Heat-Proofing Communities: Resilience Planning and Mitigation Strategies

October 22, 2024

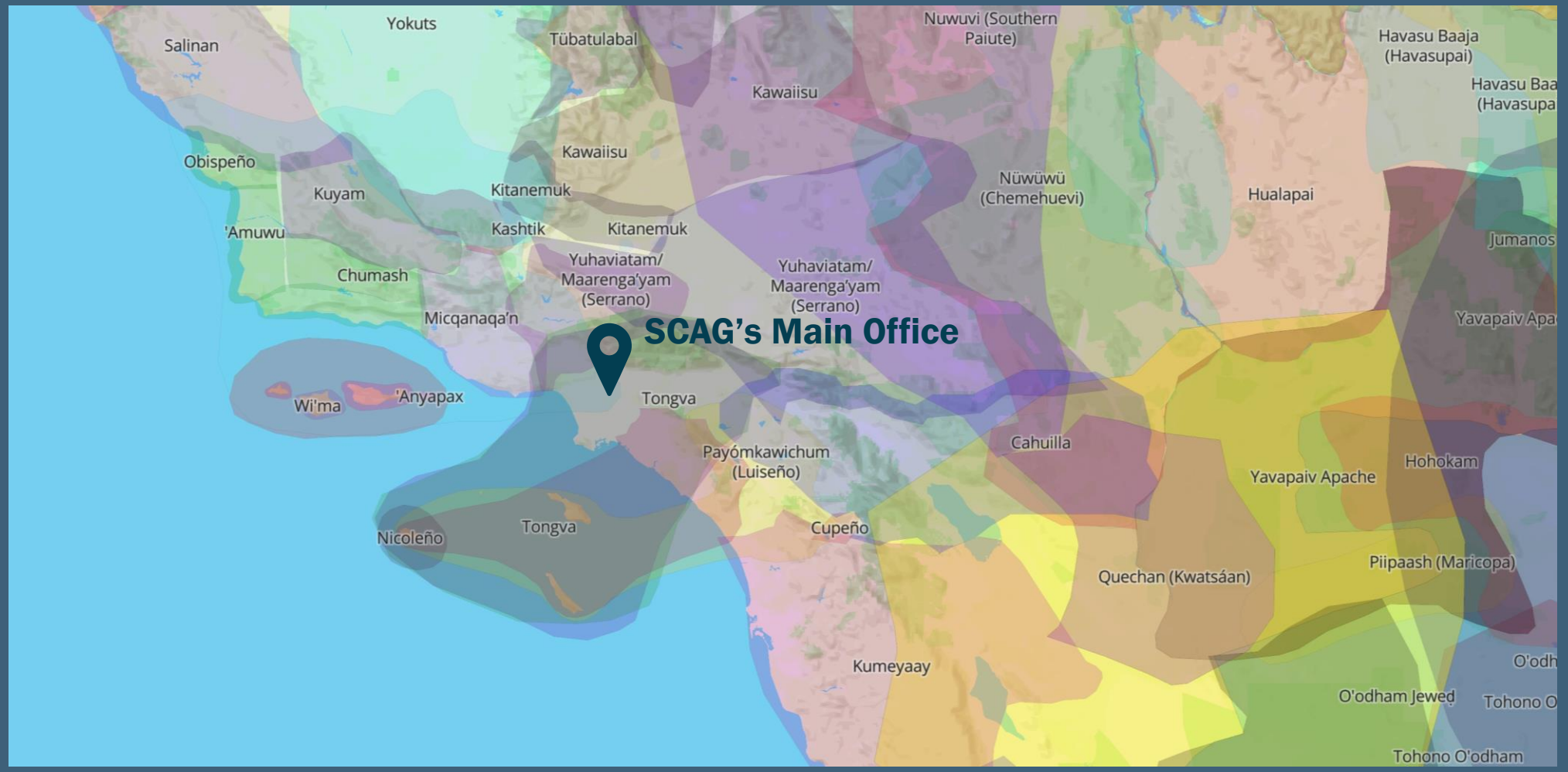
Toolbox Tuesday

WWW.SCAG.CA.GOV

Housekeeping

1. Meeting length: 1.5 hour
2. This meeting is being recorded
3. All participant lines will be muted
4. At the end of the presentations, there will be a time for Q&A.
5. If you have a question during the presentations, please type it into the chat box.
6. We will log all questions and then voice a selection at the end of the presentations. You may also raise your hand to ask questions at that time.
7. A recording of this webinar and the PowerPoint slides will be available on the SCAG website. We will send a link to everyone who has registered after the event

Land Acknowledgement



Racial Equity Early Action Plan

GOALS

Shift Organizational Culture

Focus SCAG's internal work and practices on inclusion, diversity, equity, and awareness.

Center Racial Equity in Regional Planning & Policy

Bring equity into SCAG's regional planning functions.

Encourage Racial Equity in Local Planning Practices

Promote racial equity in efforts involving local elected officials and planning professionals.

Activate & Amplify

Communicate broadly SCAG's commitment to racial equity and join with others in different fields and sectors to amplify impact.

STRATEGIES

Listen & Learn

Develop a shared understanding of our history of discrimination and the structural barriers that continue to perpetuate the inequities experienced today.

Engage & Co-Power

Create an environment where everyone is included, able to share their experiences, and equipped to talk about racial equity and inequities.

Integrate & Institutionalize

Focus on systems change to improve racial equity. Center racial equity in all aspects of work. This involves internal and external systems change. Advancing Racial Equity in Southern California.

*"As central to SCAG's work, **racial equity** describes the actions, policies, and practices that eliminate bias and barriers that have historically and systemically marginalized communities of color, to ensure all people can be healthy, prosperous, and participate fully in civic life."*

Other Learning Opportunities

- Previous Toolbox Tuesday Sessions:
  - January 2022, Equity In Action – Developing Equity Tools
  - April 2022, Taking Action to Advance Equity: Action Plans and Frameworks
  - March 2023, Planning with Rural Communities: Stories from Southern California
  - June 2023, Youth Empowerment Programs Panel
  - August 2023, Planners as Therapists, Cities as Clients
  - December 2023, Youth-Driven Urban Planning through Y-PLAN
  - January 2024, Inclusive Contracting Toolkit
  - February 2024, Data Tools & Research from the Latino Policy and Politics Institute
  - April 2024, A Guide to Environmental Justice Tools for Local Planning
  - July 2024, Voice for All: Developing and Implementing Effective Language Access Strategies
- Recordings and Presentations available at https://scag.ca.gov/toolbox-tuesday-online-training-materials

We want to know…

What type of organization are you representing today?

Where are you joining from?

Has your community implemented an extreme heat mitigation strategy?

Fill out the poll on your screen!

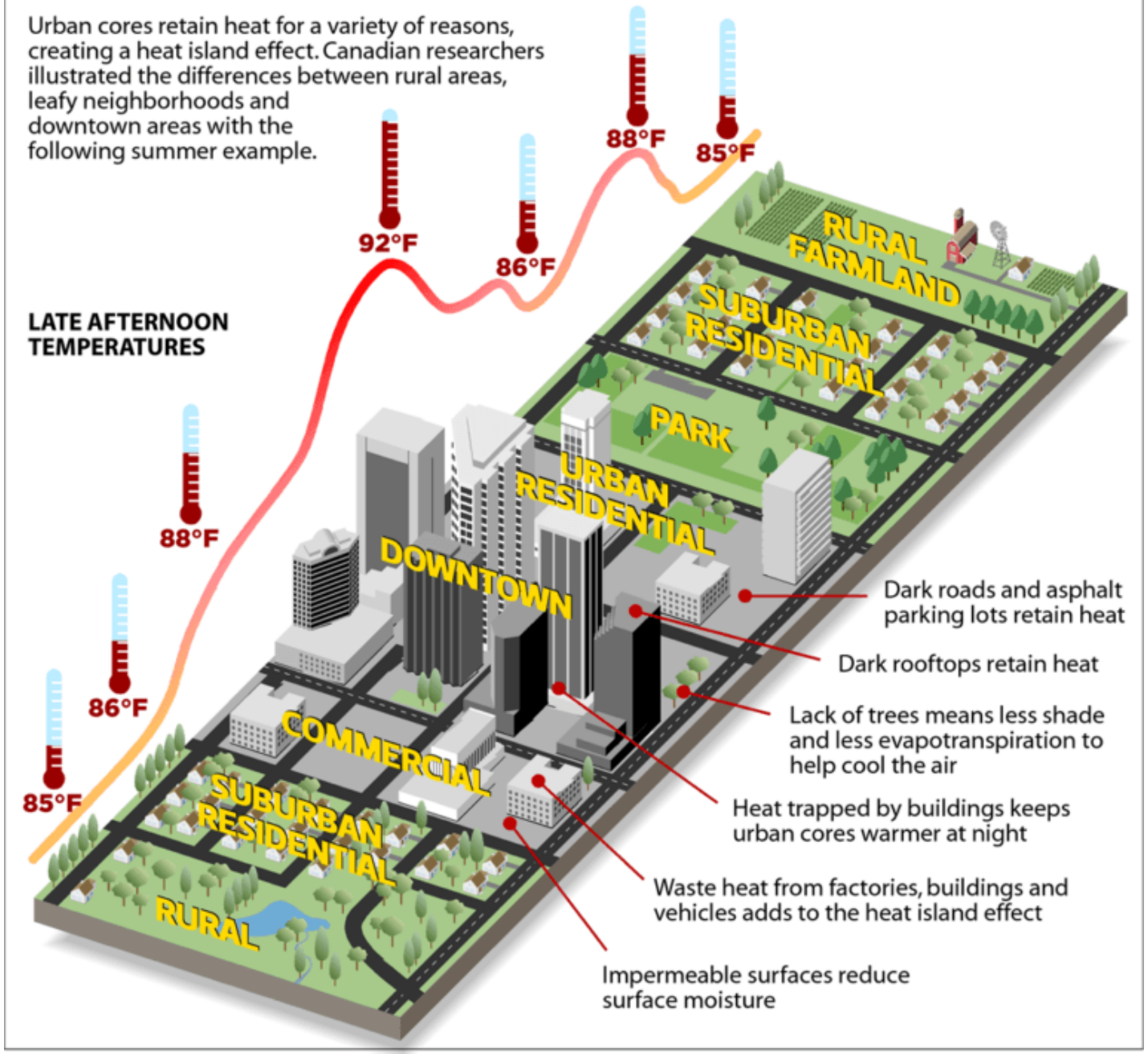
Agenda

- Walker Wells, Principal at Raimi & Associates
- Maithili Ramachandran, Climate and Health Economist at the Office of Health Equity within the California Department of Public Health
- Rabab Charafeddine, Climate Risk Specialist at the California Department of Insurance

Heat Mitigation
Built Environment Strategies

Urban Heat Island Effect

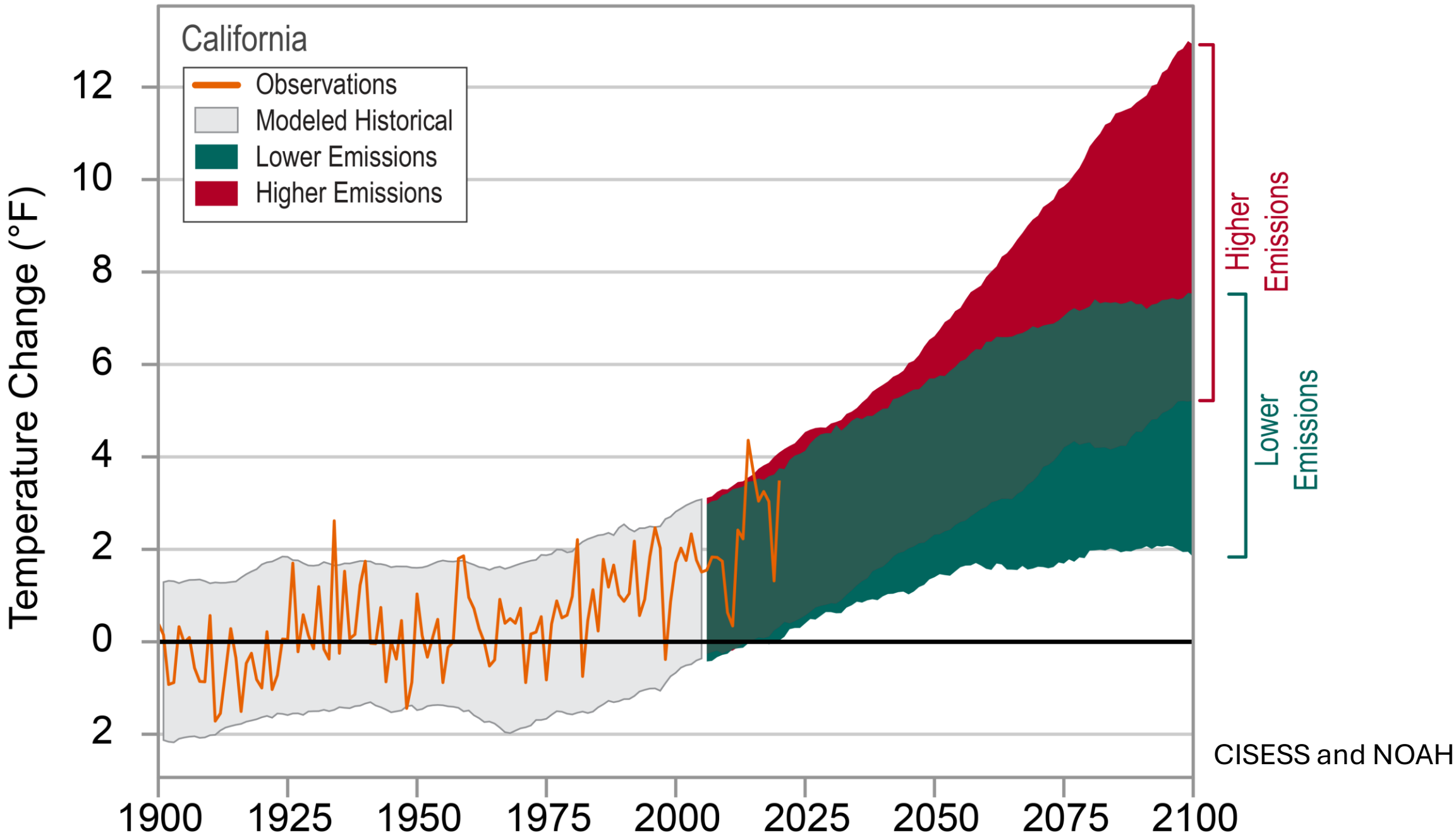
Urban cores retain heat for a variety of reasons, creating a heat island effect. Canadian researchers illustrated the differences between rural areas, leafy neighborhoods and downtown areas with the following summer example.



