



**Silicon Valley 2.0 Climate Hazard Fact Sheet:
Extreme Heat in Santa Clara County**

Extreme Heat

This fact sheet provides a snapshot of potential impacts, including economic risks, of extreme heat on people and assets across Santa Clara County ("County"). The assessed assets fall into seven categories, which include Buildings and Parcels, Communications, Energy, Shoreline Flood Protection, Solid and Hazardous Waste, Transportation, and Wastewater Treatment Facilities. For more details on the vulnerabilities and economic risks from the four available extreme heat scenarios, as well as additional information on the analysis methodology, including the social vulnerability analysis, please visit the [Silicon Valley 2.0 Climate Change Preparedness Decision Support Tool \(SV 2.0\)](#).

Climate Hazard Overview

With countywide temperatures projected to reach 108-112°F by mid-century, extreme heat has the potential to negatively impact public health and safety for all County residents, with socially vulnerable communities including outdoor workers being particularly affected. Extreme heat may also lead to increased wear and tear on critical infrastructure such as highways, rail lines, and airport runways.

Community and Health Impacts

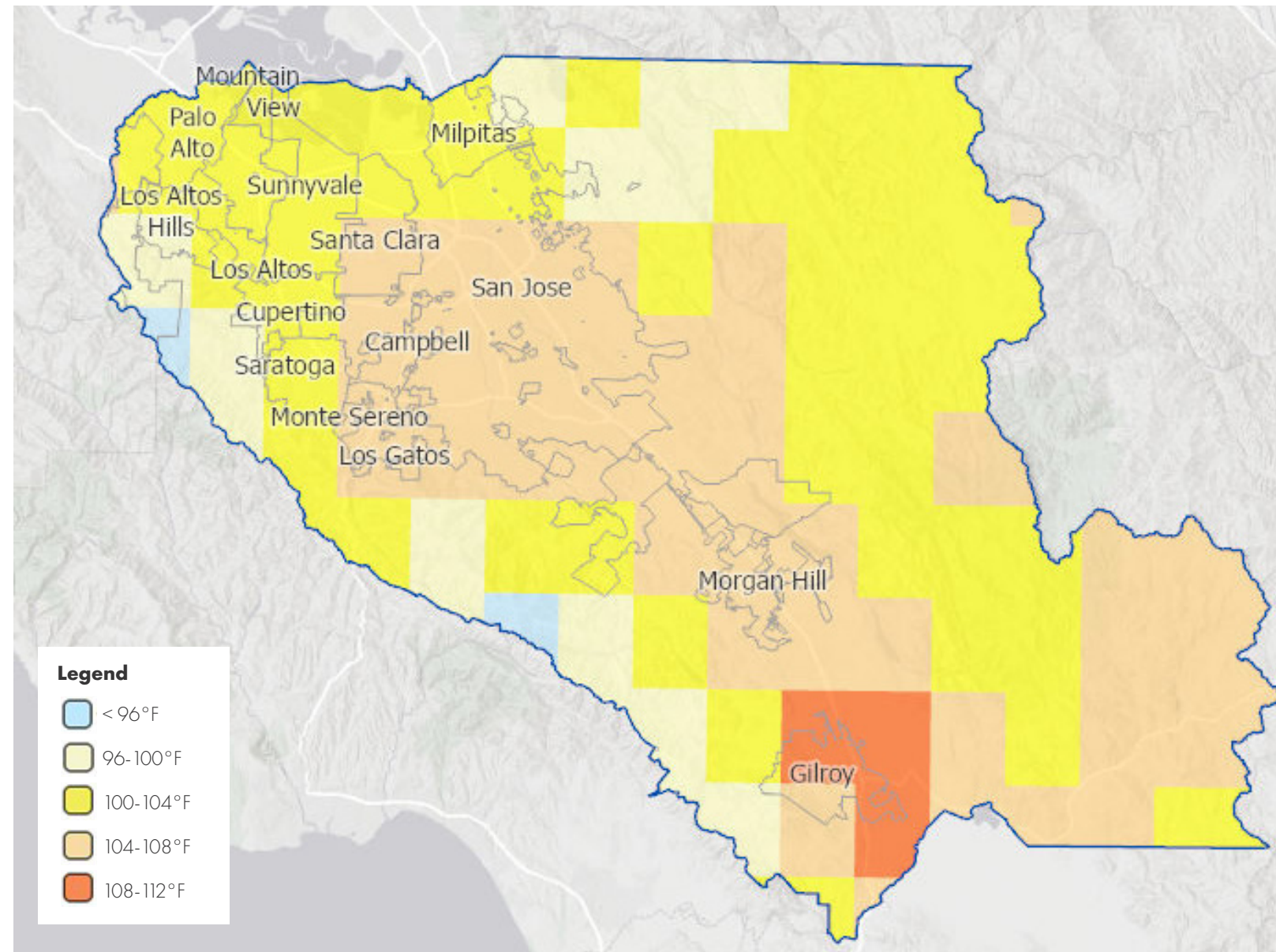
Santa Clara County residents are expected to experience more days with temperatures above 100°F by mid-century, which impacts human health. In addition, infrastructure and services, such as roads and transit, as well as less visible but essential facilities including electrical substations, wastewater treatment plants, and stormwater and sanitary sewers infrastructure will be impacted. The disruption to the complex grid of services in the community costs time, money, and can be stressful.

