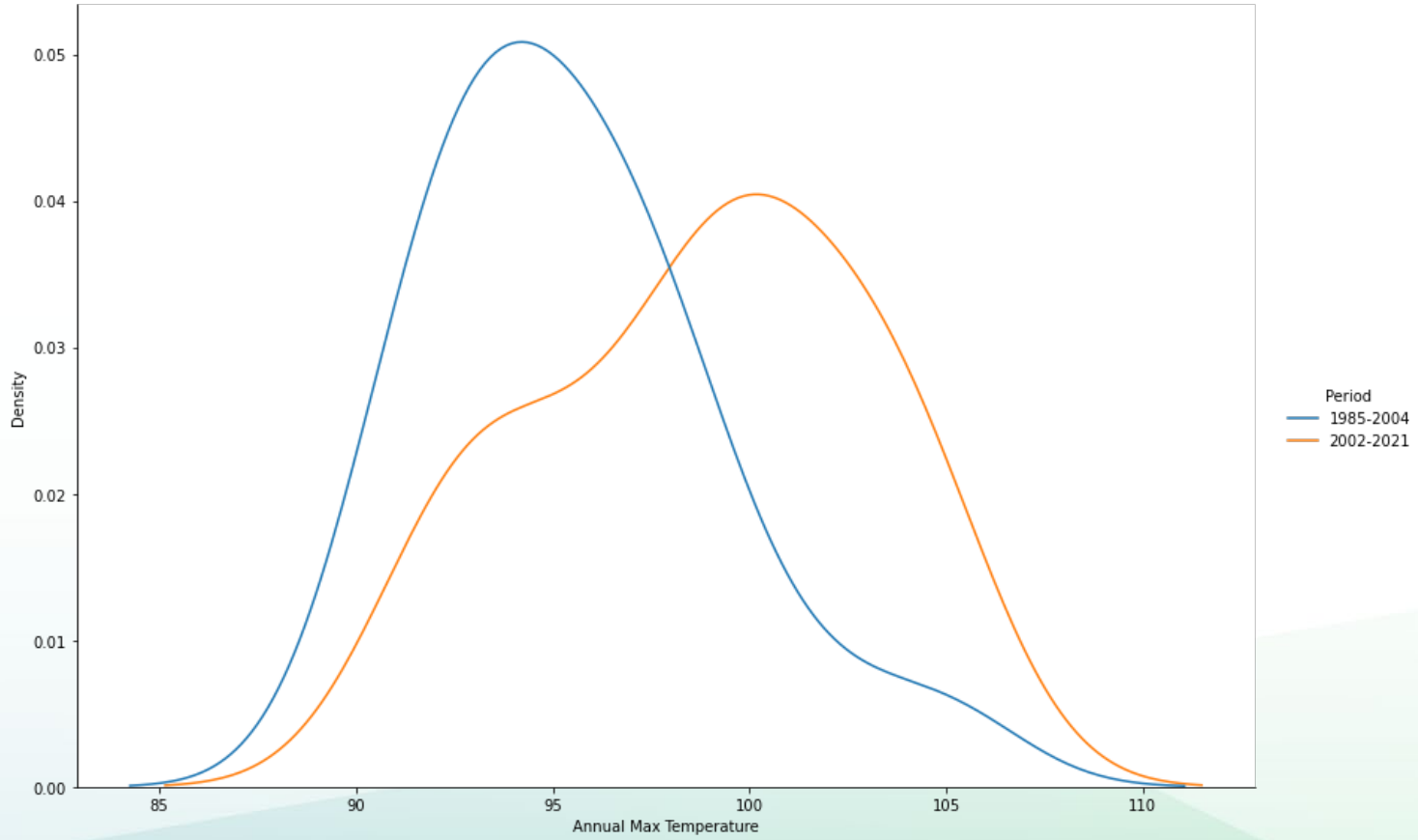


- Overall temperature change is larger for SDG&E, with both daily maximum and minimum temperatures significantly shifted higher.