SOURCE: D.S. Lemmen and F.J. Warren, Climate Change Impacts and Adaptation

PAUL HORN / InsideClimate News

Observed and Projected Temperature Change



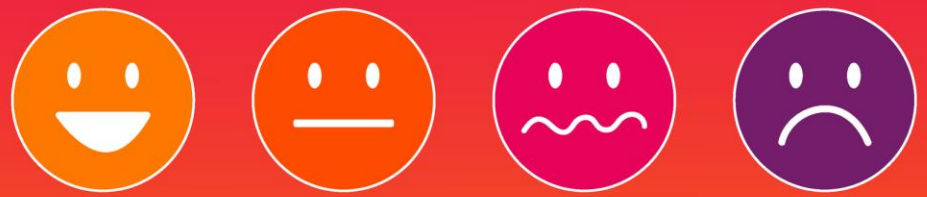
CISESS and NOAH


SPYDER

HEAT

can quickly make you ill.

Everyone is at risk!



Stay #HeatSafeLA

LARC

County of Los Angeles Public Health

MONTEBELLO

HEAT ADVISORY

COOLING CENTER ACTIVATED

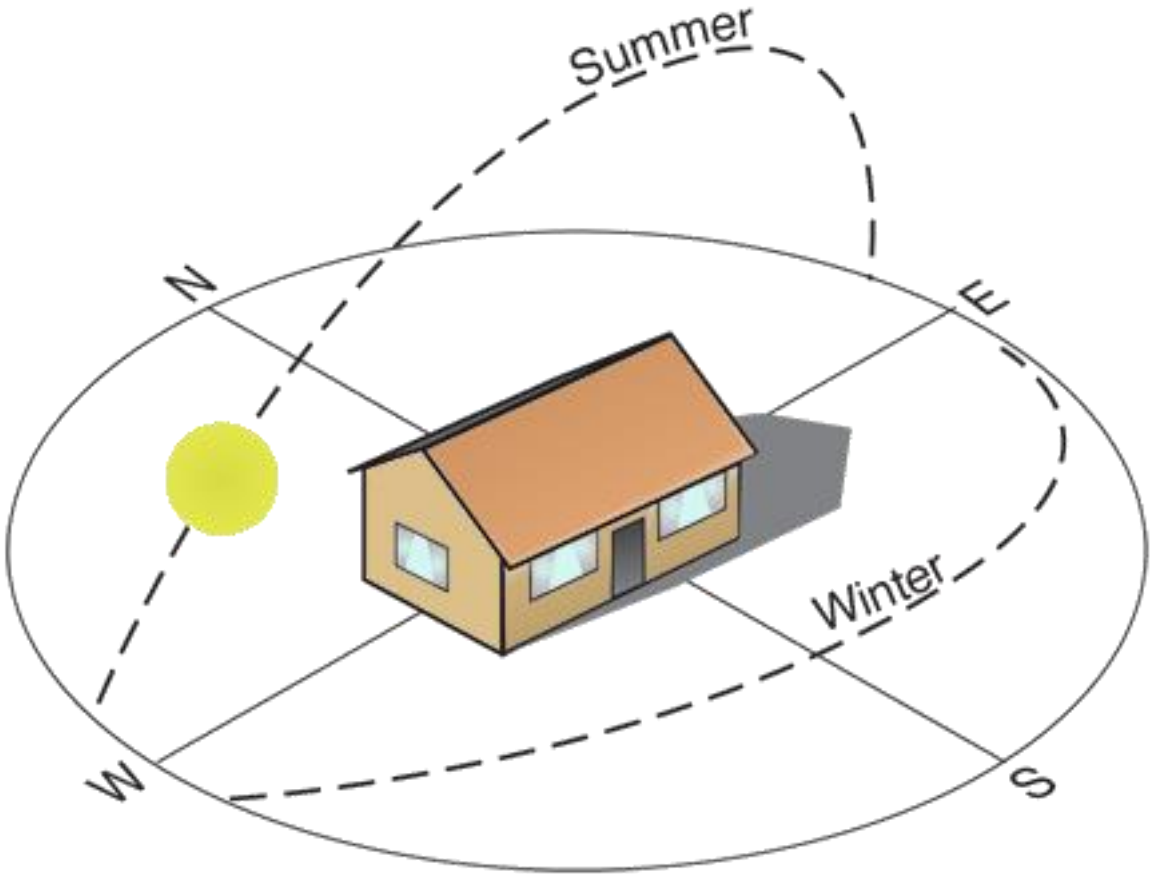
SENIOR CENTER, 115 S. TAYLOR AVE.
SEPT. 4 - 6 | 10 A.M. - 5 P.M.
FREE TO ALL AGES

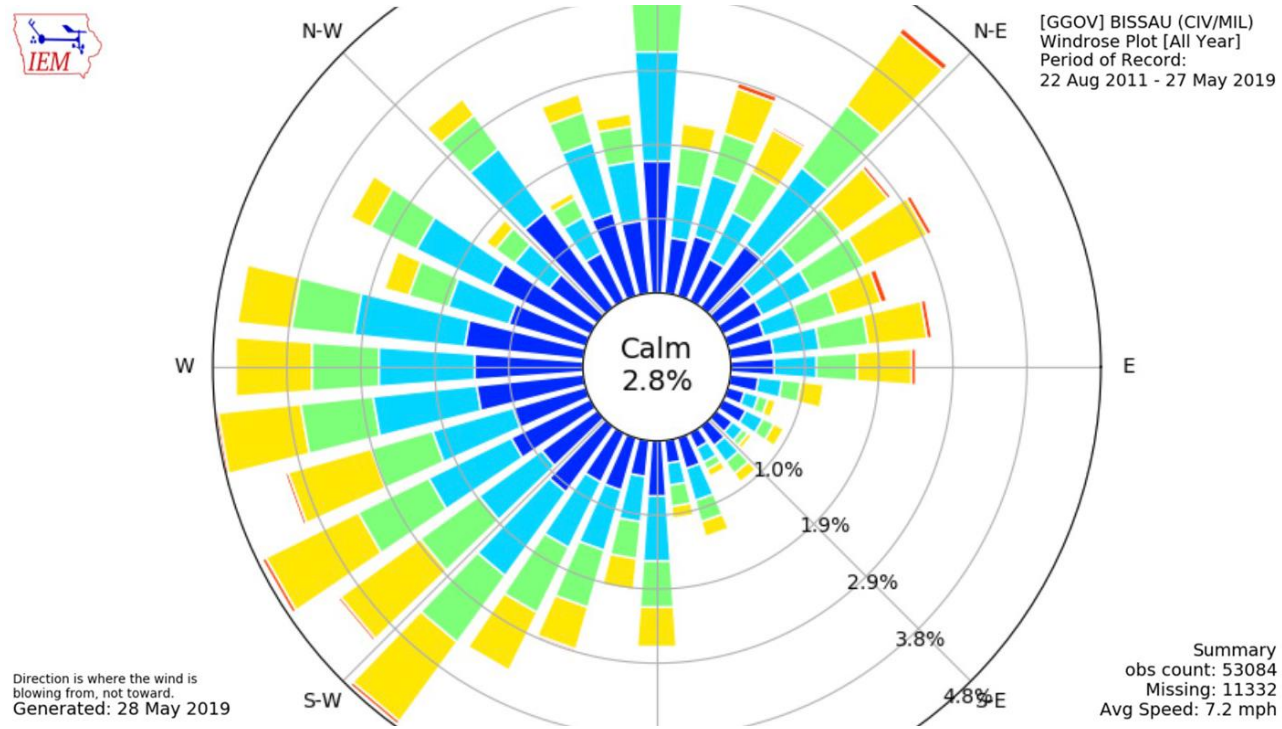
COOLING CENTERS ARE OPENED ON AN AS-NEEDED-BASIS.
INFO WILL BE IMMEDIATELY POSTED WHEN OPEN.

SPLASH PADS ARE OPEN

GRANT REA PARK, 600 REA DR.
POTRERO HEIGHTS PARK, 8051 ARROYO DR.
WED. 9/4 - FRI. 9/6 | 11 A.M. - 7 P.M.
FREE FOR ALL AGES

Building Science Basics

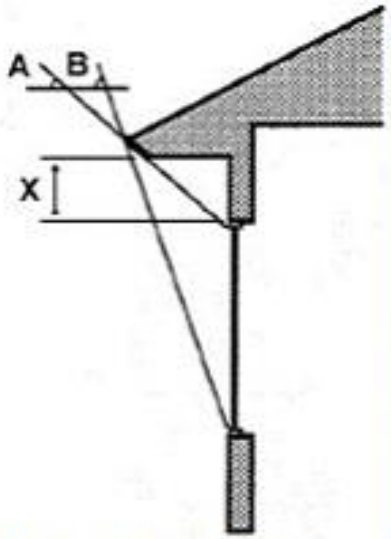




[GGOV] BISSAU (CIV/MIL)
Windrose Plot [All Year]
Period of Record:
22 Aug 2011 - 27 May 2019

Direction is where the wind is blowing from, not toward.
Generated: 28 May 2019

Summary
obs count: 53084
Missing: 11332
Avg Speed: 7.2 mph



Overhang Projection Factor
The projection factor is the overhang projection divided by the distance between the bottom of the window and the bottom of the overhang.

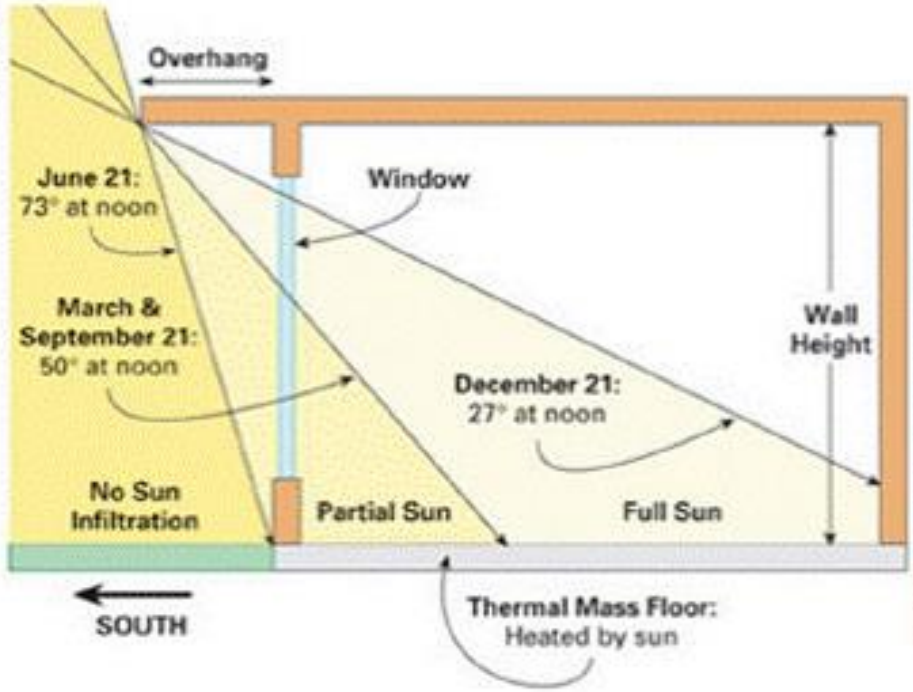
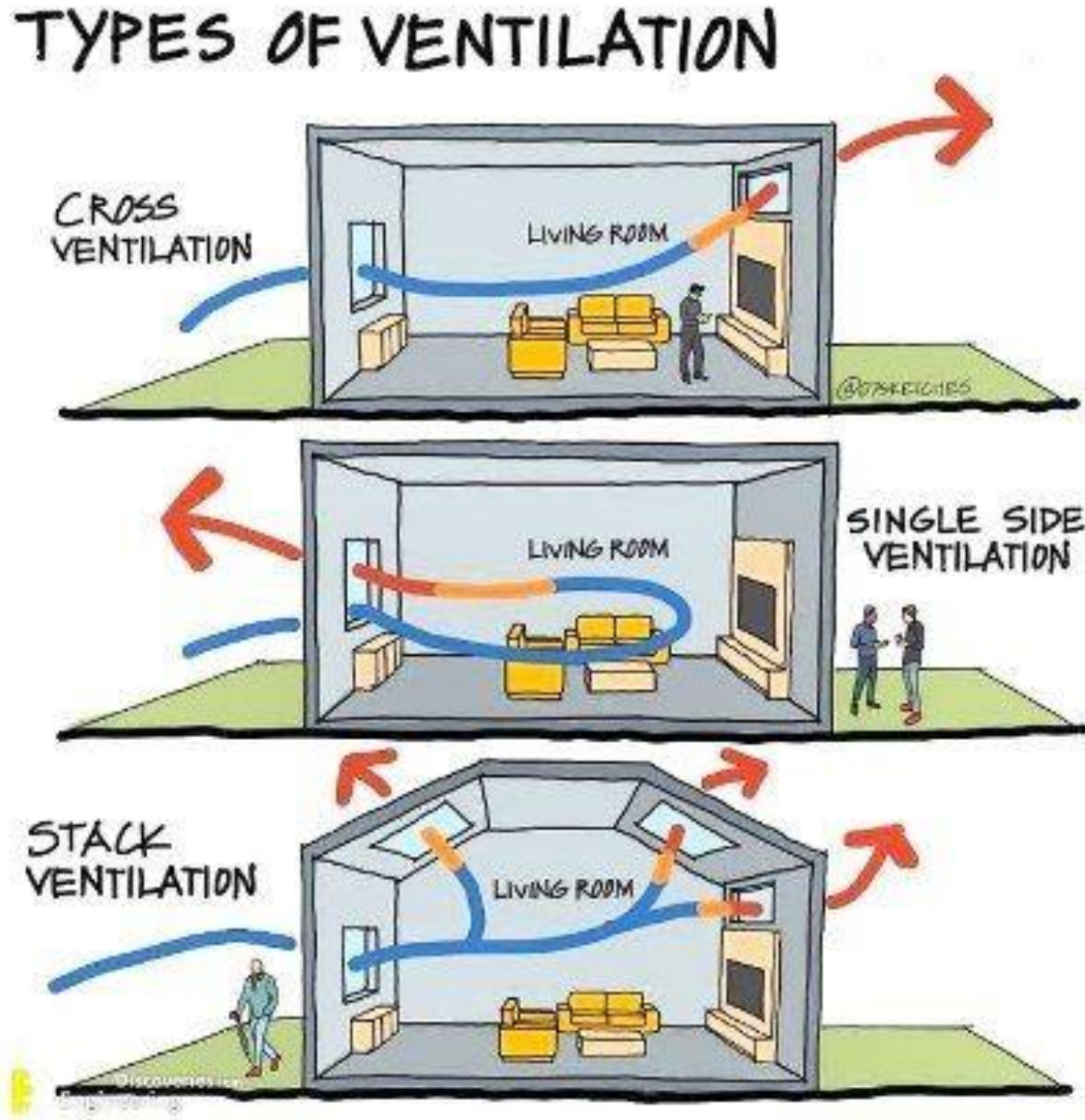


