# Coordination Committee Meeting #6

May 3, 2022 | 12:00pm – 1:00pm

Matt Wolff | SFDPH | Matt.Wolff@sfdph.org

Alex Morrison | ORCP | Alex.Morrison@sfgov.org

## Introductions (on the Chat)

Name | Agency | Optional: If you were a vegetable, what vegetable would you be? (vegetable's that are fruits also count) -- I.e Tomato

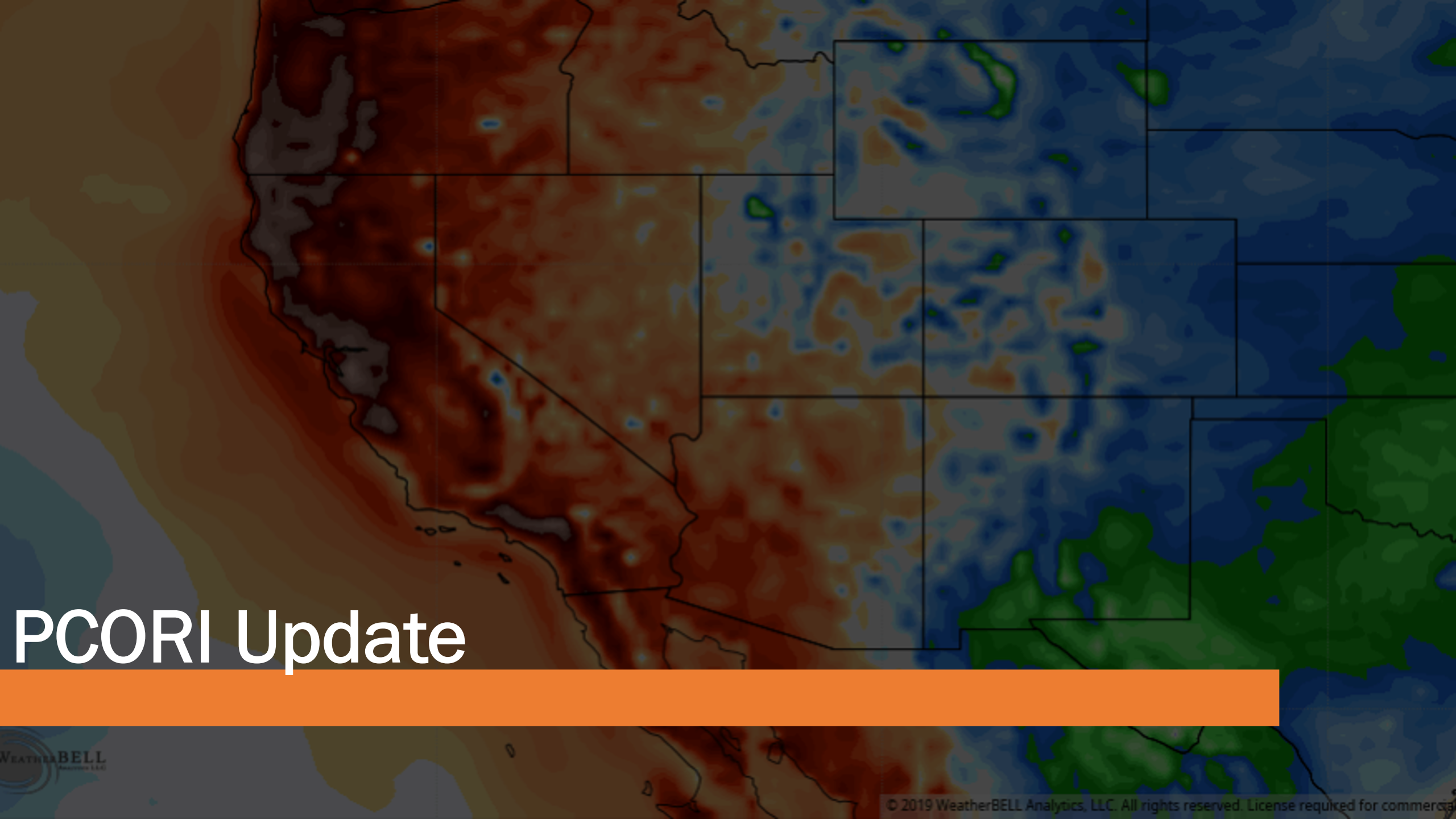
## Agenda

- HAQR Implementation Plan Progress
- PCORI Updates
- Preparations for the 2022 Extreme Heat | Wildfire Smoke Season
- Aclima Air Quality Data Release
- Presentation:
  Lawrence Berkeley National Laboratory Cool Buildings Solutions, Dr. Max Wei and Dr. Ronnen Levinson, “Cal-THRIVES: A California Toolkit for Heat Resilience in Underserved Environments”


# HAQR Implementation Plan Progress

# Heat and Air Resilience Project: Implementation Team Workflow

| | March | April | May | June | July | August | September |
|---|---|---|---|---|---|---|---|
| **HAQR Project Management** | Literature Review Complete By 03/31 | Data Collection Support<br>Finalize Plan Template 04/30/31 | Data Collection Finished by 05/31 | Write Narrative | Narrative Finished by 07/31 | Edits \| Graphic Design | |
| **HAQR Coordination Committee** | | **Meeting** | | **Meeting (Review Implementation Plans)** | | **Meeting** | |
| **HAQR Implementation Teams** | Review 2021 Implementation Team Actions<br><br>Introduce 2022 Work Plan (Timeline, Deliverables, Template, Socialize Literature Review)<br><br>• **Discussion**: How Best to Engage This Work Group?<br>• **Discussion**: Are The Right People in the Room to Collect Information? If not, who are they?<br>• **Discussion**: How do we add/expand actions based on literature review findings? | Data Collection<br><br>• **One-on-Ones**<br>• **Full Group Meetings**<br>• **Homework** | Data Collection Finished by 05/31<br>Review<br>***Meeting (Review Implementation Plan) | | ***Meeting (Incorporate Feedback / Final Review) | | ***Meeting (Next Steps) |




# PCORI Update

# New opportunity for engagement

To create a NEW Community Stakeholder Group composed of 5-6 members to support HAQR implementation teams. Stakeholders will be trained on data collection and analysis. Activities of this team will support efforts carried out by implementation teams and foundational to the development and evaluation of HAQR actions.

- Identify community concerns pertaining to heat and air quality health impacts
- Identify community preferences as they relate to resilience actions to mitigate those impacts

**Priority for groups supporting vulnerable geographic areas and those supporting socially isolated older groups **

# Roles and Responsibilities

- Co-design community survey to research about health concerns, current strategies used during extreme weather events, and identify acceptable resilience actions
- Co-lead focus groups with the HAQR team
- Participate in analysis and interpretation of findings
- Co-lead Town Halls presenting findings to community and Implementation Teams

# Priority Areas for Engagement

- 1. **Community organizations that live in or support EJ communities for geographic vulnerability**
- 2. **Older populations across SF**
- 3. **Supportive services for unhouse and marginally housed communities across SF**
- 4. **Organizations that reach socially isolated populations**

# Time Commitment & Compensation

- First 3 months: Meet every other week for 1 hour for training on methods
- Months 4-18: Meet monthly for 90 minutes
- $100 per meeting
- Anticipated Timeframe: June 2022-Oct 2023 (18 months)

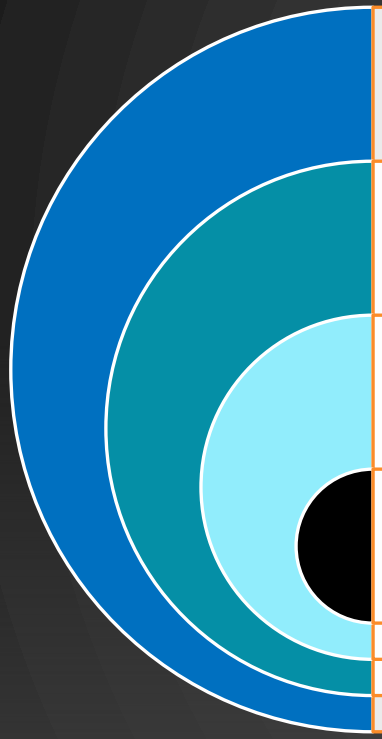
If you're interested in participating, please contact Matt at Matt.Wolff@sfdph.org or Dr. Neeta Thakur at Neeta.Thakur@ucsf.edu


