

1. What data or information did you use to define an extreme heat day (103.9 F)?

This is based on the 98th percentile of daily high temperatures from historical data between 1961 and 1990 from April and October. It is based on [Cal-Adapt data for Sacramento](#). But health impacts can kick in at lower temperature thresholds, especially for vulnerable populations (such as the elderly, young, people with pre-existing health conditions, and pregnant women), low-income residents, people working outdoors or in unconditioned spaces, as well as people engaged in physical activity outdoors.

2. Carmichael was red-lined? Can Inga expand on that?

According to research, racially restrictive covenants were introduced in Sacramento and were mandated as part of New Deal housing programs in the 1930s. In this [article](#), Jesus Hernandez examines racially segregated housing practices in Sacramento, noting that “[after the 1930s], developers of new communities throughout Sacramento actively used racially restrictive property covenants to exclude Blacks and other non-Whites from housing tracts in elite neighborhoods and areas adjacent to the northern part of the city such as Arden Arcade and Carmichael.” Another [article](#) writes that there was “documented discriminatory actions of realtors who routinely discouraged and denied purchase offers from non-white attempting to move into new suburban tracts in Land Park and in northeast Sacramento such as Arden and Carmichael.”

3. Trees and vegetation is often mandated for building in commercial areas but later we see the trees being cut down.

Thank you for sharing your observation, we will be sharing this information with our cities.

4. How is this information being used to help require these features in all buildings and retrofitting existing communities of color.

The Air District has been recommending these features and strategies in our land use review of the air quality impacts of new developments, particularly for those located in low-income and underserved communities. The reports also contain sample policy language and ordinances that can be adopted by local governments. The Air District has no authority over local building codes and other recommendations, but we have been working to share these recommendations, findings, and strategies with local governments and offering assistance with adoption or implementation. In addition, through public education, the Air District hopes to build public support for these measures.

5. Does the higher ALBEDO materials cause a reflective problem for pedestrians and drivers for vision or glare. Is there increased heat on those persons or materials around the reflective materials?

High-albedo materials do not generally create glare or vision issues, because they are not reflective in the same way as a mirror. Higher albedo materials reflect solar heat in

the infrared spectrum (heat), but they do not reflect light in the visible spectrum as a mirror or glass surface would. A good example here would be a white wall, which has high albedo and reflects heat without creating glare or vision issues. In addition, our project also capped the albedo of studied mitigation measures to 0.5, which is a technologically feasible and reasonable level, and not an extreme. Thus, the recommended strategies proposed by the Air District would not lead to any visual or glare challenges. There may be a small amount of reflected heat from these materials, but this needs further study, for example to compare with the overall cooling effects from heat island reduction and other co-benefits.

6. On slide 28 West Sacramento is not included on the map. As a disadvantage community and air pollution with two freeways I would think it would be included on this map

This is a good question. The study modeling results did not find a relatively large urban heat island effect for West Sacramento. This could be due to its geographic location, its land cover characteristics, and the fact that it is largely downwind from rural or agricultural lands, not urbanized areas.

7. Sacramento is a big city are there any areas or neighborhoods that would be targeted first for trees?

Our study recommends increasing tree planting first in low-income and under-served communities, as well as communities that are disproportionately burdened by heat and air quality impacts. These include South Sacramento, North Sacramento, Del Paso Heights, and North Highlands.

8. Is it better to shade a house with trees, or put on a solar roof?

This question depends on what your desired outcomes are, and of course, solar PV and tree shading can be feasibly combined for a house – as can cool roofs. Generally, from the perspective of heat island reduction, both tree shading and cool roofs would provide greater benefits than a solar roof, which have a relatively minor cooling impact. (Please see p.269 of the [technical report](#) for an explanation of the heat island cooling benefits of solar PV roofs.) Cool roofs can also provide significant temperature reductions inside the building, reducing air-conditioning needs during the summer, with minimal negative effects in the winter. Shade trees positioned on the south- and west-facing side of the building can also cool indoor temperatures. Reducing electricity use during the summer, especially in the afternoon and evening, is important for electric grid stability. Thus, both trees and cool roofs would provide greater benefits than solar roofs, especially when co-benefits for air quality, heat island reduction, and stormwater management are considered. This is especially true as the California grid grows cleaner as a result of

the Renewable Portfolio Standard and SB 100. For example, SMUD's electricity is already 50 percent carbon free.

9. Design use of plants which including plantings for shade design must have safety too. How do we do this with RT removing seating to discourage homeless persons from using the sites.

This is a good question, and the Air District considers it important to provide shading and seating for people. The Air District recently awarded a grant to Sacramento RT to add seating and shade for a bus stop in South Sacramento, taking into account resident input on safety. This grant was awarded through the Target Green Infrastructure Fund incentive program, and we hope to continue to provide future grants for transit stop improvements in the future.

10. Look at West Sac bus shelters....

Thank you, this is a great suggestion.