Image Courtesy of www.solar-for-energy.com



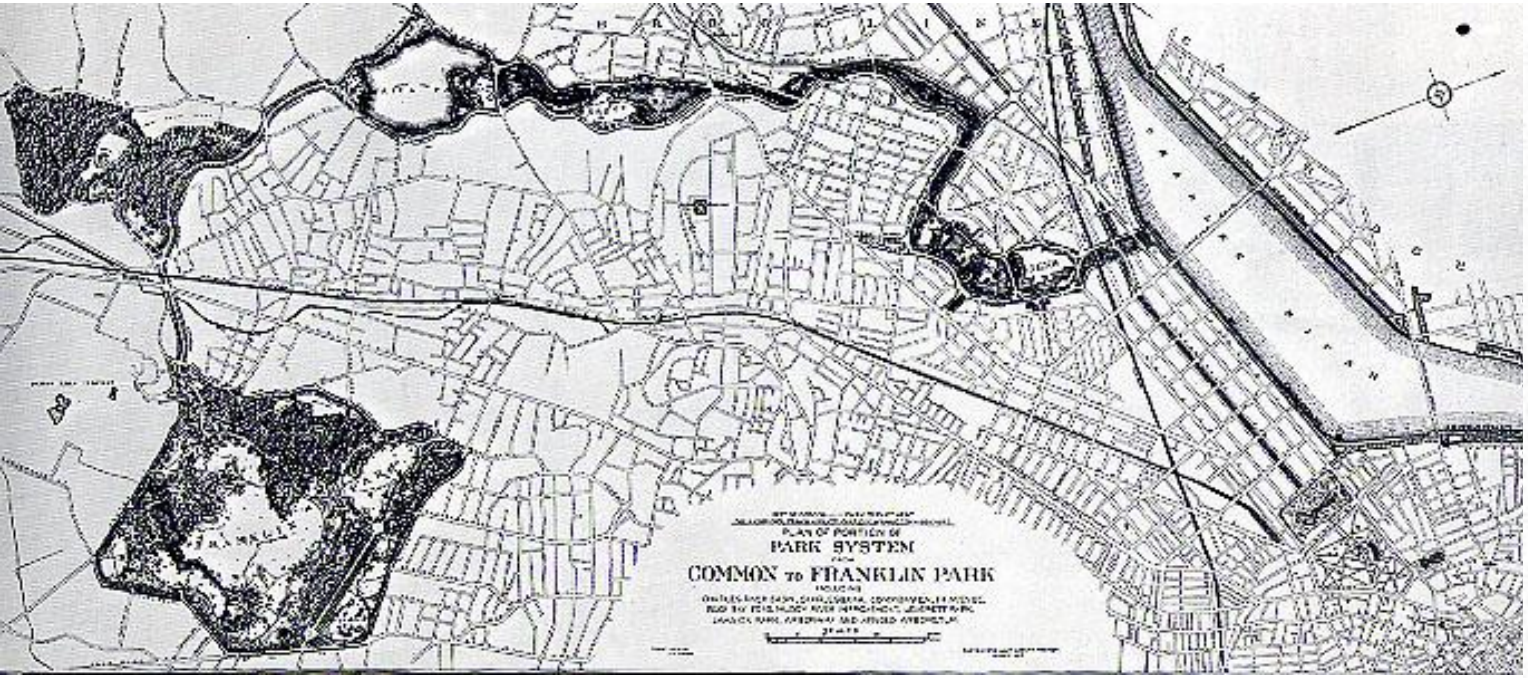
Urban and Site Strategies


Shade


Signal St.


Bonnie Lu's
Country Cafe
CHAMELEON
CHAMELEON

Water/Evaporation



Green Spaces


Toronto's Ravines
Environmentally Significant Area
Ravine and Natural Feature Protection By-law
Parklands
Municipal Boundary
Highways
Watercourse
Major Roads
0 1 2 4 6 8
Kilometres
Lake Ontario (lac Ontario)
Steeles Ave W
Steeles Ave E
Finch Ave W
Finch Ave E
Sheppard Ave E
York Mills Rd
Ellesmere Rd
Rexdale Blvd
Wilson Ave
Lawrence Ave W
Lawrence Ave E
Eglinton Ave W
Eglinton Ave E
St Clair Ave W
St Clair Ave E
Dundas St W
Dupont St
Burnhamthorpe Rd
Bloor St W
Bloor St E
Danforth Ave
College St
Dundas St W
Queen St W
King St W
King St E
The Queensway
Evans Ave
Lake Shore Blvd W
Lake Shore Blvd E
Kingston Rd
Yonge St
Bayview Ave
Leslie St
Don Mills Rd
Kennedy Rd
Brimley Rd
McCowan Rd
Markham Rd
Midland Ave
Birchmount Rd
Warden Ave
Victoria Park Ave
Pape Ave
Laird Dr
Mount Pleasant Rd
Avenue Rd
Bathurst St
Bay St
Jarvis St
Dufferin St
Keele St
Islington Ave
Highway 27 S
Highway 27 N
Martin Grove Rd
Renforth Dr
Browns Line
Dixon Rd
Albion Rd
Overlea Blvd
O'Connor Dr
Danforth Rd

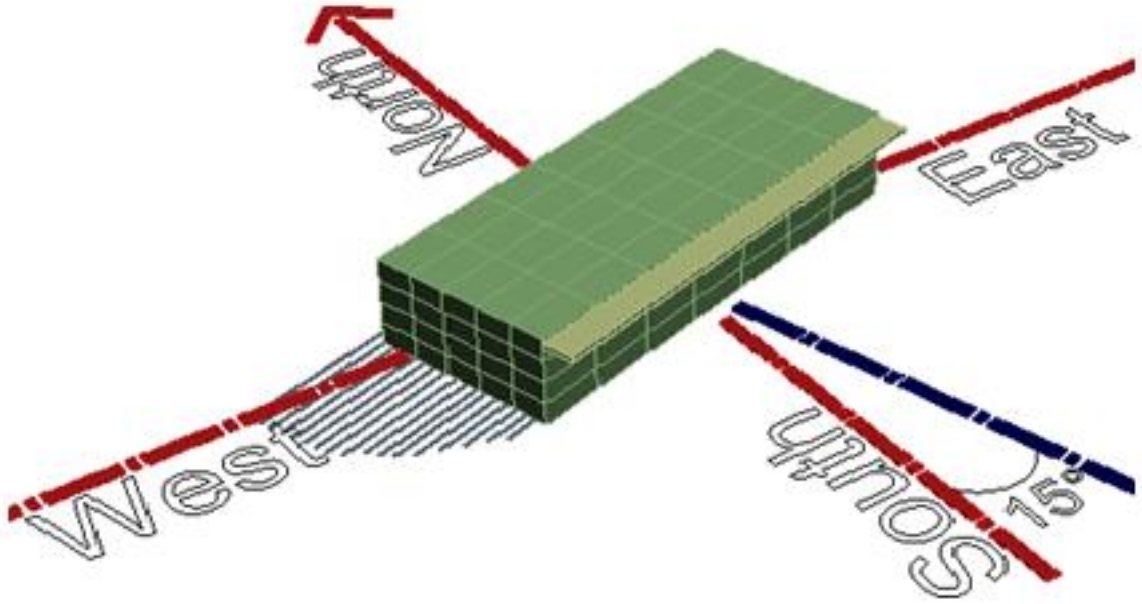

P
2 hour

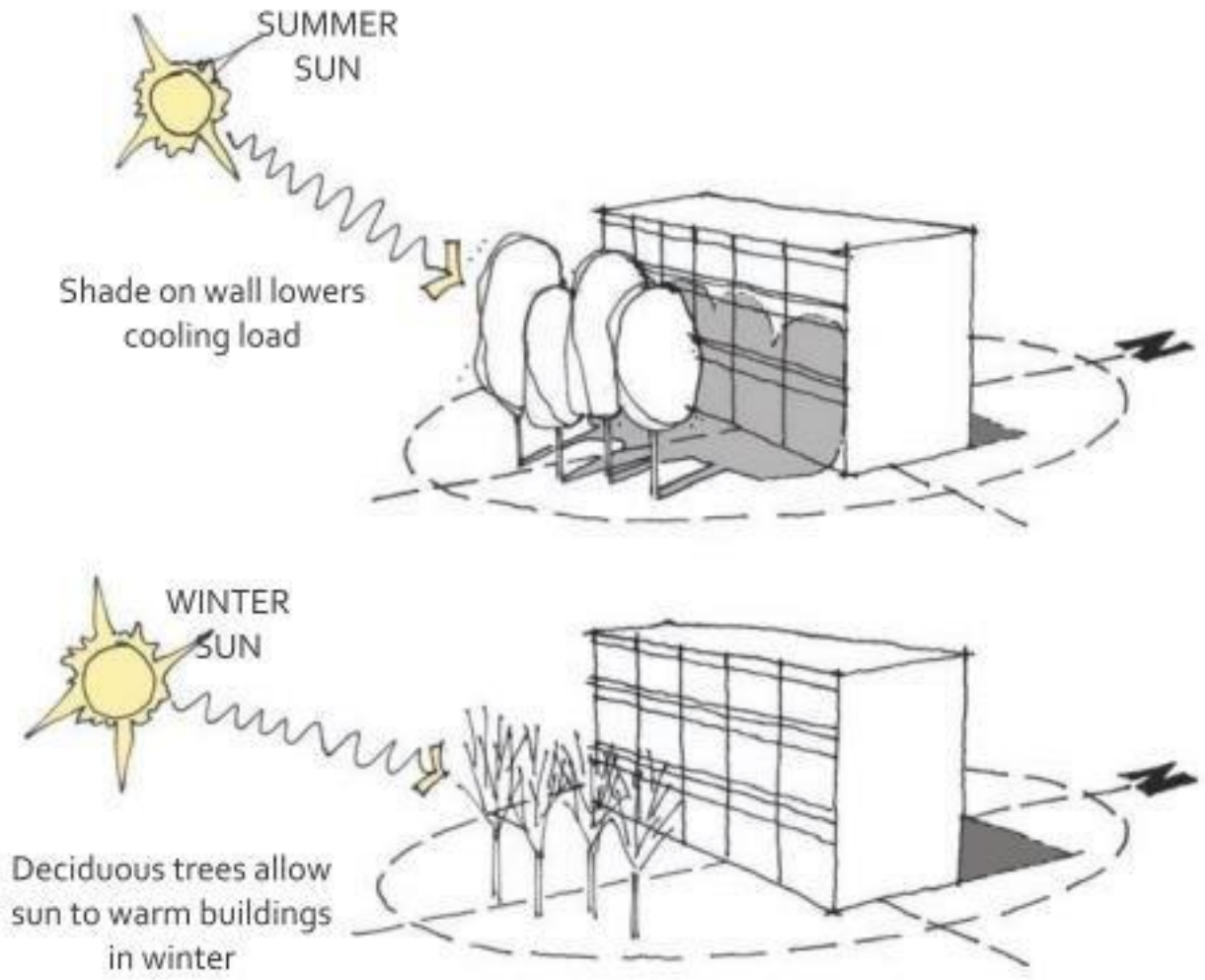

Ventilation

Building Design Strategies

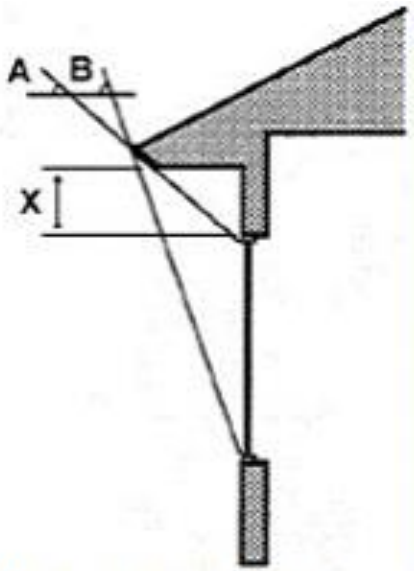
Building Orientation and Form

- Align buildings on east-west axis
- Minimize west-facing windows
- Provide overhangs or recessed windows on the southern façade
- Provide fins or tall trees on east and west facades
- Desing narrow floor plates of 40 feet or less
- Provide for passive ventilation
- Integrate courtyards and plazas