A variety of landscapes and habitats, particularly those in low-lying valleys and inland areas, are most significantly

Extreme heat can lead to:

- Increased emergency room visits, hospitalizations, and deaths, worsening of pre-existing health conditions, and strain on mental health
- Breakdown of transportation systems
- Power outages or unstable electricity supply
- Interruption of communications networks

Figure 1. Extent of Extreme Heat Risk Under High Greenhouse Gas Emissions Scenario by Mid-Century



Legend

- < 96°F
- 96-100°F
- 100-104°F
- 104-108°F
- 108-112°F

This map depicts high temperatures at certain heat thresholds during a High Emissions Scenario, which is a conservative projection for Santa Clara County according to the State of California. More scenarios are available in the SV 2.0 Tool.

Extreme heat refers to abnormally high temperatures, which are expected to increase in duration and frequency by mid-century.

A Low Emissions Scenario is projected to occur if we can limit our greenhouse gas emissions. **A High Emissions Scenario** is projected to occur if we continue with business as usual.

impacted by future extreme heat events compared to those in mountain or hillside regions. Natural landscapes, however, are more resilient than the built infrastructure when it comes to the onset of high temperatures over short periods of time.

Extreme heat can also cause both direct and indirect impacts to public health. This can include illness and loss of life during prolonged extreme heat events, subsequent power outages and evacuations, and potential increases

in levels of anxiety and post-traumatic stress following extreme heat events. These events may trigger pre-existing health conditions, causing deaths and severe health impacts, especially within socially vulnerable communities.