# 2022 Heat and Wildfire Smoke Season

# EMERGENCY RESPONSE IMPLEMENTATION TEAM UPDATE

MAY 2022

# FUNDING SOURCES



BAY AREA AIR QUALITY MANAGEMENT DISTRICT (THROUGH AB 836)

BAY AREA AIR QUALITY MANAGEMENT DISTRICT VIA DISTRICT'S WILDFIRE AIR QUALITY RESPONSE PROGRAM

REALLOCATED UASI GRANT FUNDING THAT WAS UNABLE TO BE USED DURING COVID

ADD BACK FROM THEN-SUPERVISOR FEWER TO DEM

# BAY AREA AIR QUALITY MANAGEMENT DISTRICT – 2 SOURCES

- Via AB 836
- $221,000
- Application Submitted
- Partner with CBOs to activate during poor air quality events

- Via District's Wildfire Air Quality Response Program
- $100,000
- Accept and Expend approved by BOS
- Identifying locations
- Need to purchase soon

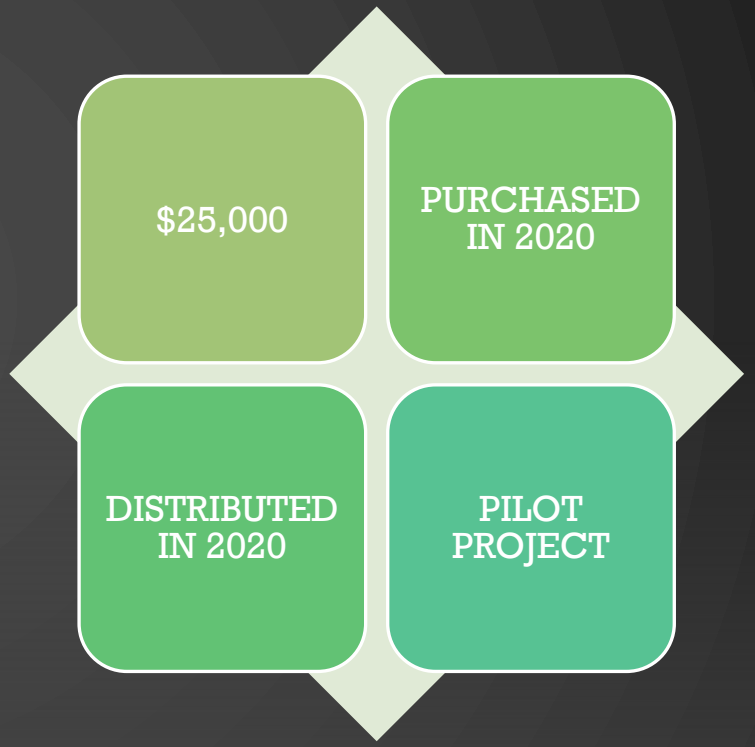
# REALLOCATED UASI FUNDING


- Air filtration units
- Air conditioning Units
- Portable generators and charging stations

# ADD BACK FROM SUPERVISOR FEWER

FOCUS ON RICHMOND AND D1

- Richmond Senior Center
- YMCA
- St. James Community Room
- One Richmond
- Russian American Community Services
- Mercy Housing



**In total, we expect to invest almost $750,000 in the community over the next several years.**

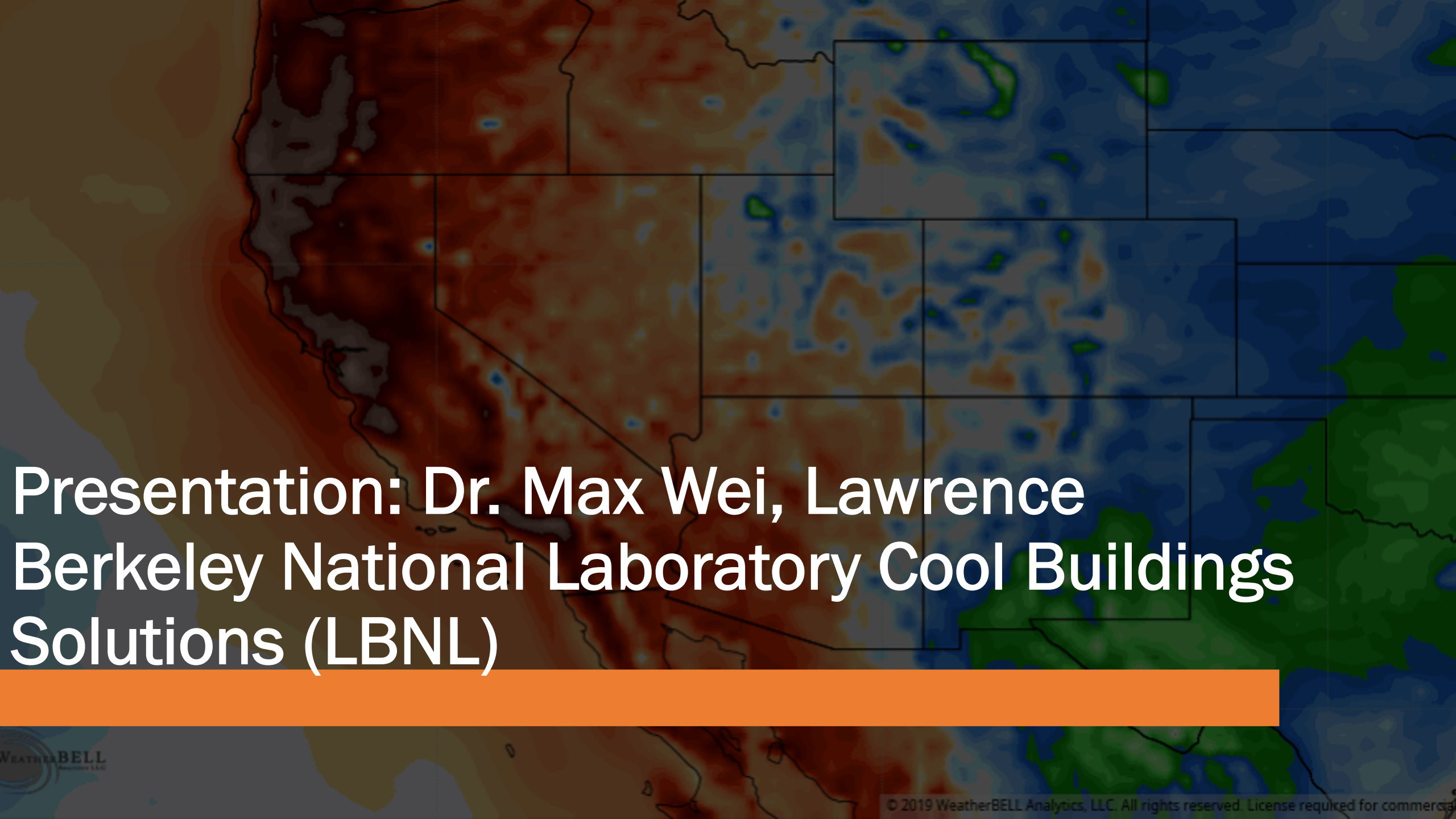
# ALWAYS WELCOMING NEW MEMBERS TO OUR TEAM

Kim Bowman, DEM

Kim.Bowman@sfgov.org

415-439-9171


# Aclima Air Quality Data Release

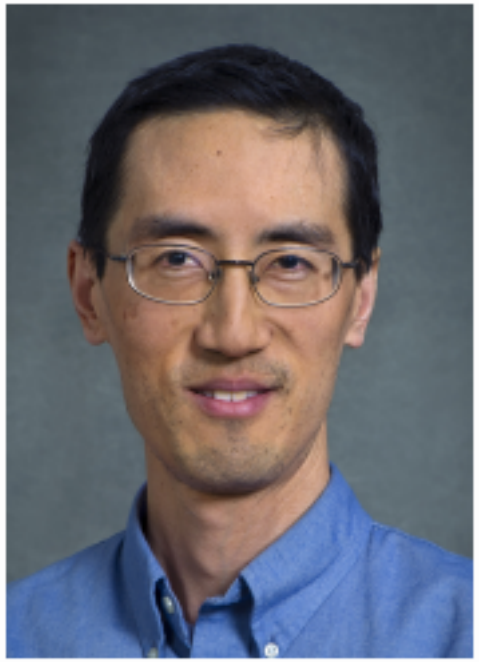


# Presentation: Dr. Max Wei, Lawrence Berkeley National Laboratory Cool Buildings Solutions (LBNL)

# Cal-THRIVES: A California Toolkit for Heat Resilience in Underserved Environments

Max Wei, Ph.D., M.B.A.