Orientation and Shading



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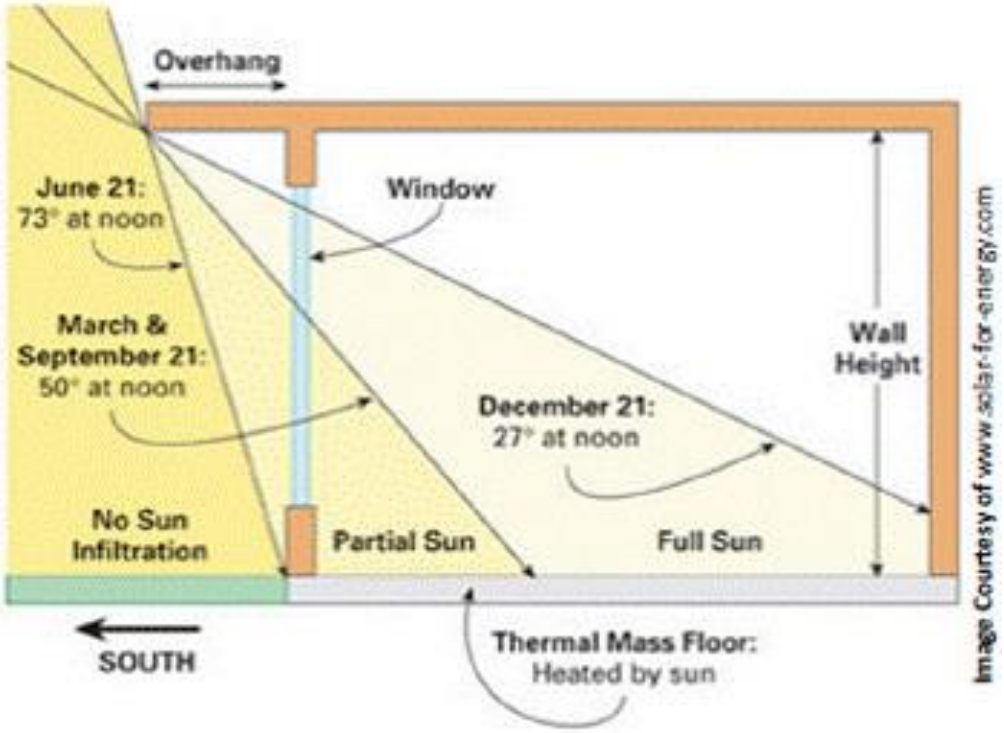


Image Courtesy of www.solar-for-energy.com

Overhangs & Fins


Narrow Floors


Evaporative Cooling

Cool Roofs & Paving

Courtyards

Principles of Design for Cooling

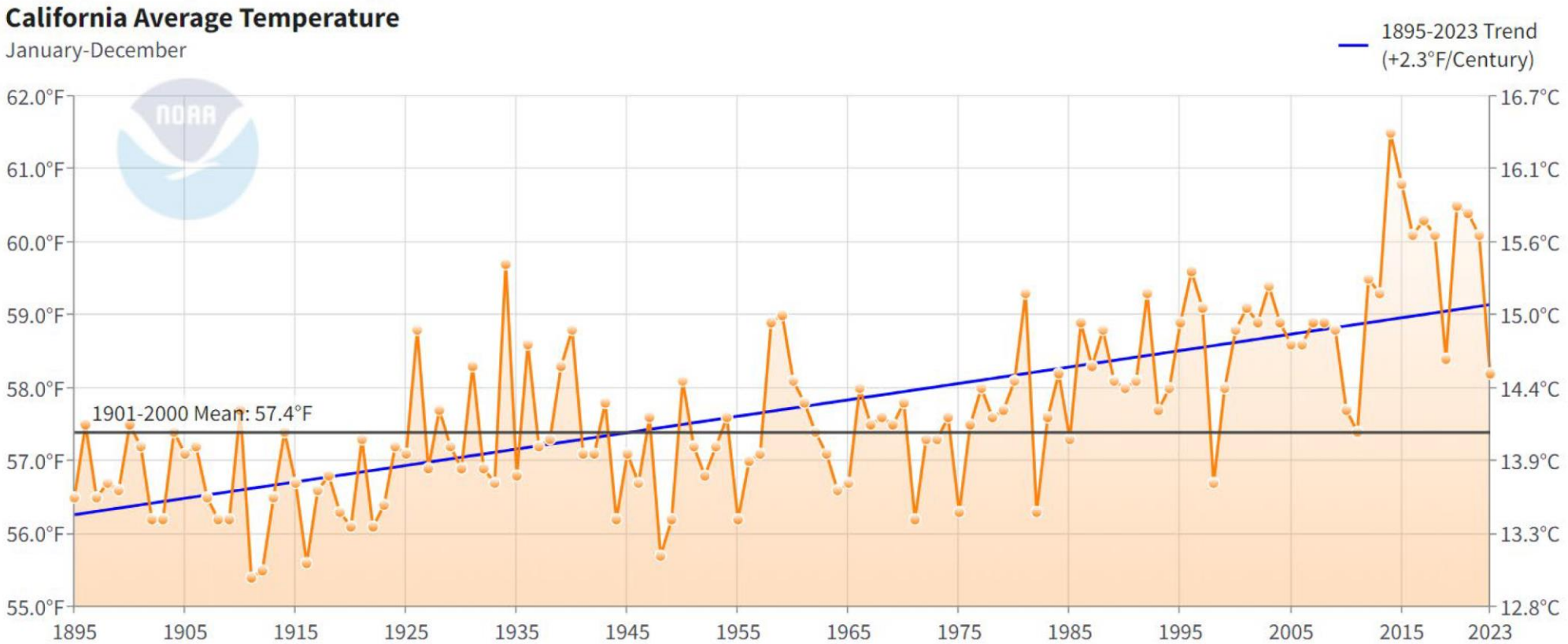
- Research local climate conditions
- Integrate passive strategies into the fundamental building design
- Work with nature
- Identify multiple benefit strategies
- Work at multiple scales – city, neighborhood, site, building

CDPH
California Department of Public Health

Valuing the Health Impacts of Extreme Heat

Maithili Ramachandran
Climate and Health Economist, Office of Health Equity
22 October 2024

Extreme Heat in California



CDPH

Source: National Oceanic and Atmospheric Administration (NOAA)

Extreme heat affects health in utero

UC RIVERSIDE
School of Public Policy

WORKING PAPER SERIES

JULY 2021

TABLE OF CONTENTS

The Impact of Extreme Temperatures on Newborn Health in California

Maithili Ramachandran[1], Kate Choi[2], Mindy Marks[3], Bruce Link[1] and Kurt Schwabe[1]

[1]*School of Public Policy, UC Riverside*

[2]*Keck Graduate Institute*

[3]*Northeastern University*

Data and Method

- Data on newborn health
  - Via Department of Health Care Access and Information (HCAI)
  - 11 million observations between 1991 and 2011
  - Main outcome: birth weight
- Weather data
  - Via NOAA's Global Historical Climatology Network
  - Daily mean temperature
  - Monthly precipitation
- Measure *in utero* exposure by trimester at ZIP codes
- Fixed effects regression with spatial clustering

Findings

- *In utero* exposure to extreme heat reduces birth weight
- Exposure in the second trimester
  - Average loss is 22 grams per day of extreme heat

  → A three-day heat wave would reduce birth weight by 2%
  - Greater loss when this trimester overlaps with cool months

  → Important to guard against exposure to unseasonably high temperatures
- Disproportionate, negative impact in ZIP codes with the greatest share of outdoor workers in the state

CDPH guidance

PREGNANCY AND REPRODUCTIVE HEALTH

Safe Pregnancies in Extreme Heat

CDPH Heat Risk Grid: Understanding "HeatRisk" Level, Who is At Risk, and What Actions to Take

Revised July 27, 2023. Adapted from the National Weather Service (NWS) HeatRisk tool. Learn more about how to stay safe during extreme heat at CDPH Extreme Heat.

Value	Risk	What does this mean?	Who / What is at risk?	What actions can be taken?
0 (Green)	**Little to None**	• This level of heat poses **little to no risk** from expected heat	• No elevated risk	• No preventative actions necessary
1 (Yellow)	**Minor**	• Heat of this type is **tolerated by most**; however, there is a **minor risk for extremely heat-sensitive groups*** to experience negative heat-related health effects	• **Primarily those who are extremely sensitive to heat,*** especially when outdoors without effective cooling and/or adequate hydration	• Increase hydration • Reduce time spent outdoors or stay in the shade when the sun is strongest • Open windows at night and use fans
2 (Orange)	**Moderate**	• Heat of this type is tolerated by many; however, there is a **moderate risk for members of heat-sensitive groups*** to experience negative heat-related health effects, including heat illness • **Some risk for the general population who are exposed to the sun for longer periods of time** • **Living spaces without air conditioning can become uncomfortable during the afternoon and evening**, but fans and leaving windows open at night will help	• **Primarily heat-sensitive or heat-vulnerable groups,*** especially those without effective cooling or hydration • Those not acclimatized to this level of heat (i.e., visitors) • Otherwise healthy individuals exposed to longer duration heat, without effective cooling or hydration, such as in the sun at an outdoor venue • Some transportation and utilities sectors • Some health systems will see increased demand, with increases in emergency room visits	• Reduce time in the sun during the warmest part of the day • Stay hydrated • Stay in a cool place during the heat of the day (usually 10 a.m. to 5 p.m.) • Move outdoor activities to cooler times of the day • For those without air conditioning, use fans to keep air moving and open windows at night to bring cooler air inside buildings
3 (Red)	**Major**	• Heat of this type represents a **major risk to all individuals who are 1) exposed to the sun and active or 2) are in a heat-sensitive group** • **Dangerous to anyone without proper hydration or adequate cooling** • **Living spaces without air conditioning can become deadly during the afternoon and evening. Fans and open windows will not be as effective.** • **Poor air quality** is possible • **Power interruptions** may occur	• **Much of the population, especially anyone without effective cooling or hydration** • Those exposed to the heat/sun at outdoor venues • Health systems likely to see increased demand with significant increases in emergency room visits • Most transportation and utilities sectors	• **Cancel outdoor activities during the heat of the day**** (usually 10 a.m. to 5 p.m.), and move activities to the coolest parts of the day • Stay hydrated • Stay in a cool place especially during the heat of the day and evening • If you have access to air conditioning, use it, or find a location that does. Even a few hours in a cool location can lower risk. Fans may not be adequate.
4 (Magenta)	**Extreme**	• This is a rare level of heat leading to an **extreme risk for the entire population** • **Very dangerous to anyone without proper hydration or adequate cooling** • This is a **multi-day excessive heat event**. A prolonged period of heat is dangerous for everyone not prepared • **Poor air quality** is likely • **Power outages are increasingly likely** as electrical demands may reach critical levels	• **Entire population exposed to the heat is at risk** • For people without effective cooling, especially heat-sensitive groups, **this level of heat can be deadly** • Health systems highly likely to see increased demand with significant increases in emergency room visits • Most transportation and utilities sectors	• **Cancel outdoor activities**** • Stay hydrated • Stay in a cool place, including overnight • If you have access to air conditioning, use it, or find a location that does. Even a few hours in a cool location can lower risk. Fans will not be adequate. • Check on your neighbors

**Populations at higher risk of heat-related health impacts include older adults, young children, unhoused residents, those with chronic health conditions, outdoor workers, those exercising or doing strenuous activities outdoors during the heat of the day, pregnant individuals, those living in low-income communities, and more.*

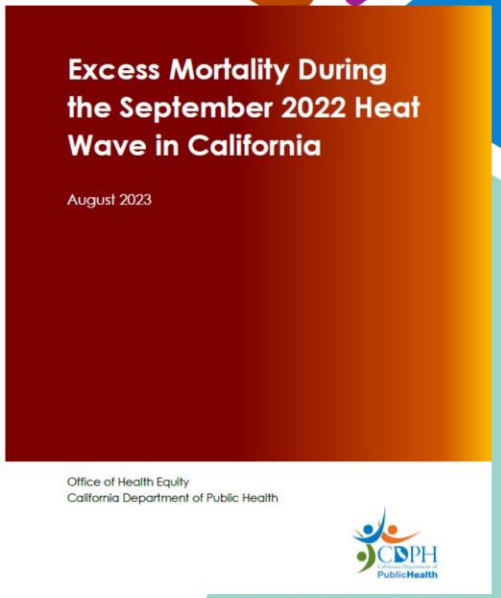
*** For Extreme (Magenta/4) and Major (Red/3) risk levels, CDPH recommends more caution and therefore guides canceling outdoor activities based on these scenarios.*

Recent Heat Wave Mortality

- **Key finding: 395 excess deaths**
- **In the future:**
  - What could we do to prevent such deaths?
  - How much should the state spend on prevention?
- **Value of a Statistical Life (VSL)**
  - USEPA central estimate is $10.95 million in (2019 $)
- **Expenditure the public would accept**

  = 395 x 10.95 million

  = $ 4.3 billion (2019 $)



Heat-Mortality in California's Future

Roadmap

i. Project frequency, intensity, duration of future heat waves

ii. Project excess mortality of future heat waves

iii. Translate projected mortality impact into economic terms

iv. Compare to program costs of adaptation and prevention

v. Support climate action by showing benefits of avoided heat-mortality exceed program costs