11. What other vegetation besides trees help with temp control?

Trees are among the most beneficial for urban cooling, because they provide an extensive shade canopy, but most plants and greenery will have a cooling effect through evapotranspiration. This is the process in which plants take up water and release it through the air, cooling temperatures along the way.

The cooling effect is even greater if plants and vegetation are used to replace heat-absorbing pavement, asphalt, or other manmade surfaces. The use of vegetation can help to decrease the amount of heat-absorbing surfaces in a community, reducing heat. Native vegetation, pollinator-supporting plants, and community gardens will have additional co-benefits.

12. I wanted to vote more than once more trees and less driving

We agree! Thank you for your support.

13. I thought cool roofs were required by building code? Perhaps that's just commercial and multifamily projects.

The California Energy Commission's building code has two paths for compliance, prescriptive or performance. Cool roofs are required in the prescriptive path, which sets out standards and metrics for every element of the building envelope. Many developers choose the performative path, which requires only that buildings meet energy use targets and does not dictate specific elements.

14. FYI per tree cost is about \$150/tree pocket parks are extremely expensive to maintain which is part of the problem.

Thank you for the comment.

We will link additional resources for tree maintenance and pocket parks costs that we become aware of.

15. Can we get a copy of this information? I would like a copy if possible.

You can find the project website here: <https://urbanheat-smagmd.hub.arcgis.com/> The website contains reports, data, and resources. The webinar in English and Spanish will be posted online at our Youtube channel:

<https://www.youtube.com/channel/UCb0dUEGBsiGfd0-FLweh7Qw> The English video is here: <https://www.youtube.com/watch?v=4QiDH9ySnNA>

16. In low income neighborhoods there needs to be programs to assist residence with pruning trees. It is expensive and trees are removed because they can't afford the regular maintenance.

This is an excellent comment. We will share this comment with our city and planning partners.

17. For the cooling impacts of enhanced trees - is that showing full planting scenarios and mature trees?

Yes, these scenarios reflect full planting / tree maturity.

18. I might have missed how the ranking was determined for areas that are priorities for cooling. Is it based on the number of existing trees in conjunction with the overall size of the area? What were the factors for determining the ranking?

The priority areas for cooling were determined by the overall heat island effect and the absolute temperature. These factors were calculated into a score that provided the ranking of priority areas for cooling seen in our project report. You can find a discussion of how these priority areas were determined on p20-26 in the executive summary, and a more detailed discussion on p223-229 of the [technical report](#).

19. Where is the survey?

If you missed our initial follow up email with the survey link, our post webinar survey can be found [here](#).

20. What is the cost of these material in comparison to traditional materials. Especially, for retro fitting in lower income neighborhoods?

Some of these materials are comparable in cost to traditional materials. For example, many cool roofs available are comparable in cost to normal roofs. Cool roofs can also pay for themselves over time as a result of reduced electricity costs in the summer. Many contractors and suppliers lack knowledge of cool roof materials and will only stock or promote standard products with which they're most familiar.

Some cool pavements are similar in price to normal pavements, but many are more expensive. However, they provide benefits to public health, energy use reduction, and safety (cool pavements are brighter and more visible at night). As adoption increases, costs will likely decrease due to economies of scale.

21. What is Sac. Government doing about helping slow climate change?

The City of Sacramento and the City of West Sacramento launched a Mayor's Climate Commission to tackle how both cities can work together to achieve carbon neutral by 2045. The Commission recently approved the final report that you can find at the following link. <https://www.lgc.org/climatecommission/>

The City of Sacramento is also currently working to update its climate action plan as part of its 2040 General Plan update. You can find more information about the project, resources, and engagement opportunities here:

<https://www.cityofsacramento.org/Community-Development/Planning/Major-Projects/General-Plan>

The City of Sacramento also has many other efforts underway, such as to increase electric vehicle (EV) adoption and zero-emissions mobility. The City has a comprehensive [EV strategy](#), and has a goal to reach 75,000 EVs on the road by 2025.

The County of Sacramento is also in the process of developing a climate action plan.

22. How much will the temperature rise in the next few years?

To learn about how city temperatures will change in the future, you can visit this interactive feature at [Climate Central](#). By 2050, the Sacramento and West Sacramento climate will be predicted to experience temperatures similar to Tucson, Arizona.

<https://www.climatecentral.org/news/summer-temperatures-co2-emissions-1001-cities-16583>

This is a great question. According to the [extreme heat module in Cal-Adapt](#) (a website built by the State of California to help provide localized predictions for future climate change impacts), Sacramento will have an average of 32 days over 100 degrees Fahrenheit each summer in the 2025-2040 period. This assumes that we continue down our current climate change trajectory and GHG emissions continue to increase. Historically, Sacramento only experienced 14 days per year over 100 degrees in the historical 1961-1990 period. Heat waves will also last longer, averaging 5 days instead of about 2 days.

The [annual daily high temperature](#) will also increase from 74 degrees Fahrenheit historically to about 78 degrees Fahrenheit by the 2025-2040 period. This may not sound like a large increase, but it accounts for daily maximum temperatures over the entire year, including winter.