Research Scientist
Sustainable Energy & Environmental Systems Department
Lawrence Berkeley National Laboratory
Berkeley, California, USA
tel. +1 510-332-9651
MWei@LBL.gov



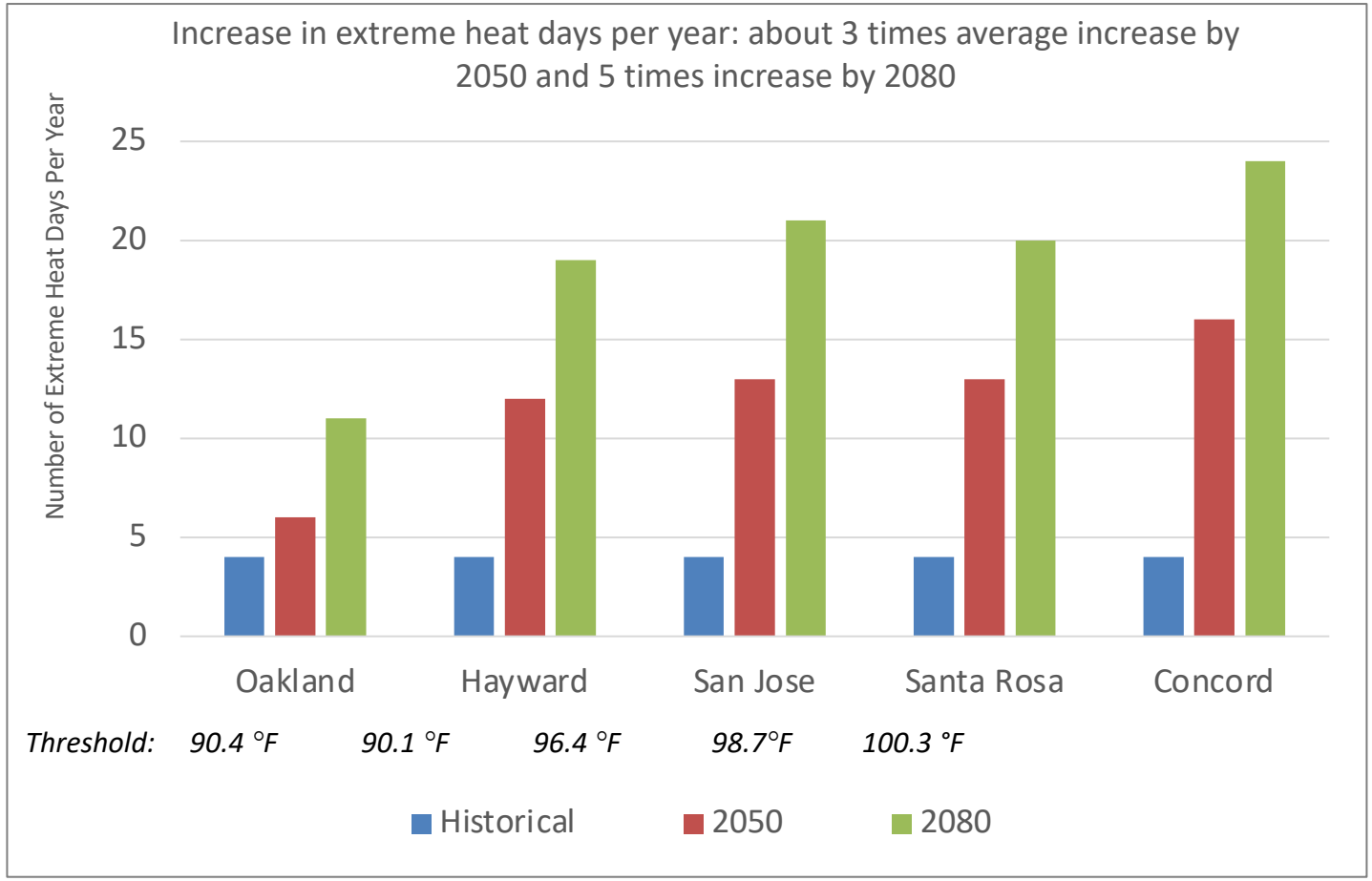
City of SF - HAQR Coordination Meeting • 3 May 2022

# Extreme heat is highly coupled to equity, public health, natural resources, the energy system & GHGs

Extreme heat:

- has increased severity/frequency from climate change
- Impacts disadvantaged communities disproportionately
- Is a critical public health issue, leading cause of mortality from climate-change
- Degrades quality of life, increases discomfort/misery
- Worsens air quality
- Increases summer utility bills
- Increases wildfire risk & exacerbates drought
- Stresses the electricity grid from more air conditioning
- Increases GHG emissions from more air conditioning
- Stresses agriculture & ecological systems
- Strains other infrastructure

# Bay Area will see several-fold increase in the frequency of extreme heat days

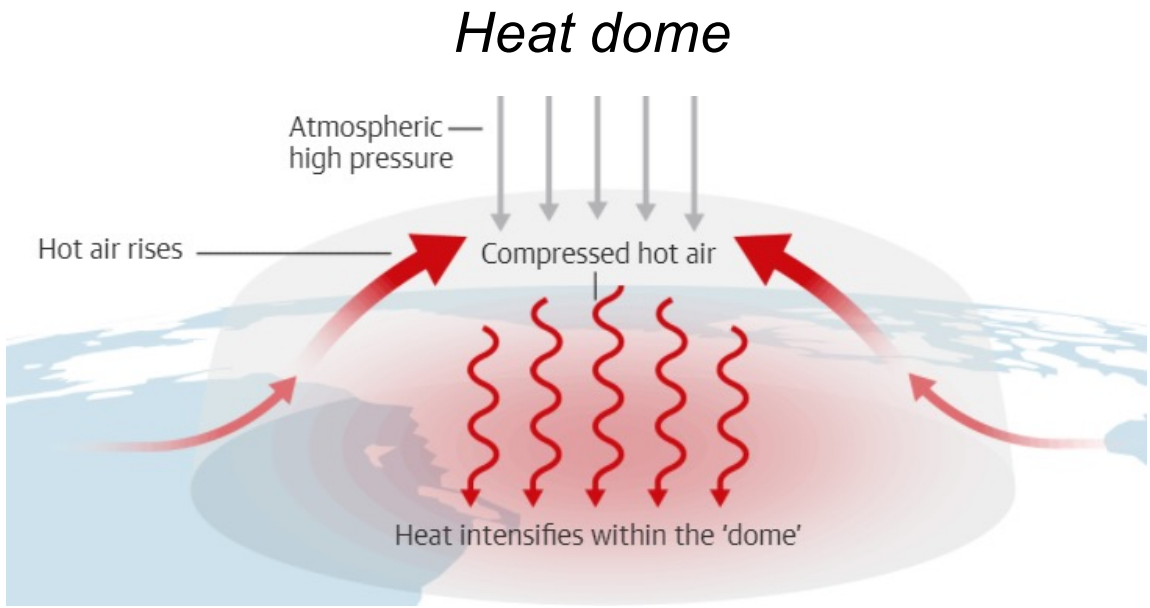



*Ref: Cal-Adapt*

# What about worst-case conditions?

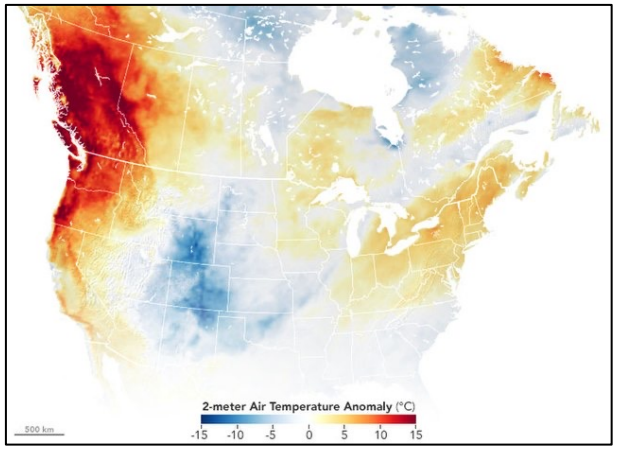
The preceding plot is for AVERAGE increases in the annual number of extreme heat days.