Heat-proofing Communities

Home Weatherization

Urban Greening

Protecting Workers

CDPH

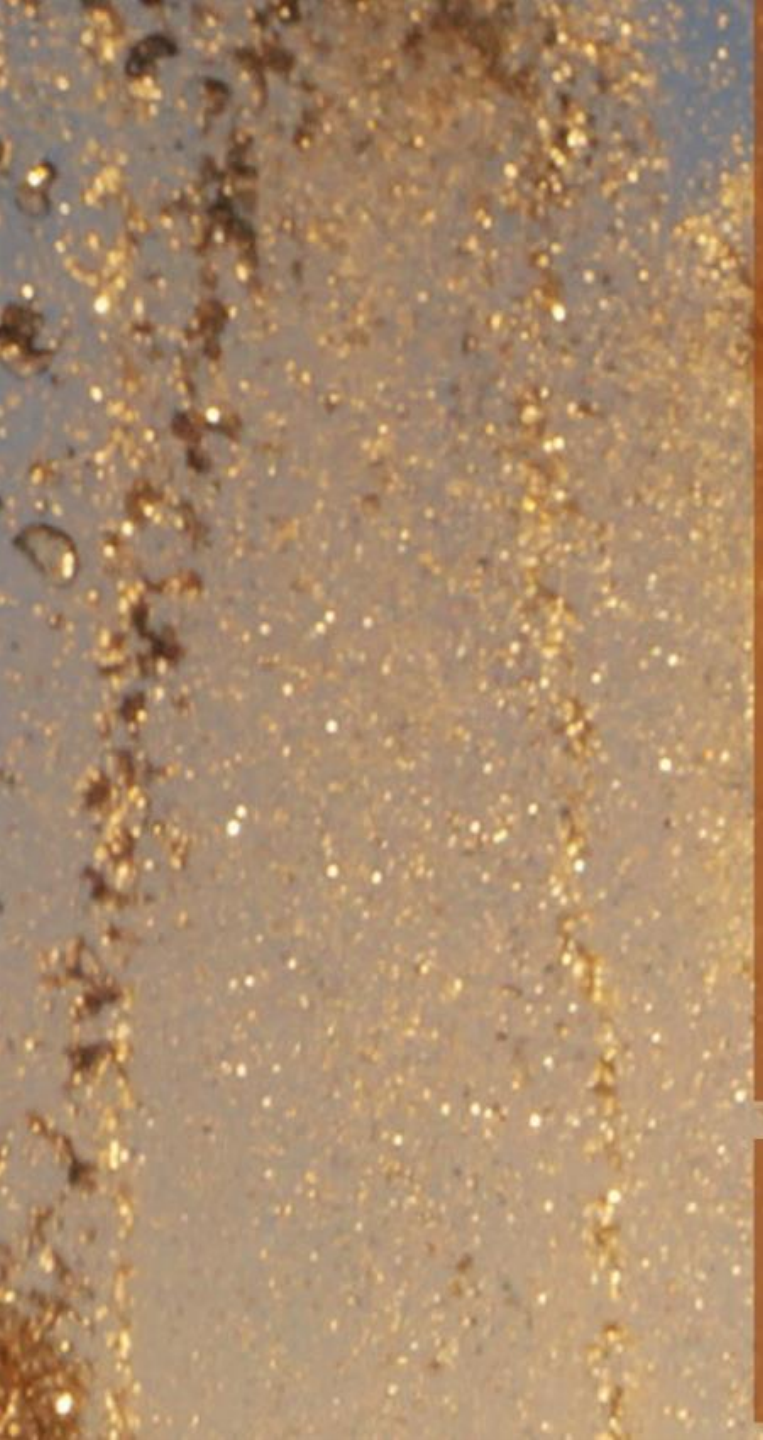
Thank you!

Email: Maithili.Ramachandran@cdph.ca.gov

CDPH

CDPH

California Department of
Public Health



IEc

RICARDO LARA
INSURANCE COMMISSIONER
California Department of Insurance

Impacts of extreme heat to California's people, infrastructure, and economy

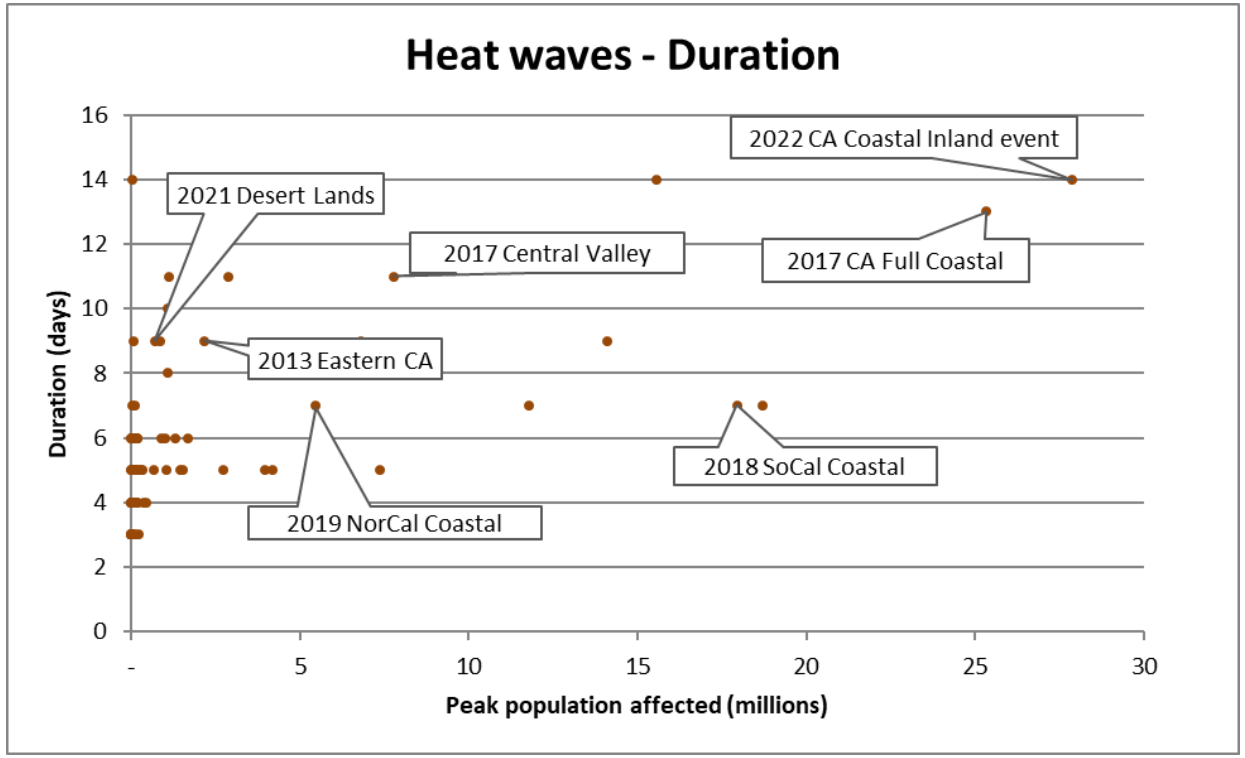
Pioneering analysis measuring uninsured and insured costs of extreme heat events

Examining the Costs Per an Extreme Heat Event

COMPREHENSIVE LOOK AT DIFFERENT TYPES OF ECONOMIC AND FINANCIAL IMPACTS

EXAMINES COSTS OF SPECIFIC RECENT EVENTS

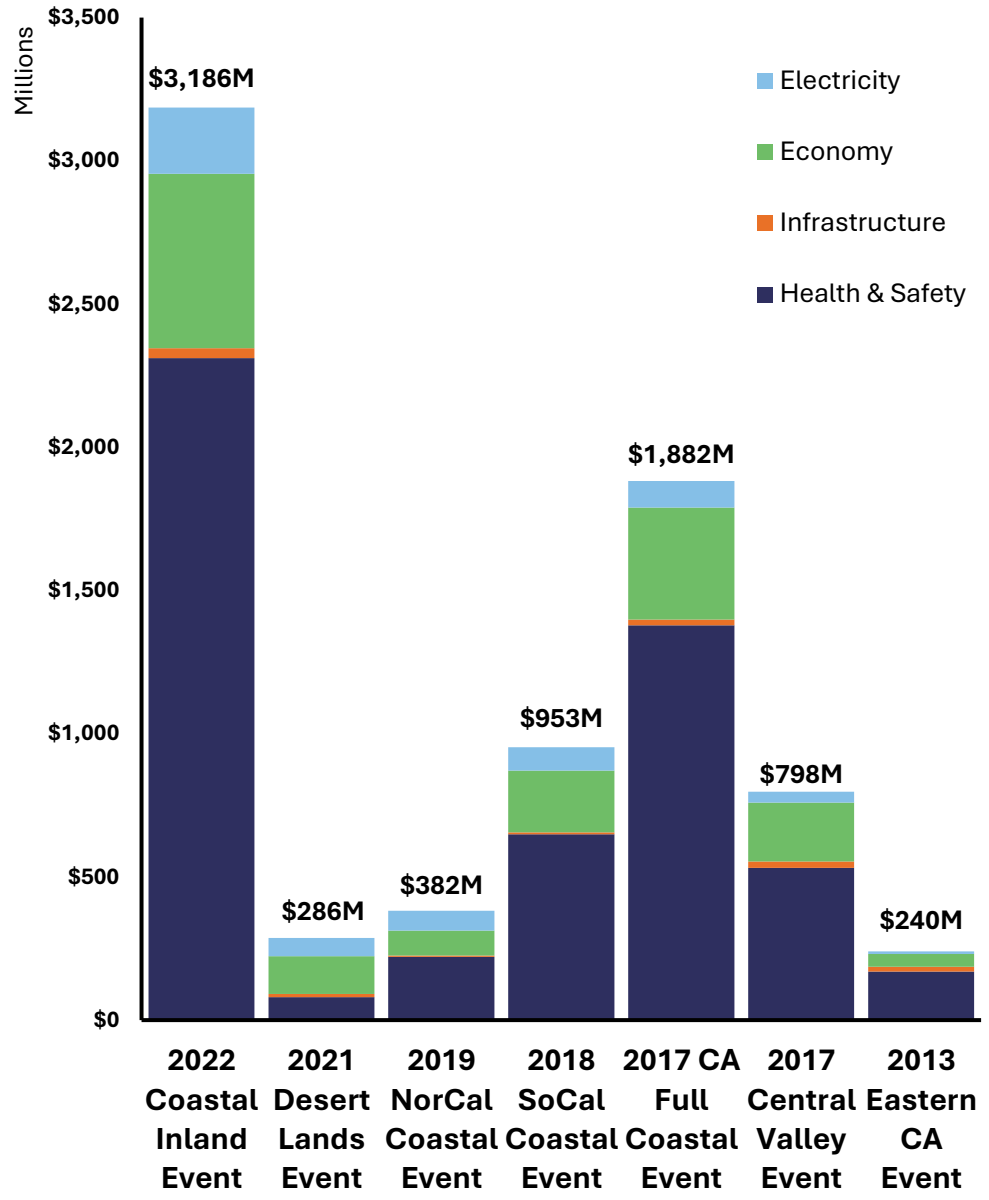
COVERS MOST OF THE GEOGRAPHIC LOCATIONS AND POPULATIONS ACROSS CALIFORNIA

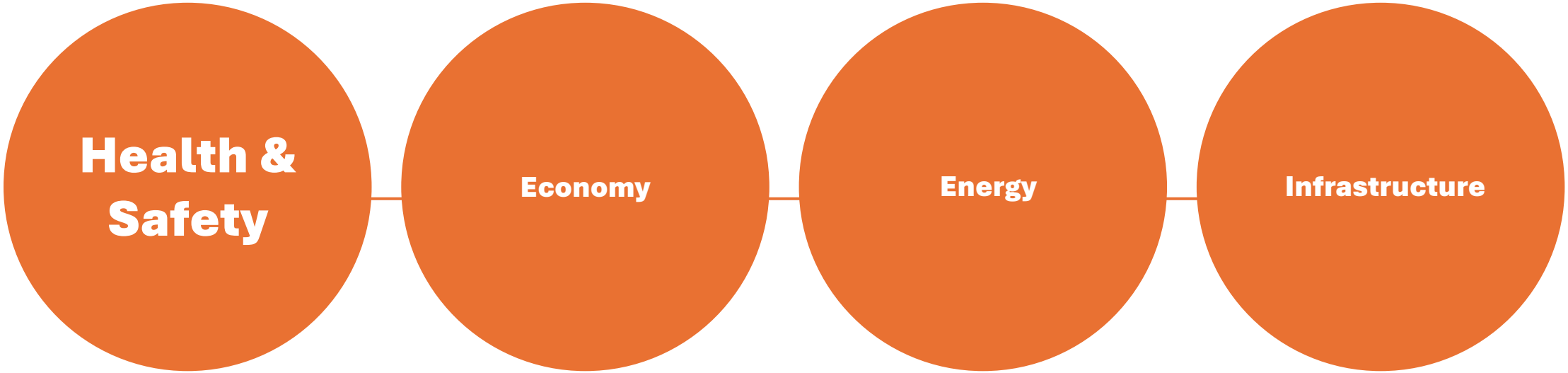


Geographical Exposure of the Seven Past Extreme Heat Events Spans the Majority of California