23. Interested in mitigation strategies for Carmichael.

Based on our modeling, Carmichael is in one of the areas of Sacramento County that experiences a moderately large urban heat island effect. Thus, it would benefit from many of the strategies discussed in our project. Older homes and buildings should consider using a cool roof, which can help to reduce temperatures indoors, saving on air-conditioning costs, during the summer, as well as reducing the heat island effect. [Cool walls](#) for older homes (pre 1970s) can also help to reduce the heat island effect and indoor temperatures in the summer. More tree planting, in both individual yards as well as public spaces, will also be important. Public solutions include cool pavements for roads, sidewalks, and bike lanes, as well as public street trees.

<https://newscenter.lbl.gov/2019/07/09/cool-walls-can-reduce-energy-costs-pollution/>

<https://heatisland.lbl.gov/coolscience/cool-roofs>

[https://coolroofs.org/documents/CRRC Marketing Fact Sheet for End-Users 2020-05-18.pdf](https://coolroofs.org/documents/CRRC_Marketing_Fact_Sheet_for_End-Users_2020-05-18.pdf)

24. The concern is the significant loss of canopy and planting space in downtown Sacramento in the past decade. If you look at projects constructed in the past 10-years the majority do not have mature trees. All the street trees were recently removed for three State of CA office high rises under construction. The Sacramento Commons project has commenced removal of 199 large trees on the blocks 5th & 7th St., "N" & "P" St.. There were 26 street trees removed on "R" St between 13th & 16th St. for a beautification project. The Crocker Village project 244 trees which included a significant number of native oaks. This is referred to as the undeclared on Sacramento's trees. The City of Sacramento has been very effective with the support of the Sacramento Tree Foundation in controlling the message. So many trees are being removed that the Sacramento Tree Foundation started

a "Rescue Wood Program" but why aren't they protecting the trees from being removed? The City of Sacramento has crafted a process so that any tree can be removed which makes filing a tree appeal futile. Trees for Sacramento filed an appeal on a project. The developer withdrew the removal request. A tree appeal hearing was never held but the City of Sacramento would not refund the money.

Thank you for sharing your comments, we will be sharing this information with the City.

25. Re: Cooling Centers. Are there aspects of your work or report that can help inform where to open cooling centers in Sacramento County and neighboring areas in order to be accessible to those most vulnerable to heat? Such as communities that are vulnerable to heat (low income, elderly, homeless) as well as geographic areas that tend to be hottest during the late afternoon (the hottest part of the day).

Our study does provide some recommendations for priority areas for heat island reduction, based on the size of the heat island effect and absolute temperatures, but this does not reflect population vulnerability. On **p.25-26**, you can see how these priority areas for heat island reduction compare with AB 617 community areas, with Tier 3 and Tier 4 being the highest priority areas. The method to determine these priority areas on p20-26 in the executive summary, and on p223-229 of the technical report. On p.138 to 139 of the [technical report](#), you can find a discussion of and a regional Sacramento map comparing the heat island effect to the CalEnviroScreen 3.0 score.

Technical report:

http://www.airquality.org/LandUseTransportation/Documents/Altostratus_Final_Report.pdf

Generally Dr. Taha also provides special focus on the AB 617 areas in Sacramento, their heat island impacts, and how they benefit from mitigation throughout the entire report. Many analytical points were selected within these areas. Generally, the AB 617 areas in South Sacramento/Florin areas have a heat island effect of 4.2F, while the North Sacramento, North Highlands, and Del Paso Heights area have heat island effects of about 8 degrees F. Thus, it seems like developing cooling centers for the North Sacramento areas would be more of a priority.

Somewhat related, on p.206 of the technical report, there is a discussion of the ability of UHI mitigation measures to reduce the National Weather Services' Heat Index to lower warning thresholds, e.g. from Danger to Extreme Caution or from Extreme Caution to Caution.

There are a few other resources to help find the intersections between areas with higher heat island effects with areas that have higher shares of people experiencing homelessness, low-income households, elderly populations, people facing social or linguistic isolation, people with mobility and access challenges, or older homes. The [California Heat Assessment](#)

[Tool \(CHAT\)](#) also provides this comparison between extreme heat event data and vulnerability data at the census tract level.

<https://www.cal-heat.org/explore>

You can access our heat island maps here:

Download GIS data for your own maps:

<https://urbanheat-smagmd.hub.arcgis.com/pages/data>

Explore maps visually - to select between different layers, go to the Details box on the left then **Content:**

<https://www.arcgis.com/home/webmap/viewer.html?webmap=ec5b88df4a25443180ad4aea2ab9f84e&extent=-122.096,38.0774,-120.6856,38.7832>

- 6am and 3pm base temperatures are daily temperatures, not UHI maps.
- The other layers reflect different mitigation scenarios.

Some regional resources for identifying vulnerable populations include:

Healthy Places Index: <https://healthyplacesindex.org/>

Cal EnviroScreen 3.0:

<https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>

Regional Opportunity Index:

<https://interact.regionalchange.ucdavis.edu/roi/webmap/webmap.html>