Worst case: “Heat domes”



# Bay Area/Central CA escaped the 2021 Pacific Northwest heat dome

The 2021 Pacific NW heat wave has been deemed a “1 in 1000 year event”… but could become more frequent
e.g. Redding, CA had 15 days above 100 °F in June 2021 with **9 days at or above 105 °F, high at 112 °F**




KPIX CBS SF BayArea

**Bay Area Escapes Heat Dome Searing Pacific Northwest, For Now**

*“The intense heat gripping the Pacific Northwest was originally intended for the Bay Area. As recently as June 18th, long range* ***high resolution forecasts began depicting an intense heat dome centered over Northern California’s Central Valley*** *with daytime highs reaching up to 119 in Sacramento and 126 in Redding.” – CBS KPIX, June 28, 2021*

# Cal-THRIVES Research Background and Objectives: focus on heat resilience in Fresno

**EXTREME HEAT**:

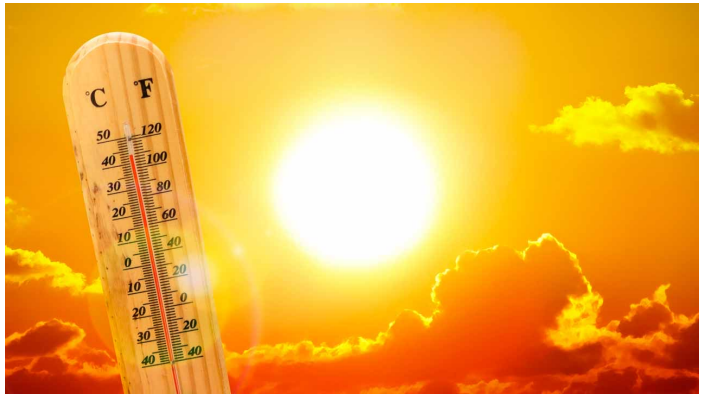
"**Heat now causes more deaths** than hurricanes, tornadoes or floods in most years"

*The Guardian, June, 2020*

**"Most costly climate change impact in CA by 2050"** *CA 4th Climate Change Assessment, 2018*

***Research objectives:***

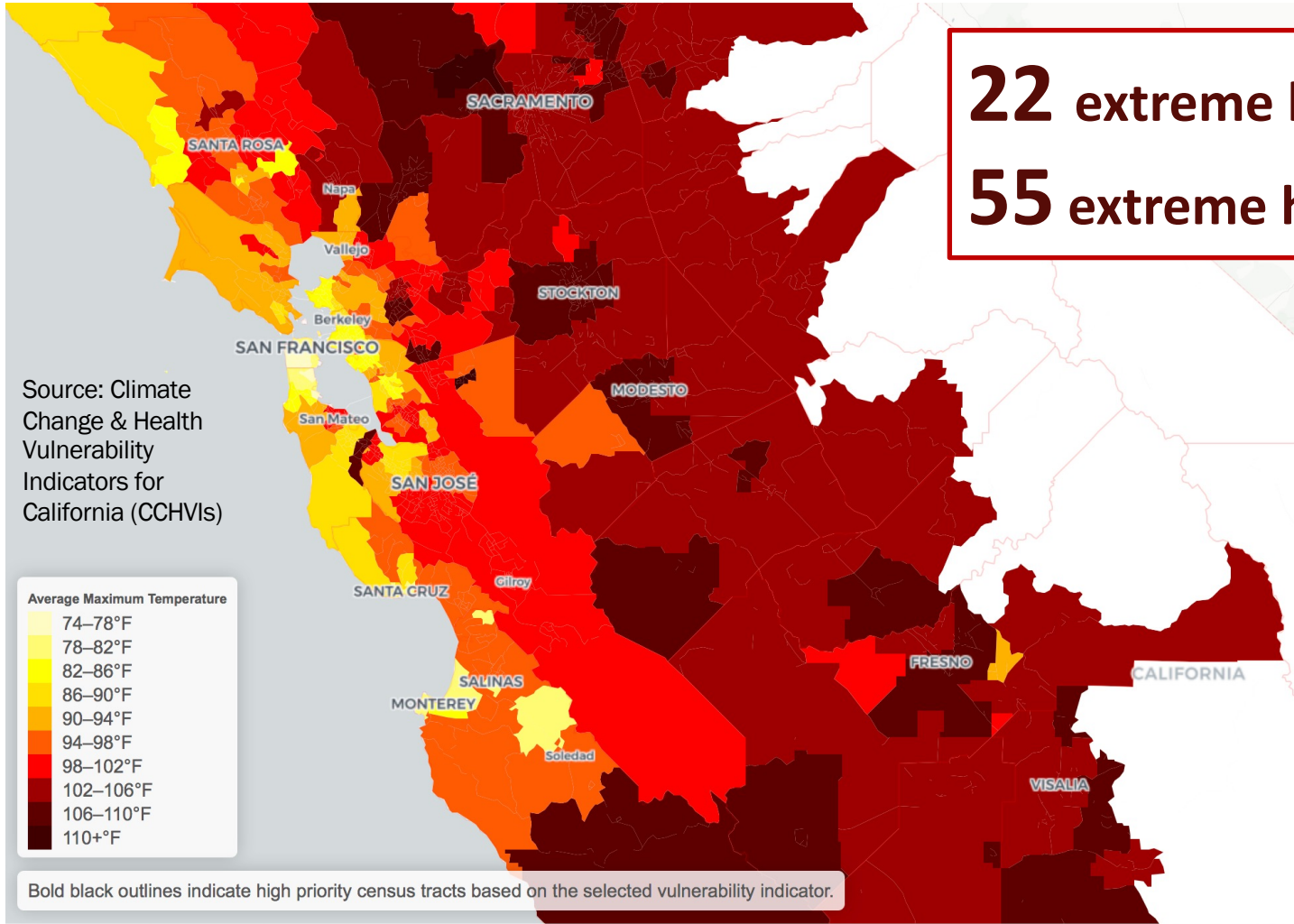
- Develop methodology to model heat resilience at neighborhood scale
- Quantify resilience benefits of passive and active measures during extreme heat waves in a disadvantaged community
- Develop a set of toolkit items to help disadvantaged community (DAC) residents better cope with extreme heat



# **Heat is increasingly brutal in California's Central Valley**, where low incomes, poor air quality, old homes, and high utility bills disadvantage many residents

## California and Fresno are hot

## …and getting hotter




**22 extreme heat days/year by 2040 - 2060**

**55 extreme heat days/year by 2080 - 2099**

Environment ▸ **Climate change** Wildlife Energy Pollution Green light

Climate change

**In California's interior, there's no escape from the desperate heat: 'Why are we even here?'**

Soaring temperatures are a way of life in the Central Valley, but racial disparities mean many have no access to relief

▲ Farmworkers stack boxes of melons on a mobile platform in Firebaugh, California, where temperatures are expected to surpass 110F. Photograph: Terry Chea/AP

**Maanvi Singh** *in Fresno*

@maanvissingh

Sat 10 Jul 2021 06.00 EDT

https://www.theguardian.com/us-news/2021/jul/10/california-central-valley-extreme-heat-race

# The good news is that we **can implement preventative strategies now** to mitigate heat health impacts

## The Cal-THRIVES project has developed a toolkit for local and state stakeholders

**SHORT TERM**

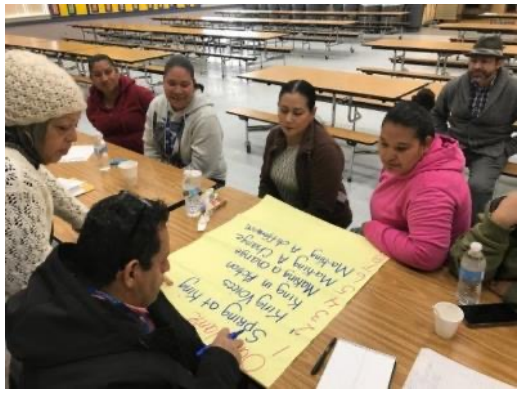
- Increase awareness of heat-related vulnerability
- Identify areas that are vulnerable to extreme heat events