Extreme Heat Events Impact Various Aspects of Our Lives

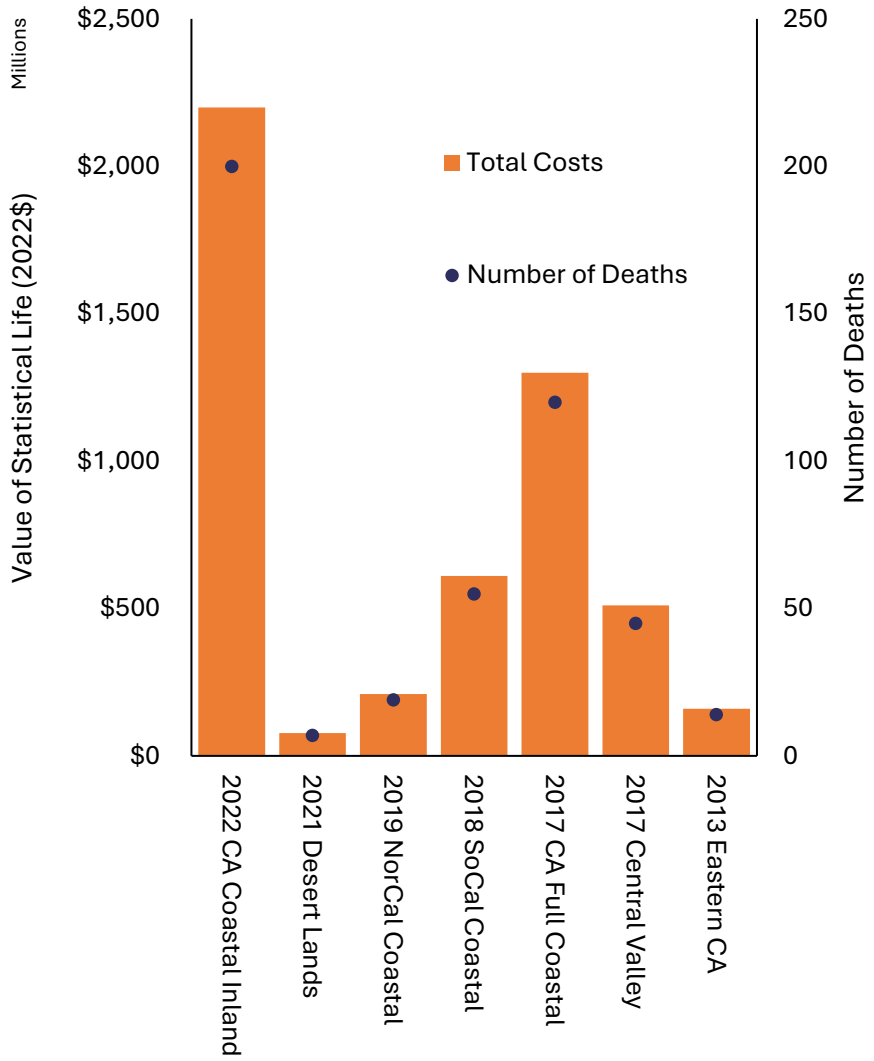
Health & Safety — **Economy** — **Energy** — **Infrastructure**




Health & Safety
Economy
Energy
Infrastructure

Health and Safety had the Biggest Impact

- 460 Deaths
- >138,000 Outpatient Visits
- ~ 10,600 Emergency Department Visits
- >5,000 Hospitalizations
- ~ 344 Adverse Birth Outcomes
- Higher rates of workplace injuries
- Vulnerable populations were hit the hardest



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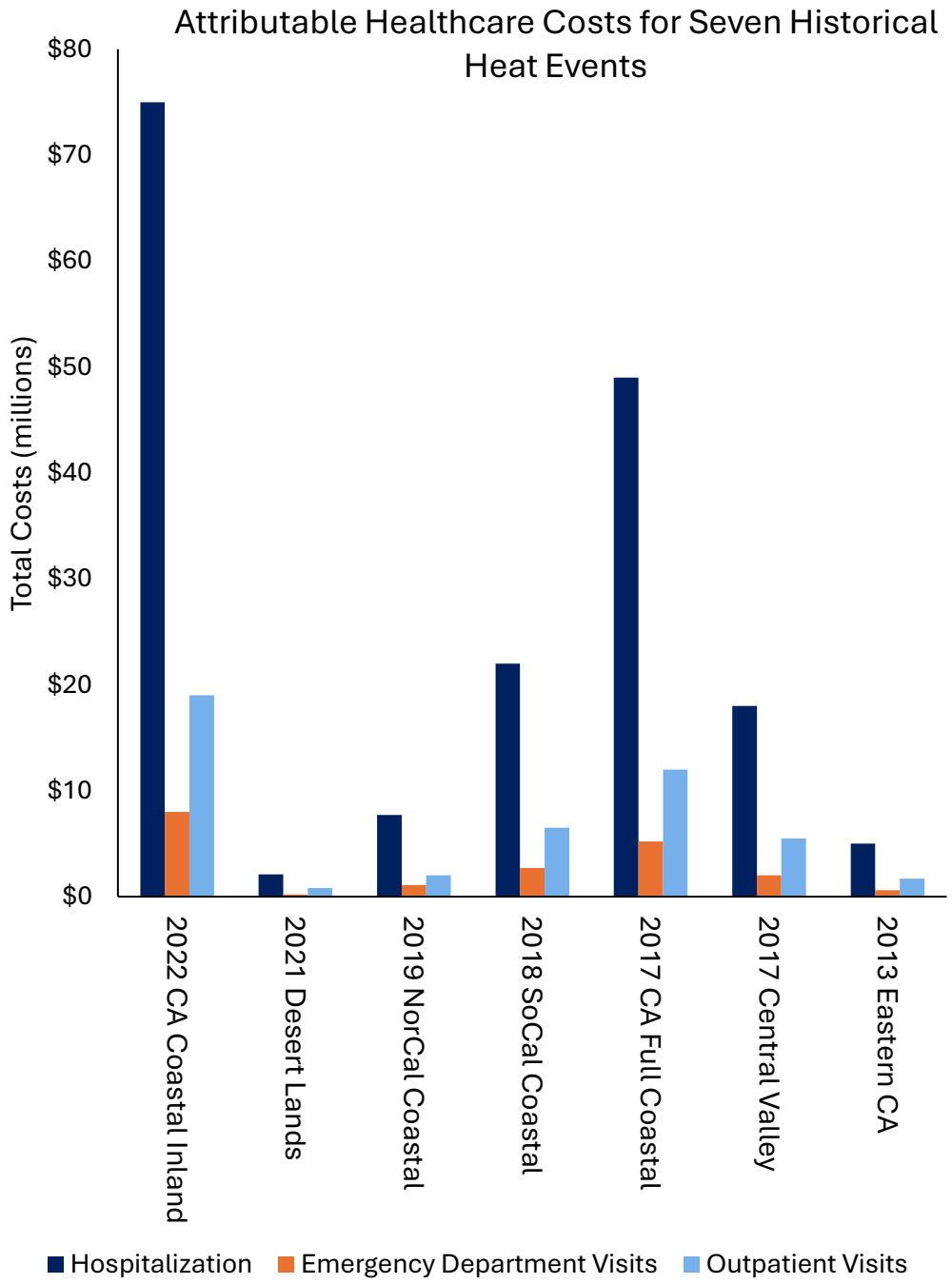
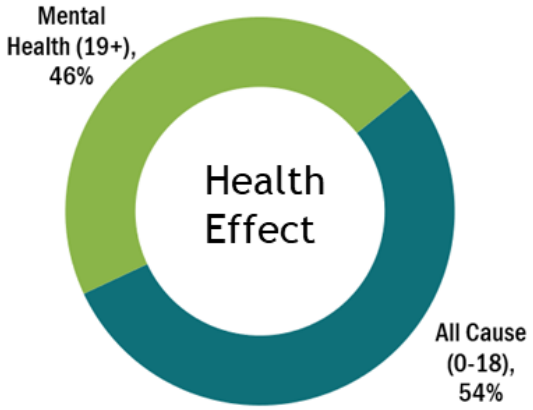
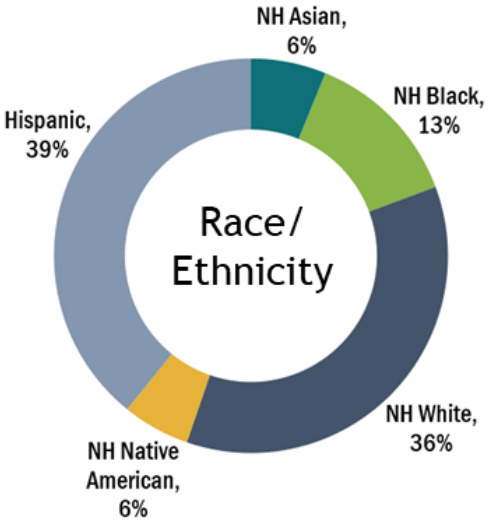
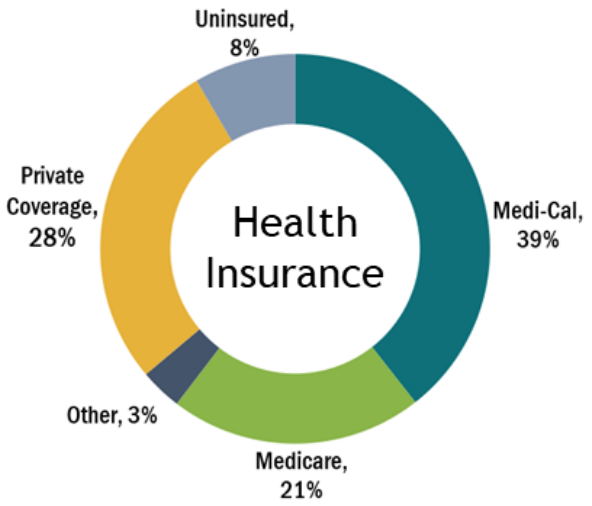