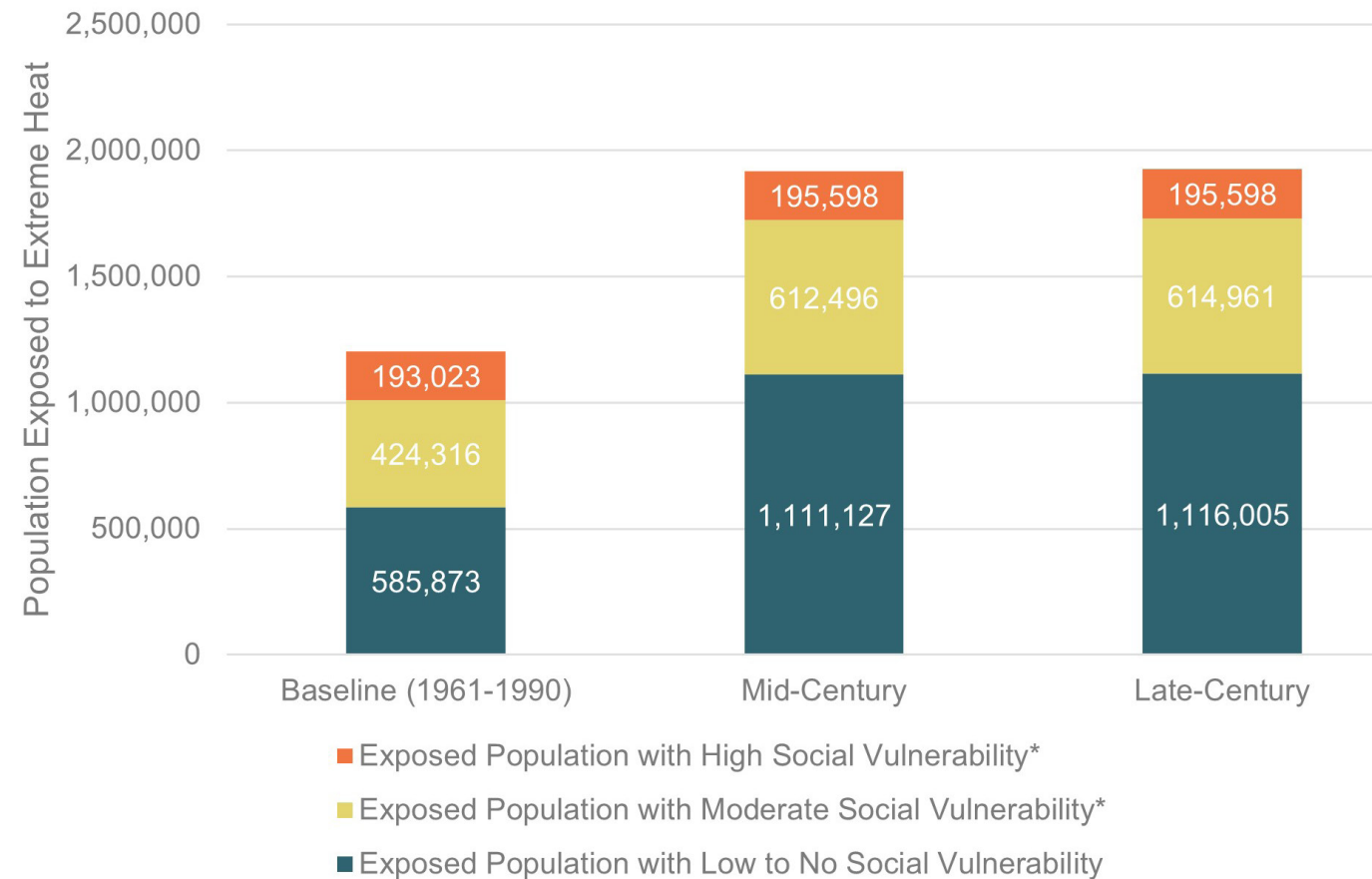
Social Vulnerability

Certain populations in the County are at higher risk of being harmed during extreme heat events. These include children, seniors, people with disabilities, communities of color, households with limited English proficiency, as well as those who face disparities in income, education level, housing (including access to air conditioning), transportation, food access, health insurance, and health outcomes. The combination of these social vulnerability factors and exposure to extreme heat makes them especially vulnerable, with outdoor workers and unhoused residents among the populations most at risk.

Approximately 60,000 people within moderate socially vulnerable communities in South County jurisdictions, like Morgan Hill and Gilroy, could be exposed to more frequent extreme heat events (above 108°F) by mid-century.

Inland communities most exposed to extreme heat include Gilroy and Morgan Hill, in addition to South San Jose, Campbell, Santa Clara, Los Gatos, and San Martin.

Figure 2. Social Vulnerability Exposure



* **High Social Vulnerability** refers to populations that have been identified to experience more than 9 of the 16 socio-economic and demographic factors included in the SV 2.0 Social Vulnerability Index (SoVI) that lead to increased risks and impacts from climate hazards. **Moderate Social Vulnerability** refers to those who experience 5-9 of these risk factors. **Low to No Social Vulnerability** refers to those who experience less than 4 or none of these risk factors.

Note: For detailed results on populations that are particularly sensitive to climate hazards in Santa Clara County, see the SoVI within the [SV 2.0 tool](#).



62% of the total County population is currently exposed to extreme heat conditions. At least 42% of the exposed population have moderate to high social vulnerability as a result of 5 or more existing socio-economic and demographic attributes that exacerbate social vulnerability including low income, race and ethnicity, housing situation, food and transit access, and health conditions such as asthma or heart disease.

Asset Exposure Overview

Table 1. Vulnerable Assets by Sector for a High Emissions Scenario

Vulnerable Assets	Mid-Century	Late-Century
Buildings	100%	100%
Energy		
Transmission Lines	37%	60%
Transportation		
Roads	4%	30%
Highways	4%	32%
Heavy Rail	0%	7%
Airport Runways	0%	5%



What is at Risk

Buildings + Parcels (includes all plots of land and the buildings on them, such as our homes, places of work, and recreation areas)



While parcels are not particularly vulnerable to extreme heat impacts, 100 percent, or 1.3 billion square feet, of buildings could be exposed to high temperatures throughout all parts of the County, including those in low-lying urban areas and hillside communities. Abnormally high temperatures during extreme heat events could result in greater energy costs associated with more air conditioning usage, which could threaten the County's power grid, in addition to widespread power outages under high heat circumstances.

Economic Risks from Damage to Building + Parcel Assets During High Emissions Scenario by Mid-Century

- \$18 million in operational costs lost.

Communications (includes fiber optic cables, data centers, and communications towers)



If communication assets are disrupted, all aspects of our lives, from simple services to the complex and interdependent regional economy, will be impacted. Fortunately, extreme heat is not expected to bear substantial impacts to data centers, fiber optic lines, or communications towers throughout the County by mid-century, so the risk to these assets are minimal.

Energy (includes energy generation facilities, substations, and transmission lines countywide that provides power for our homes, businesses, and daily operations)



Certain energy infrastructure, especially in South County, are projected to experience vulnerabilities to extreme heat by mid-century.