**NEAR TERM**

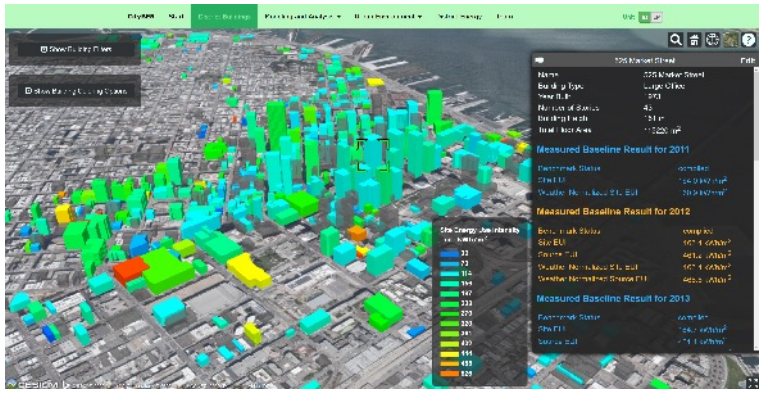
- Remedy the built environment, such as building retrofits & increases to tree canopy
- Enhance community and home cooling programs

# Approach: Our heat-resilience toolkit incorporates both **community inputs and science**

Community engagement

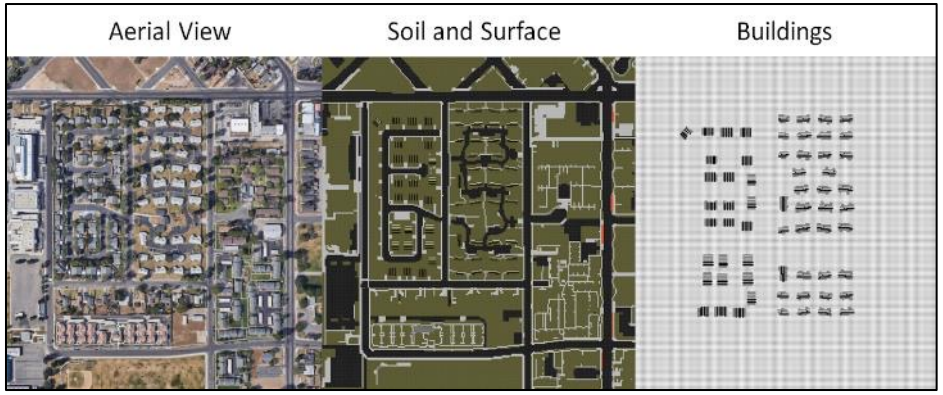


Neighborhood-scale building modeling




Cooling center optimization


Outdoor measure modeling



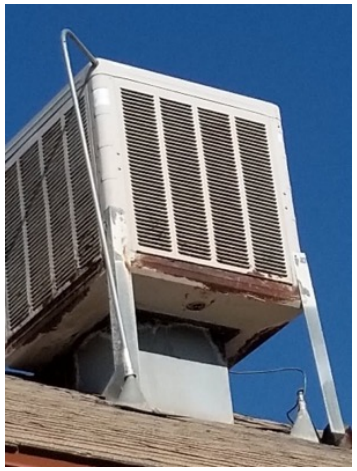

## Heat Resilience Toolkit

Community cooling guide
**Fact sheets**
**Modeling outputs**
**Heat vulnerability index tool**
Online tutorials (videos, webinars)
**Policy/program recommendations**

# We find **several key vulnerabilities** for residents in disadvantaged communities (DACs) in south Fresno

- Over 70% are uncomfortably hot at home very often during the summer
- Residents on the top floors and those residents in units that lack air conditioning (about 15%) are especially vulnerable

Old, inefficient window ACs

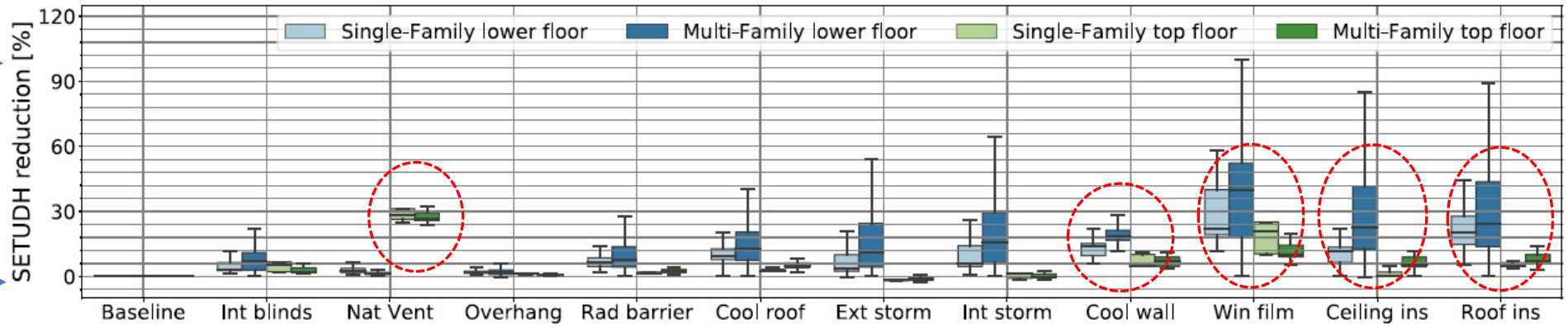


Swamp coolers

# **Window films, roof/ceiling insulation, and cool walls** are the among the most effective passive measures overall; **natural ventilation** on top floors is very helpful

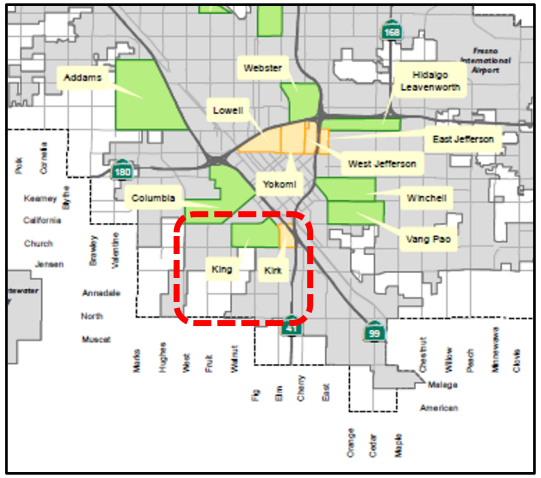
More protection from extreme heat (bigger value)

Less protection from extreme heat (lower value)




(c) King Passive 5-Day SETUDH Relative Reduction Grid Off

*Modeled for worst case historical heat wave conditions across five days*




King & Kirk neighborhoods in Fresno

Fact sheet example

# Cal-THRIVES

## Air Conditioning Systems

### Purpose

This document provides summary information about air conditioning system options available in the market. The document also discusses air conditioning system selection and replacement considerations, installation practices, and tips/recommendations for its daily operation.

### What Is an Air Conditioner?

An air conditioner (AC) cools your home by extracting indoor heat and expelling it outside. ACs improve indoor comfort and are usually required to keep you home at safe temperatures during extreme heat waves. There are many types of air conditioners and several important considerations when choosing a new or replacement unit. ACs are most commonly operated by using electricity.

### Keeping You Cool And Comfortable

- Reduces temperature and humidity inside your home
- Eliminates life-threatening overheating and keeps you up to 18°F cooler during extreme heat waves compared to no air conditioning.
- Keeps you 5°F cooler and much more comfortable than evaporative coolers during extreme heat waves.

SOURCE: LBNL Cal-THRIVES

### What Factors to Consider?

- Do you need an air conditioner?
- Equipment energy efficiency, reported as Energy Efficiency Ratio (EER) or Seasonal Energy Efficiency Ratio (SEER) — a higher EER or SEER means a more efficient unit and therefore lower electricity bill. EER is used to rate the efficiency of window and portable ACs as well as PTAC/PTHPs. SEER is used to rate the efficiency of central ACs, air source heat pumps, and mini-split ACs and heat pumps.
- Equipment cooling capacity/size to meet household comfort needs
- Noise level and other impacts to your home, such as limited access to window installed with a window AC type
- Quality and reliability
- Ease of installation and maintenance
- Equipment price
- Overall costs, including labor and other potential retrofit work

### Types of Air Conditioning

Various types of AC exist in the market. In general, AC systems can be categorized in two groups: 1) Larger centralized systems, which have a cooling unit and air handler that distributes cooled air to different rooms through ducts or plenum space and 2) Smaller, "room-scale" systems, which supply cooled air directly to the room, such as window ACs, ductless mini-split ACs, packaged terminal units, and portable AC units.