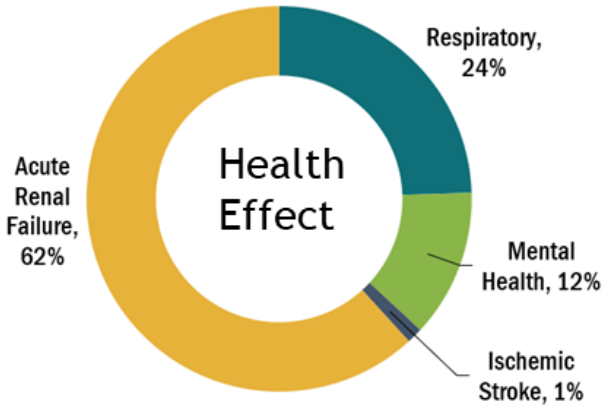
Emergency Department visits

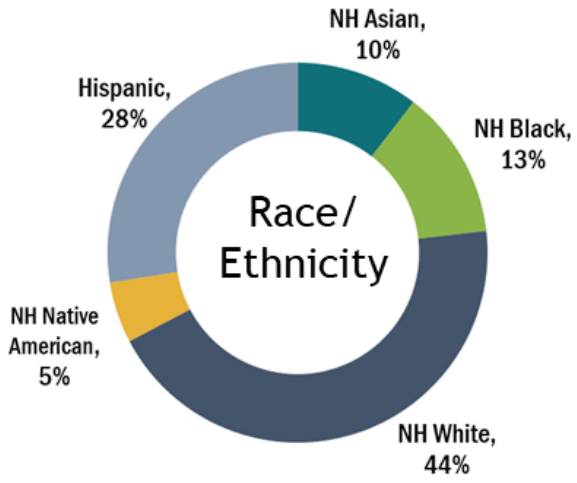


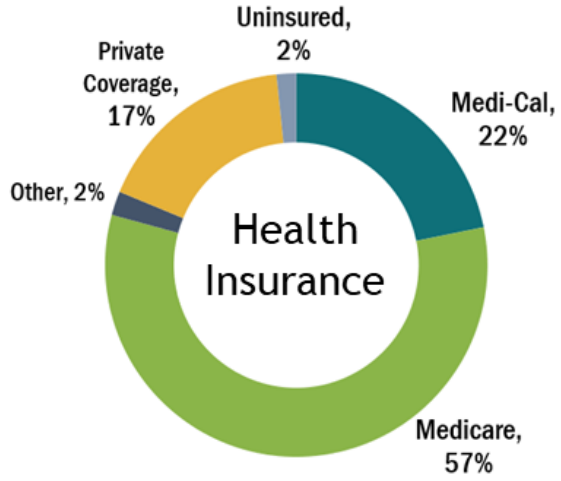


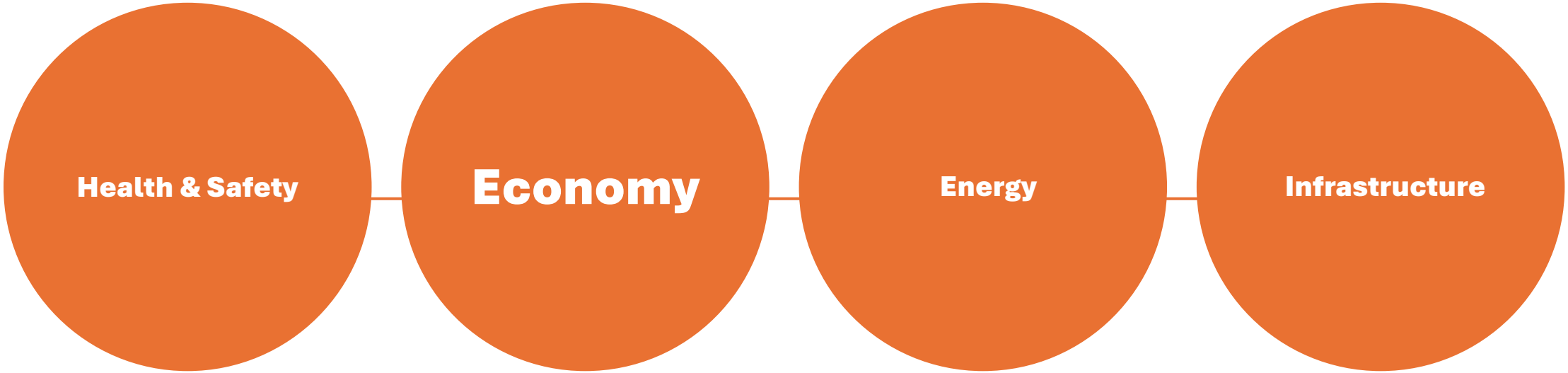


Hospitalizations





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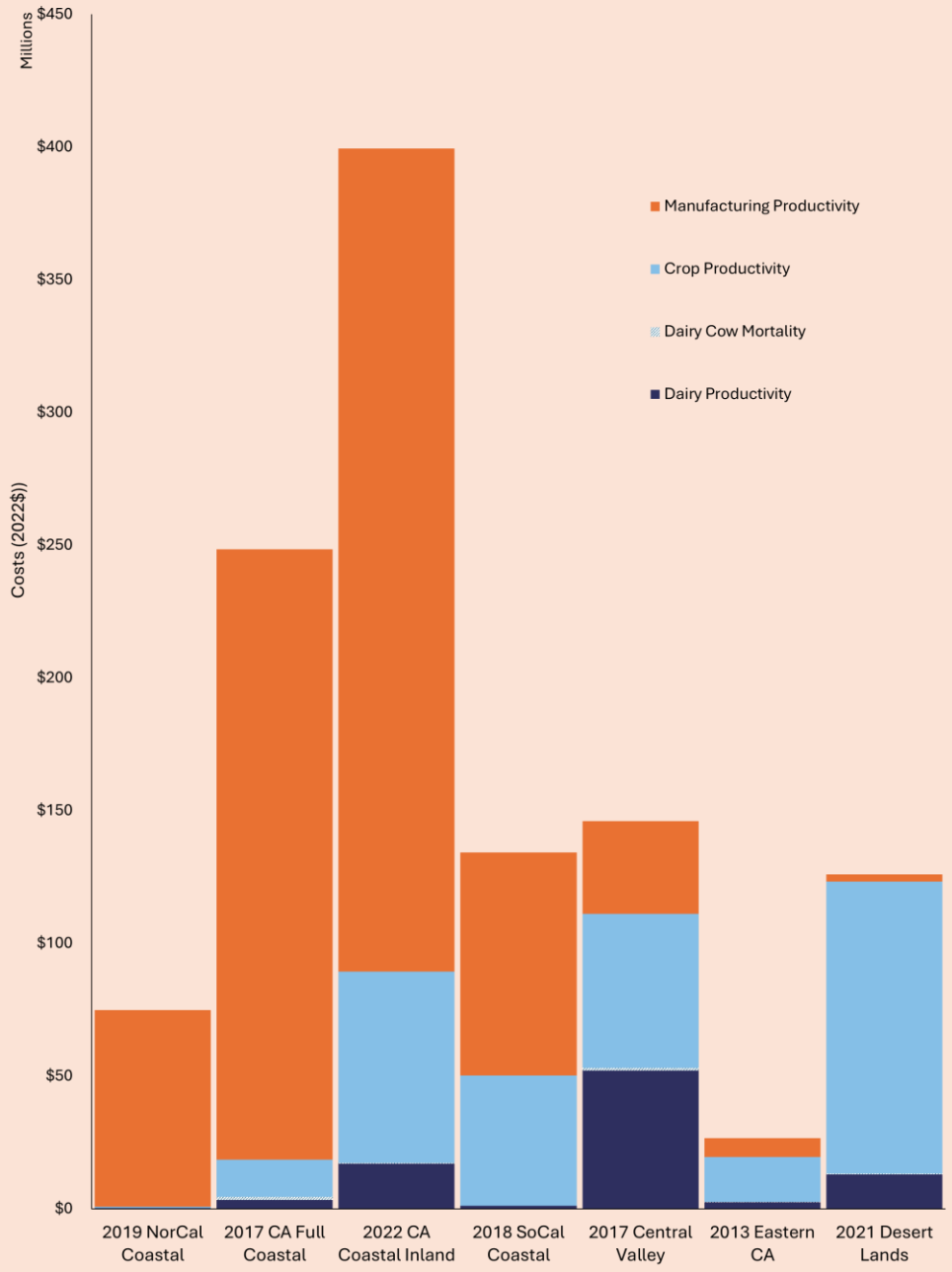
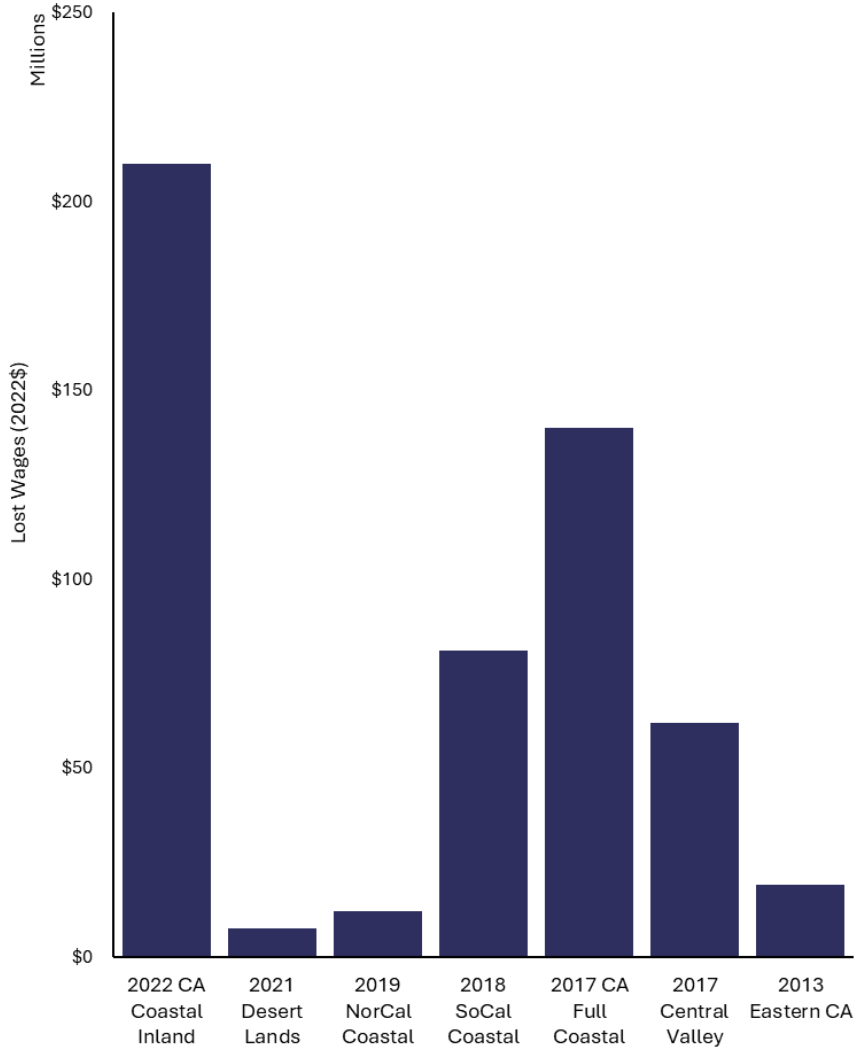
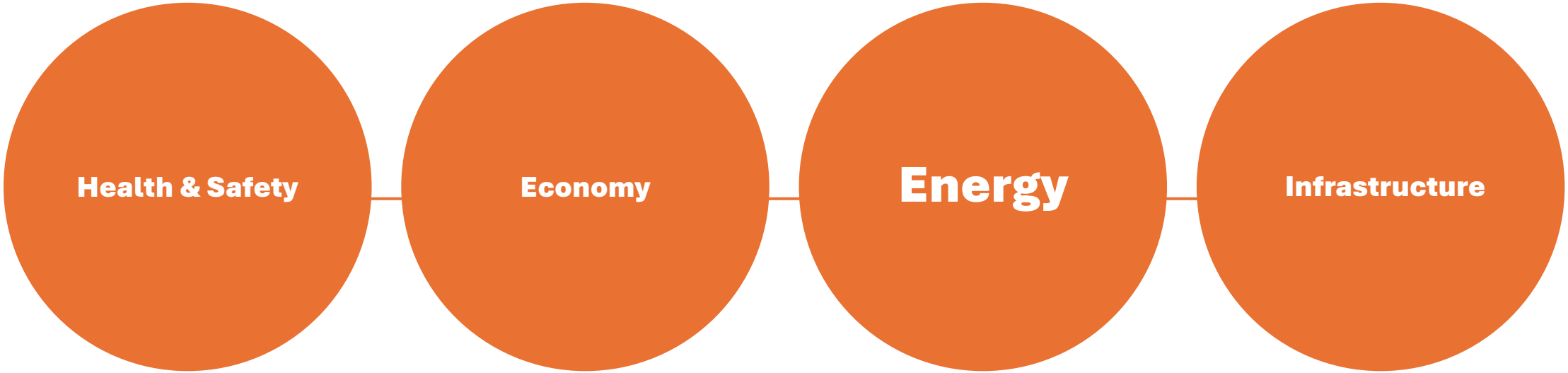


Extreme Heat Disrupts Expected Income for Workers

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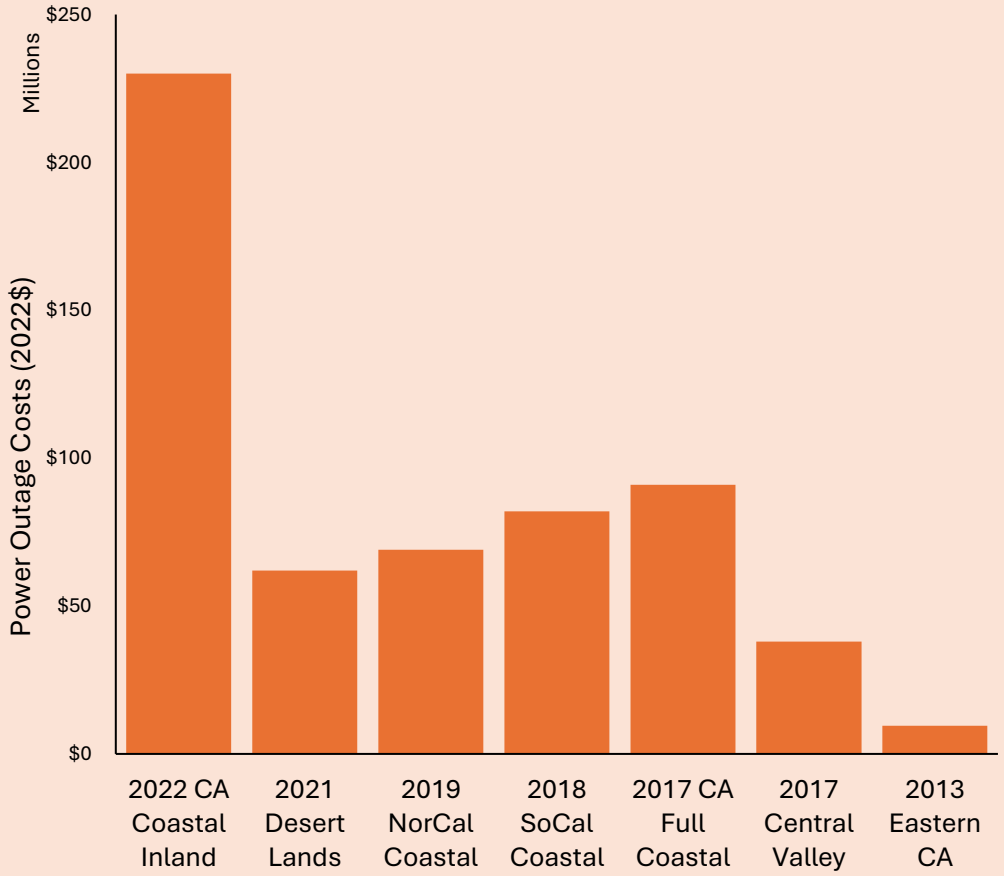
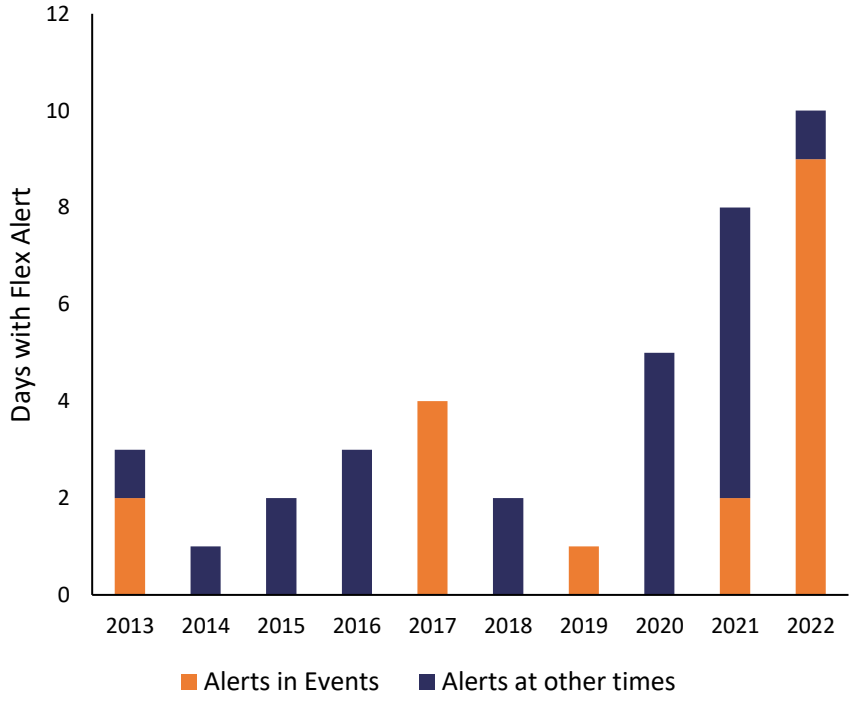
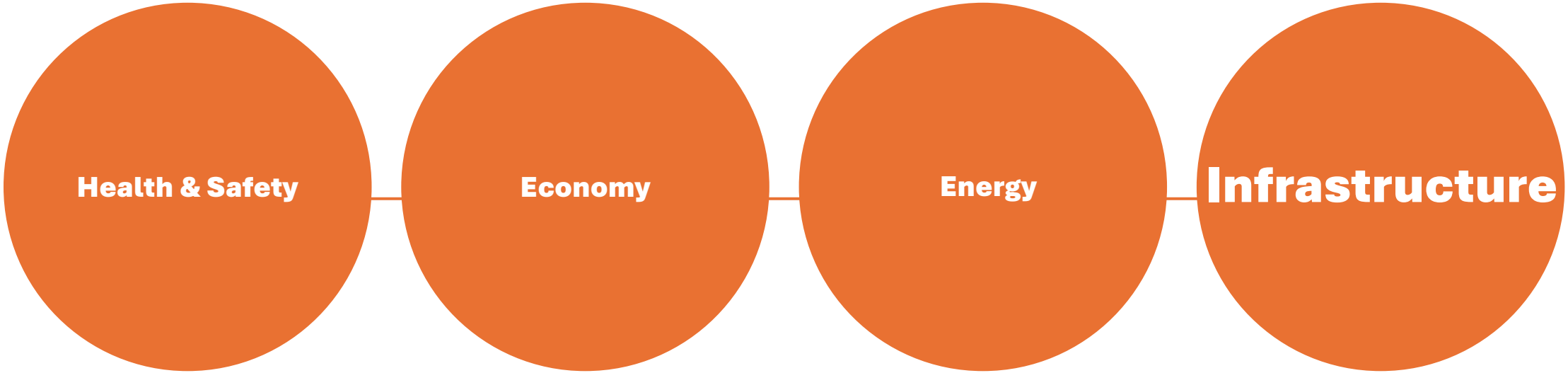
Extreme Heat Events Increase Power Outages