SDG&E Summer Temperature Change

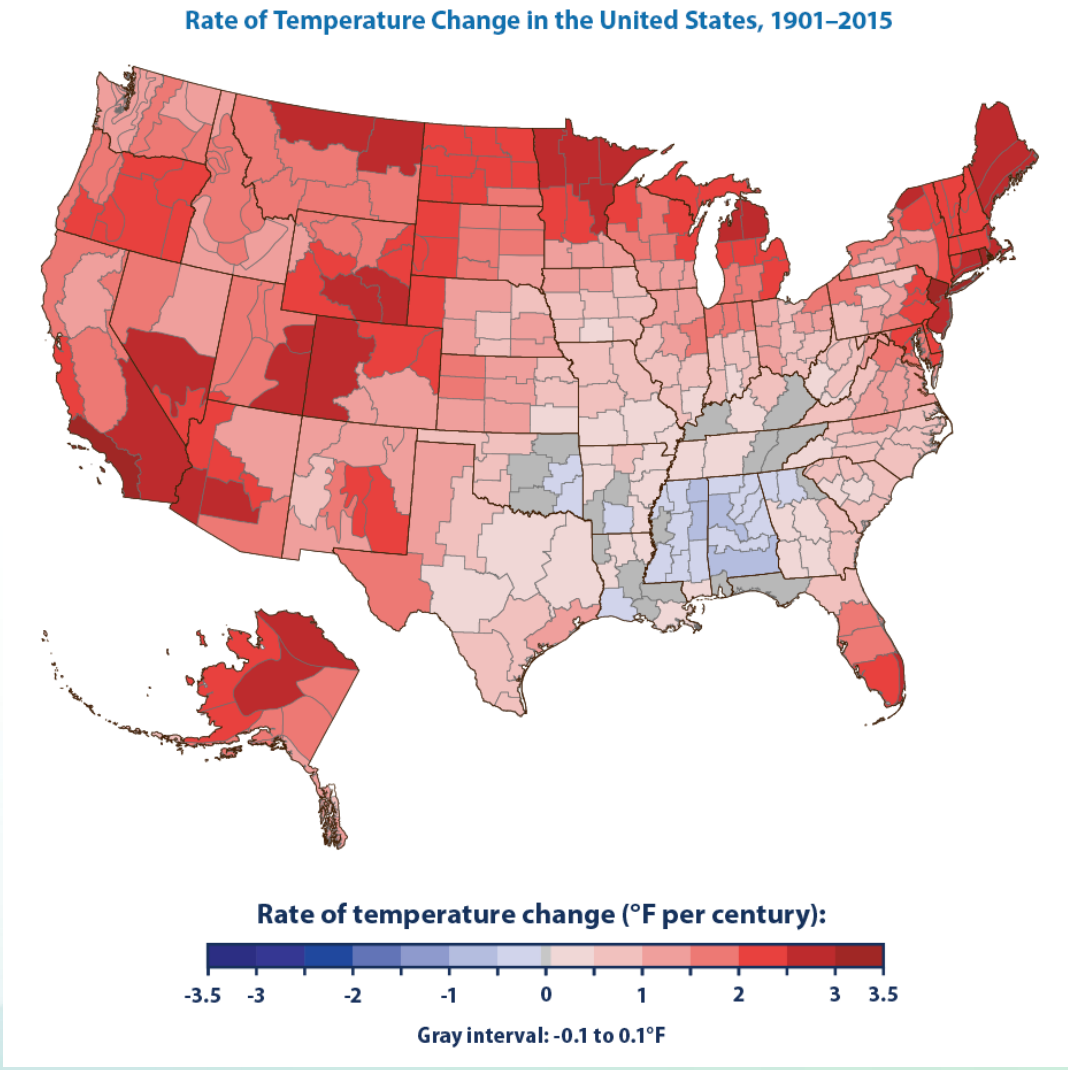
- Extreme events, >100 degrees, are more likely to occur
- The median of the distribution is shifting rightward.

Annual Maximum Temperatures



EPA Climate Change Indicator

- EPA Climate Change Indicators data shown similar trend of temperature change in California.
- Southern Coast (SDG&E, and part of SCE) has a much higher climate change impact than the North (PG&E).



U.S. EPA 2017: https://19january2017snapshot.epa.gov/climate-indicators/climate-change-indicators-us-and-global-temperature_.html

Thank You!