The following is a list of AC types available in the market:

**Central AC** — A ducted system that cools many rooms in a home with a central evaporator and air handler indoors and a condenser outdoors.

**Air source heat pump** — Similar to central AC, it provides cooling in the summer but also heating in the winter, delivering cold or warm air to rooms through ducts.

**Window AC** — A non-ducted system that cools a room or an indoor space and is a self-contained unit, installed in a window opening, with a section exposed to the outdoor

**Mini-split air conditioner/heat pump** — These through-the-wall units join an indoor evaporator unit to an outdoor condenser unit with a pipe that carries refrigerant, and is typically used to cool or heat a single room. Some mini-splits provide only cooling, while others can also heat. It is more expensive to install than a window AC but can be much more energy efficient.

**Packaged terminal air conditioner (PTAC)/ packaged terminal heat pump (PTHP)** — These self-contained (single unit) "through the wall" units that can provide cooling only (PTAC) or both cooling and heating (PTHP). Commonly found in hotels and motels.

**Portable AC** — A self-contained unit (evaporator plus compressor) that sits on the floor and typically cools a single room, blowing hot air from its compressor out a window-mounted hose. "Dual-hose" models that use outside air, rather than room air, in a sealed loop to cool the compressor are more efficient and won't create a vacuum that can draw outside air through cracks below doors and around windows. Portable ACs are easy to install but are among the least energy efficient choices.

BERKELEY LAB

INDICIA Consulting

family resource center

Window AC

Portable AC

Mini-split heat pump indoor unit

Outdoor unit

Other than the ACs, there are other types of mechanical cooling systems that may also provide some level of thermal comfort, as follows:

**Evaporative cooler** — Not a mechanical air conditioner, this device cools the air by evaporating water. Evaporative coolers use little energy, but do require water. They work best in dry climates.

**Fans** — Portable fans and ceiling fans improve indoor comfort by circulating air, and let you raise the temperature set point of your air conditioner without sacrificing comfort. This can save on energy and utility bills during the cooling season.

### Installation

Air conditioners can be professionally installed or can be a do-it-yourself project for smaller self-contained units such as window ACs or portable ACs.

The cost to install an AC unit (equipment cost plus installation cost) varies widely for different AC options and depends on the existing AC in the home. For example, a new mini-split AC can be much more expensive to install than a portable AC, but cost less to operate because it's more energy efficient.

The labor cost to replace an existing unit, such as an old window AC, with a newer, more efficient version is much lower than the labor cost to install a new central cooling system. Consult an HVAC installer if you need a new system to cool multiple rooms.

### When to Consider Getting a New AC?

In general, when an existing air conditioning system is no longer delivering sufficient cool air for comfort, and cannot not be repaired cost effectively, a new AC may be the solution. This is especially critical if the lack of thermal comfort is adversely affecting productivity, health, and risks during extreme heat events. The typical lifetime of ACs used to cool a single room is ten to 15 years. Central ACs and heat pumps, as well as mini-split ACs and heat pumps, have typical lifetimes of 15 to 20 years.

Adding AC to a home without it: If you are uncomfortably warm during the summer even when using a fan, and have explored other energy efficiency measures for your home such as increased insulation, a radiant barrier in your attic, solar control window films, or cool roof/cool walls.

**When to Consider this Retrofit—Ownership**

- ☑ Homeowner
- ☑ Apartment/Home Renter — Long Term
- ☐ Apartment/Home Renter — Short Term
- ☑ Live in a Condo/Townhouse
- ☑ Live in a Historical District

### What to Look at When Your AC is Not Performing Well?

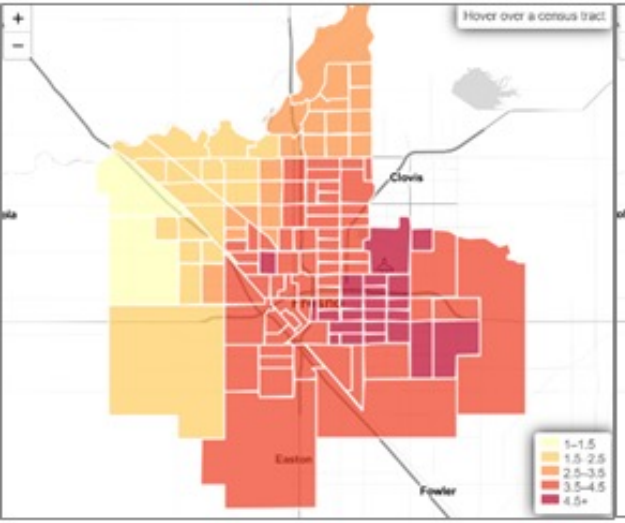
Here are potential problems with an existing AC:

1. Not working as designed — needs service to repair compressor or fan
2. Not working as designed — needs service to fix refrigerant leak, typically in either the refrigerant line or evaporator (i.e., indoor heat exchanger) of a central or mini-split AC or heat pump
3. Not working as designed — distribution system needs service to fix duct air leaks or replace/install duct insulation
4. Working as designed, but not suitable for today's climate (evaporative AC or undersized mechanical AC)
5. Working as designed, but costs too much to operate because it's inefficient.

*For #1–2, the first step might be to service the AC equipment. For #1 as well, if the compressor fails in a window or portable AC, the cost of repair typically exceeds the cost of a new unit. For #3, the first step might be to fix the ducts. For #4–5, a new system might be best.*

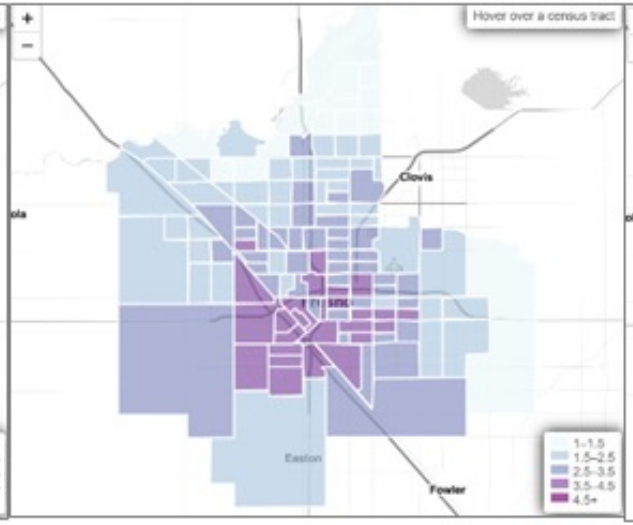
# Our **Heat Vulnerability Index Tool** maps exposure, sensitivity, adaptation, and overall heat vulnerability

## Exposure



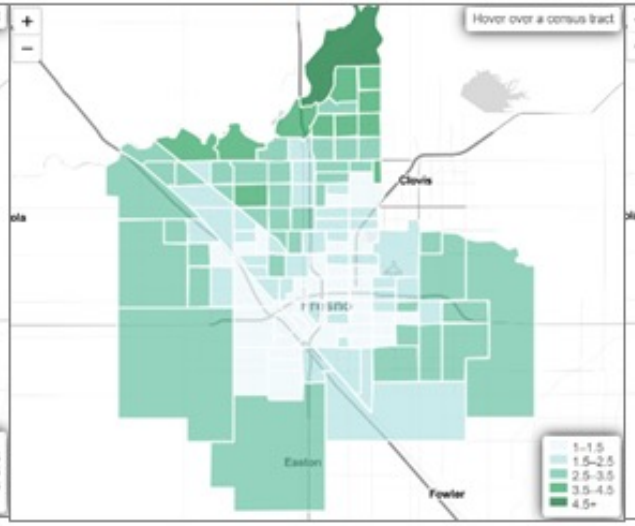

- Number of hours with high heat index
- Longest number of consecutive heat-wave days
- Number of heat-wave days
- PM2.5 concentration
- Ozone concentration
- Building heat resistance indicator