While energy generation facilities and substations are not expected to face impacts related to extreme heat under a High Emissions Scenario, transmission infrastructure is expected to experience substantial vulnerabilities. Specifically, 37 percent, or 186.6 miles, of transmission lines located in South San Jose, Campbell, Los Gatos, Morgan Hill and Gilroy are projected to be vulnerable at temperatures above 105°F. The ability of the electric

power cables to transmit electricity decreases and transmission losses increase as air temperature rises. This, coupled with increased demand for air conditioning, increases potential for outages. Public health and safety could be affected due to the temporary loss of power and community-wide disruption of transportation networks, businesses, homes, and daily life. Prolonged loss of grid power could result in backup systems for critical facilities being depleted, resulting in disruption of operations to hospitals and fire and police stations, threatening public health and safety.

Economic Risks from Damage to Energy Assets During High Emissions Scenario by Mid-Century

- Potential structure damage, interruptions to economic activity, changes in operational costs, and replacement costs for damage to transmission assets.

Shoreline Flood Protection (includes the network of berms and levees that protect the County)



These assets are FEMA certified flood protection levees that are designed to allow fresh water to reach the Bay without flooding developed areas. Since shoreline protection devices like dikes and levees are located in northern areas of the County least impacted by extreme heat events (above 104°F), and flood infrastructure is not particularly vulnerable to heat in general, dikes and levees are not expected to face vulnerability to high temperatures under the High Emissions Scenario by mid-century.

Solid and Hazardous Waste (includes solid waste facilities, hazardous waste sites, and contaminated lands)



Solid waste facilities, contaminated land sites, and hazardous waste sites are not projected to be vulnerable to extreme heat due to the nature of these pieces of infrastructure and their overall concentration in northern jurisdictions of the County that are expected to experience lower extreme temperatures on average.

Transportation (includes roads, highways, bridges, light and heavy rail lines, airports, and bicycle/pedestrian pathways)



Several miles of highways and local roads, in addition to bridges, pedestrian ways, and bike ways are expected to be vulnerable to extreme heat under a High Emissions Scenario by mid-century. More specifically, segments of Highway 101 and Highway 152 in the southern part of the County (Gilroy and Morgan Hill areas), in addition to local roadways in these jurisdictions, are projected to experience impacts related to extreme heat. Overall, over 4 percent, or 19 miles, of highway and 4 percent, or 285 miles, of local roads are expected to experience moderate vulnerability to extreme heat in the Gilroy and Morgan Hill areas under a High Emissions Scenario, with temperatures projected to exceed 108°F by mid-century. High temperatures can cause pavement to soften and expand which can create rutting and potholes leading to higher maintenance costs.

Economic Risks from Damage to Transportation Assets During High Emissions Scenario by Mid-Century

- \$334 million in replacement costs from damage to transportation assets.
- Potential interruptions to economic activity, changes in operational costs, and loss of tax revenue.

Wastewater (includes wastewater treatment plants which are vital to human and environmental health)



The four wastewater treatment plants in the County are not projected to be vulnerable to extreme heat under the High Emissions Scenario by mid-century since these assets are not particularly heat sensitive. These treatment plants include the San José-Santa Clara Regional Wastewater Facility (RWF), the Sunnyvale Industrial Wastewater Treatment Plant, the Penitencia Wastewater Treatment Plant, and the South County Regional Wastewater Authority Treatment Plant.



Arbor Day 2022 Celebration and Tree Planting in South County Annex, Gilroy.

What Can We do: Potential Strategies

We must protect people, places, and ecosystems from being harmed by the increase in extreme heat risk. By increasing public awareness and understanding of climate change and extreme heat impacts on the community and planning ahead, we can work together to build a livable, equitable, and resilient county. Some potential strategies to address extreme heat risk are below:

- **Incentivize and implement cool pavement and cool/green roofs.**
- **Implement nature-based solutions such as green stormwater infrastructure and increased vegetation and urban tree cover.**
- **Raise awareness about risk factors, symptoms of heat-related illness, and when and how to seek treatment from the dangers of extreme heat.**
- **Improve and expand unhoused support services and access to cooling locations during extreme heat events.**
- **Increase access to programs related to weatherizing homes and providing air-conditioning units in homes.**
- **Incorporate heat-resistant or heat-reflective materials in the construction of new or replacement rail tracks.**
- **Provide adequate shade for passengers at transit stops or stations.**



Details on all the riverine flooding scenarios are available at
<https://siliconvalleytwopointzero.org/home>

Contact Us

County of Santa Clara Office of Sustainability
sustainability@ceo.sccgov.org