Extreme Heat Events Limit the Use of Electricity



Source: California ISO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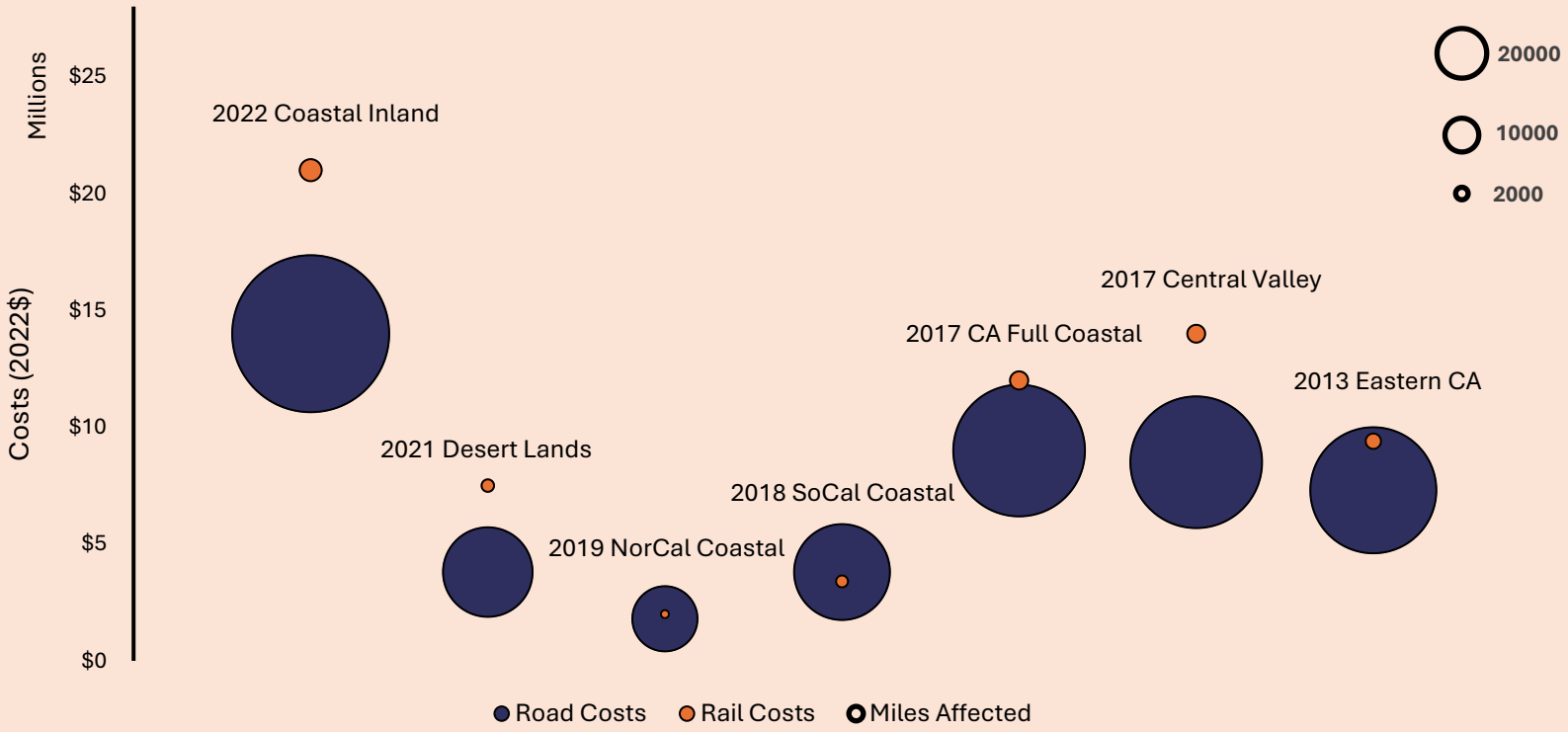
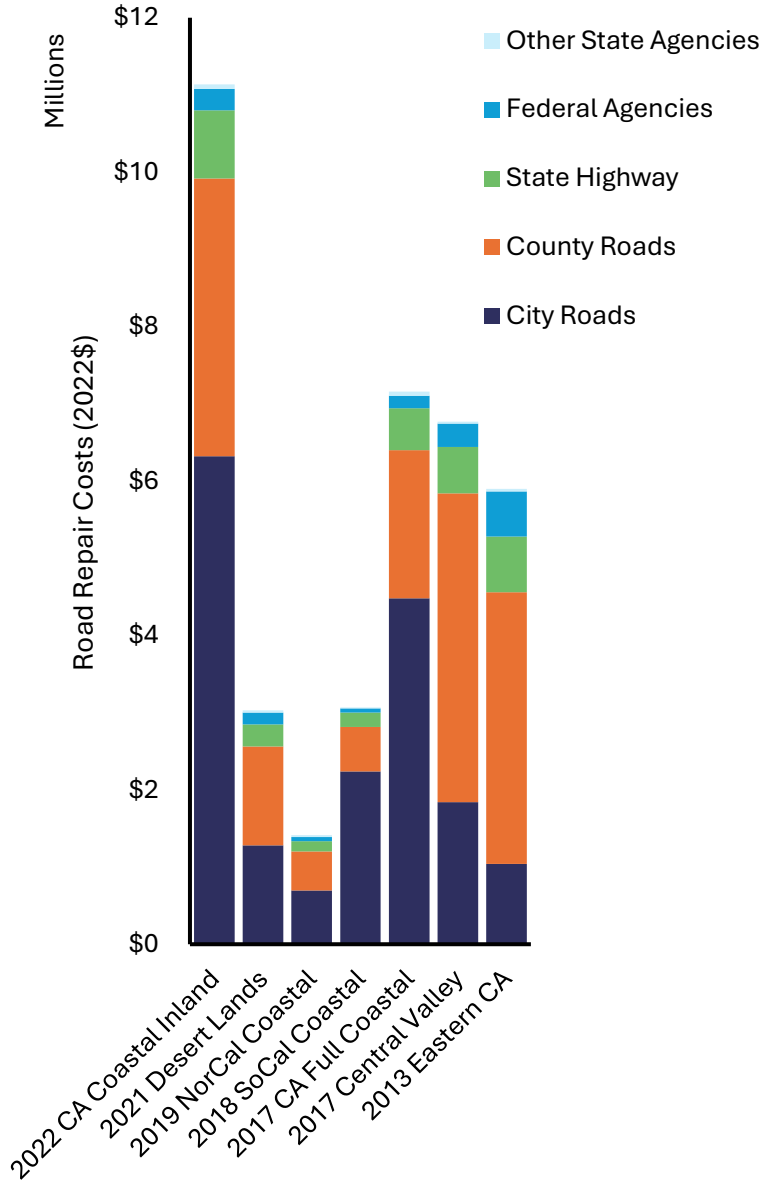
Extreme Heat Events Damage Roads and Delay Passengers





Local Governments Incur Other Losses Due to Extreme Heat Events

- Increased Demand for Services
- Tax Revenues
- Response and Operational Costs

Incurred Costs to Local Government Operations due to Extreme Heat

Increase in the number of emergency services

Resources

Use of backup generators

Staff overtime at cooling centers

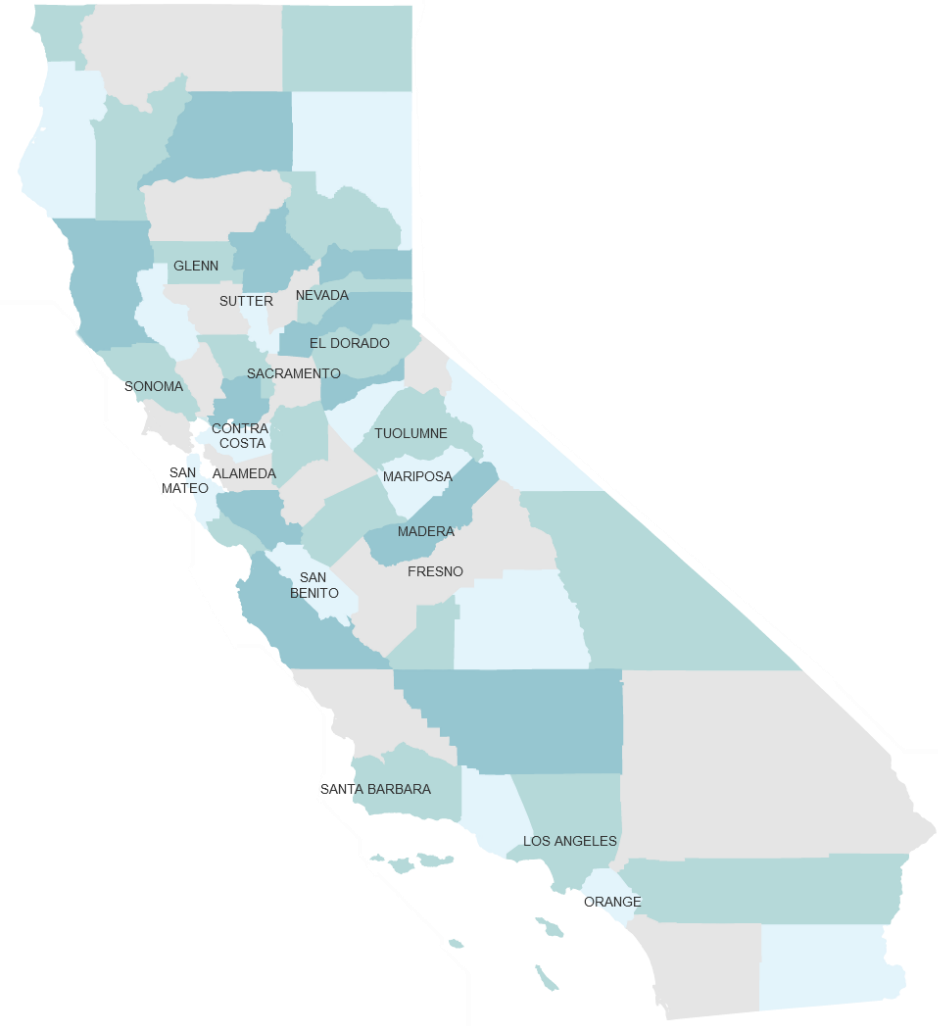
Increase in hospital bed days

Security

Electric bills

Wear and tear of public infrastructure

Increase in visits to community health clinics



Local Governments Incur Other Losses Due to Extreme Heat Events

- LA COUNTY FIRE: Two million dollars in additional calls for emergency medical services in 2022

- MADERA COUNTY: Wildfire losses after an extreme heat event in 2022

Interventions

Explore Cost Benefit Analysis of Extreme Heat Interventions:

- Trees in Los Angeles County
- Evaporative Cooling for Dairy in the Central Valley

Local Heat Action/Response Plans

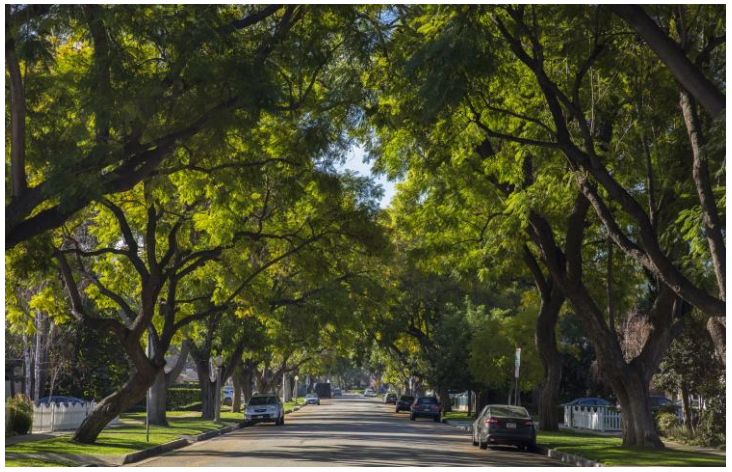
Heat education and guidance campaigns

cooling centers public health warnings

longer operational hours for cooling activities

transportation services

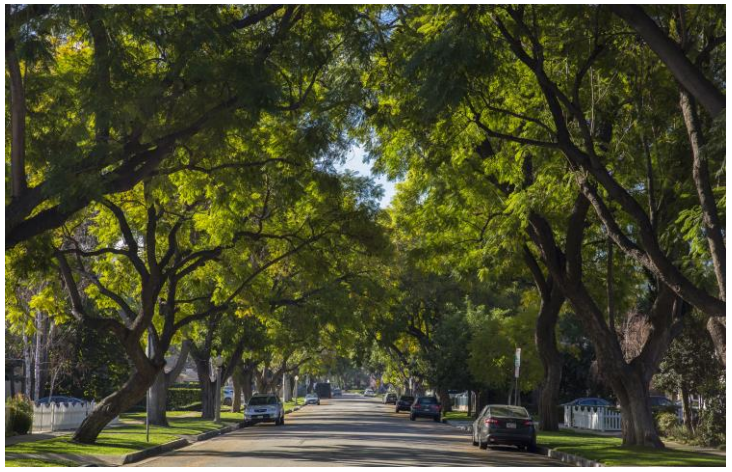
In-home supportive services



Recommendations

Explore Innovative Insurance Solutions:

- Incentivizing Heat-Illness Reduction Strategies
- Incentivizing Extreme Heat Resilient Strategies
- Developing novel insurance mechanisms and pilot projects



THANK YOU

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www.insurance.ca.gov/01-consumers/180-climate-change/

Tell us how we did!

Take a quick 2-minute survey to help us improve future Toolbox Tuesdays!