## Sensitivity



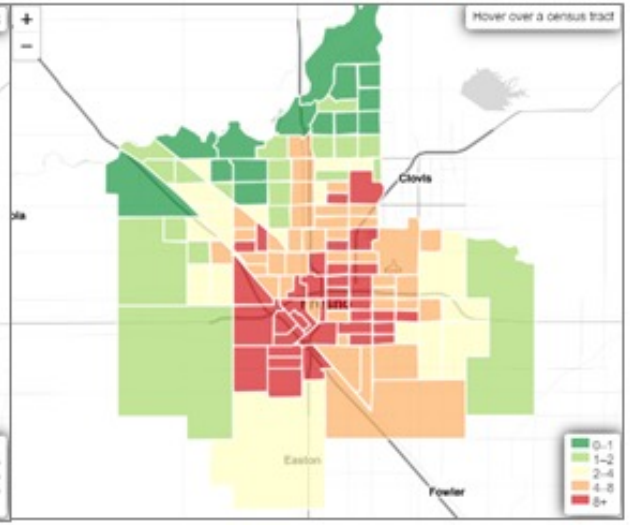

- Percent elderly and under 5
- Percent of pop. without high school degree
- Percent of pop. below poverty level
- Percent non-white pop.
- Percent of pop. with ambulatory disability
- Asthma hospitalization rate
- Heart attack rate
- Percent of pop. with a cognitive disability

## Adaptation




- Median income
- Percent of area covered in parks

## Heat Vulnerability Index




**Highest vulnerability in south/central Fresno with high sensitivity and low adaptation**

https://citybes.lbl.gov/?hvi=1

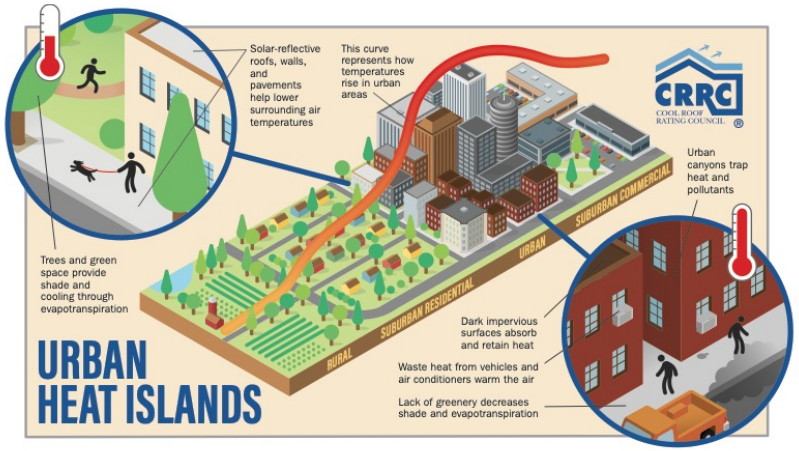
# Some policy and program recommendations

# ❶ Heat-island countermeasures provide **failsafe cooling** and can be **5-10X more effective indoors** than outside

Cool roofs

Cool walls

Shade trees

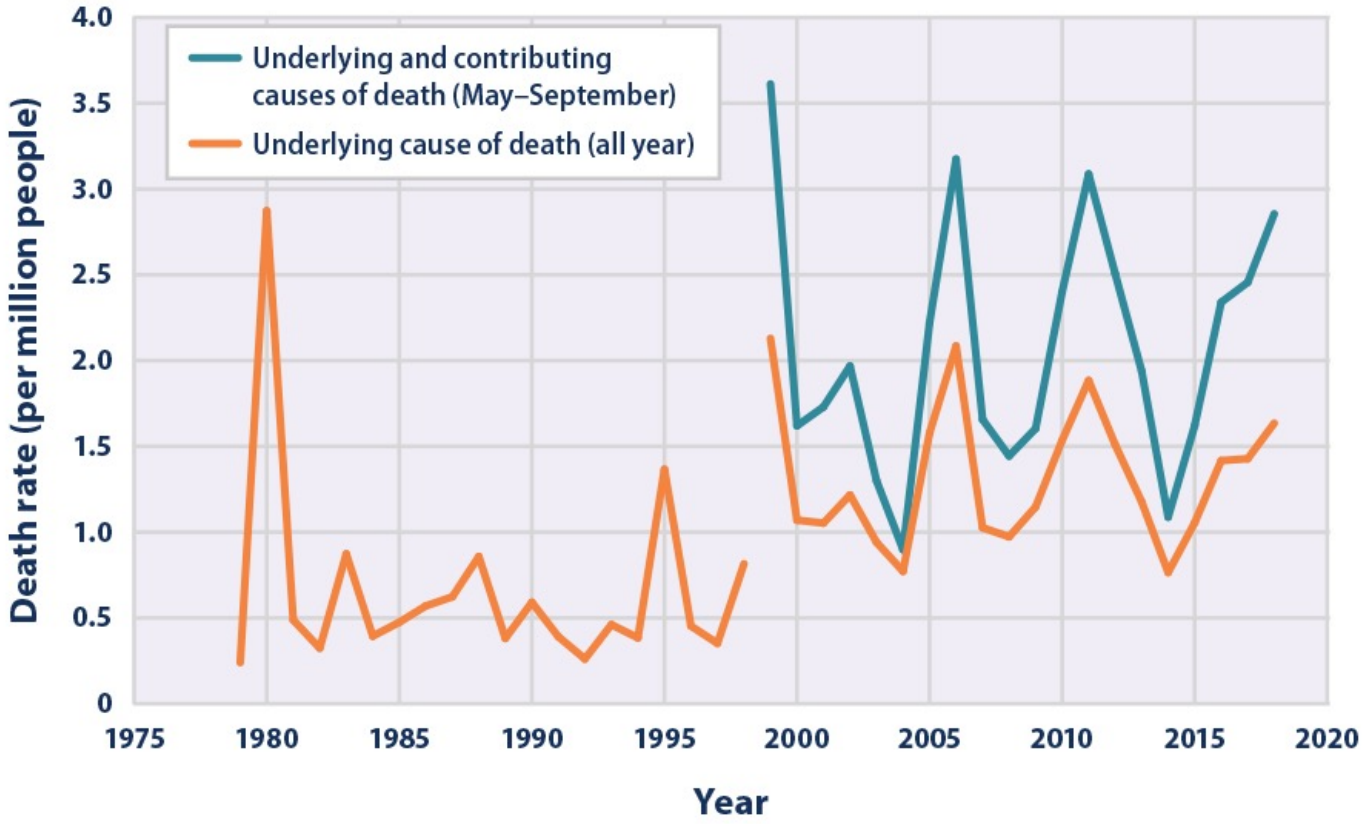



We propose more stringent requirements for cool walls and cool roofs when roofs need replacement and when homes need repainting

R. Levinson - LBNL Heat Island Group Leader

# ❷ To guide California's future investments, extreme-heat mitigation programs should dedicate resources to **monitoring outcomes**

U.S. heat deaths per million people, 1979-2018 (U.S. EPA)

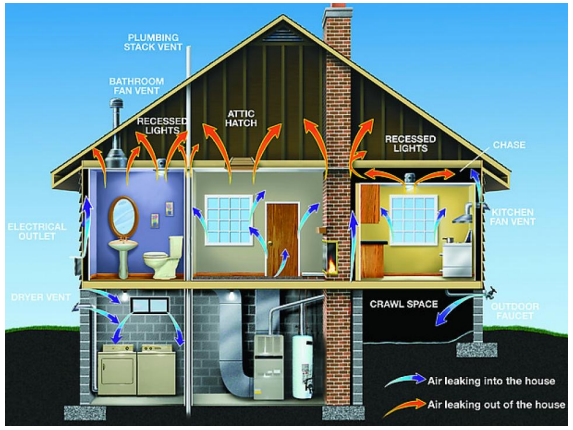



**Let's learn what works** by measuring

- <u>reductions</u> in temperature, heat stress, illness, hospitalizations, deaths
- <u>improvements</u> to health, comfort, productivity, learning

# ❸ **Expanding weatherization audits** for energy efficiency (EE) to include climate resilience is recommended for identifying homes most in need of heat resilience upgrades

- Climate resilience audits expand the scope of existing EE audits and auditors would need additional training and well-defined protocols for privacy and data collection
- Additional home audit checklist items might include
  - Testing AC system operation
  - Collecting demographic information about residents
  - Noting risk factors for overheating – top floors, south facing windows, inoperable windows, mobility of residents, transportation options of residents
- These should feed into a 'heat vulnerability index' score to identify those most in need for interventions such as home cooling upgrade



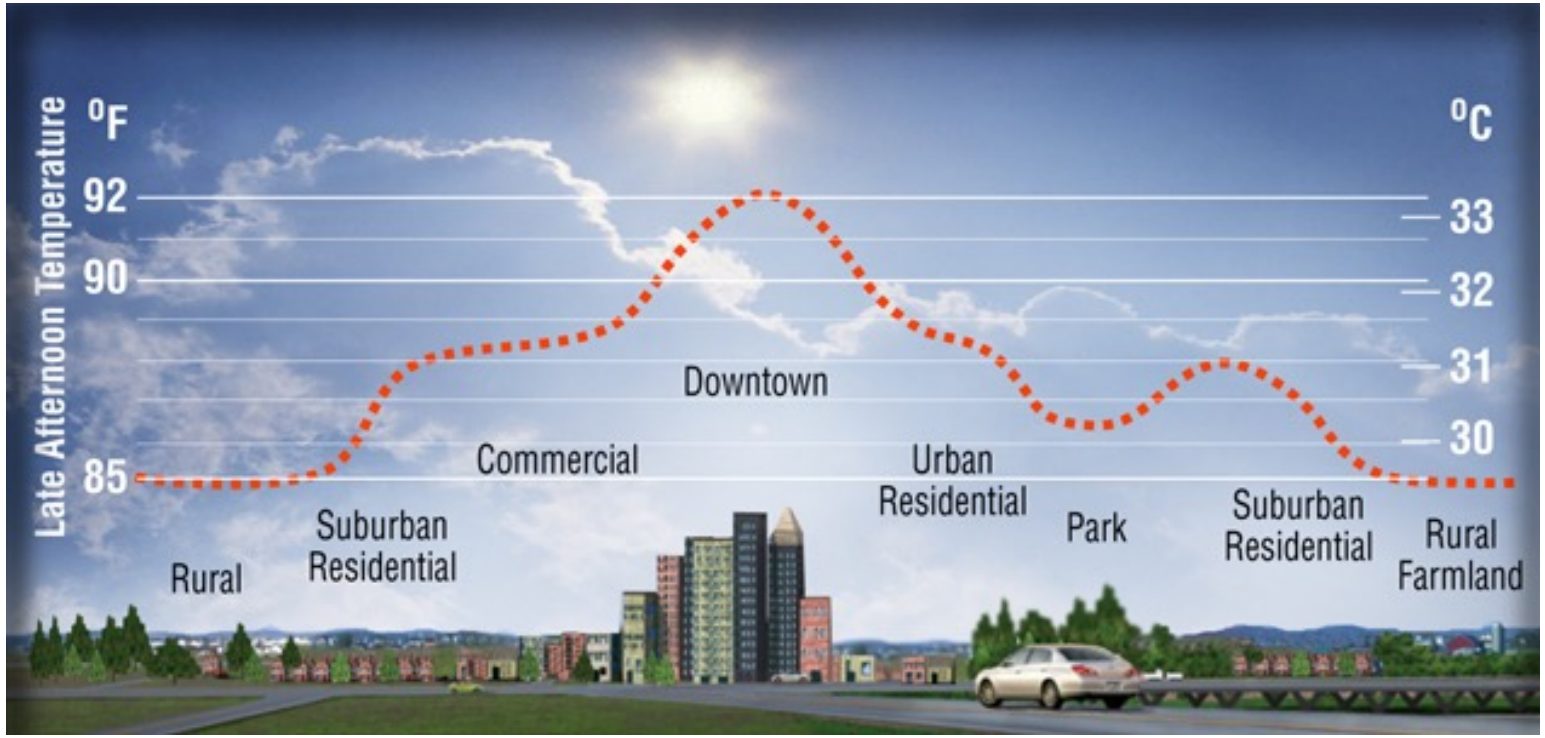

# Thank you

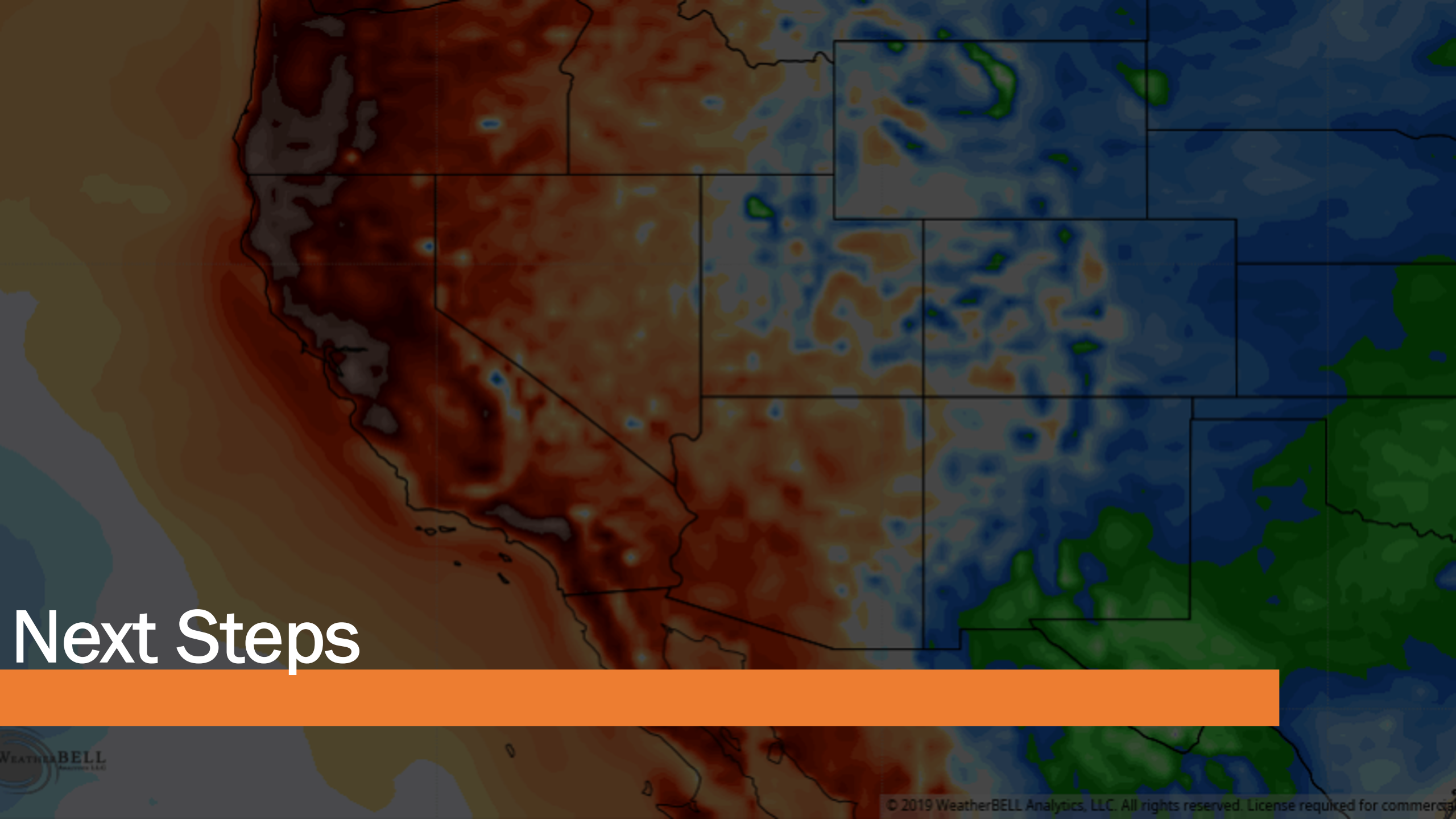
Max Wei, MWei@LBL.gov

**Cal-THRIVES.LBL.gov**

We also thank the **SGC Climate Change Research Program** for their support and our research partners below:

# Urban Heat Island effect




WeatherBELL
© 2019 WeatherBELL Analytics, LLC. All rights reserved. License required for commercial

# Next Steps

# Next Steps

- NOAA Urban Heat Island Mapping Project: It's Back!

- Implementation Plans: If you're interested in joining an Implementation Team, please contact Matt.Wolff@sfdph.org or Alex.Morrison@sfgov.org

- Next meeting will be to review Implementation Plan