Cooling Our Communities: Reducing Heat Through the Built Environment

February 7, 2018

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Welcome

ALAMEDA COUNTY
Community Development Agency

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Climate Adaptation Defined

Mitigation

Actions that **reduce the emissions** that contribute to climate change.

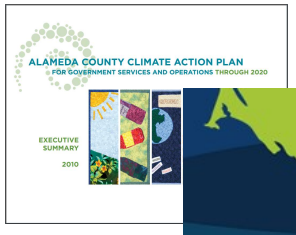
Globally-responsible thing to do

Adaptation

Actions that **minimize** or **prevent the negative impacts** of climate change

Locally-responsible thing to do

Alameda County Climate Adaptation



Coastal Conservancy

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Agencies Already Taking Action

- Climate-smart agriculture
- Responding to vegetative fires
- Mosquito-borne disease tracking
- Salt ponds as buffer to flooding
- Emergency preparedness training

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Goals for This Morning

- To **familiarize attendees** with how projected increases in temperature will impact health and infrastructure, and how the built environment contributes to heat risk.
- To **explore cooling strategies** for the built environment to mitigate the impacts of increased heat in Alameda County's unincorporated areas.
- To **inform planning policies**.

Goals for this Morning

- Strategies developed will inform, as appropriate:
  - The Community Climate Action Plan,
  - Relevant sections of Specific Plans,
  - Amendments to General Plan as mandated by SB 1000,
  - Residential Design Standards and Guidelines, and
  - Discretionary guidance in the permitting process.

Agenda

9:00am-1:00pm *Refreshments Provided*

- Heat, Climate, and the Built Environment Presentations
- Case Study: Sacramento County
- Breakout Group Activity
- Report Out & Next Steps

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CLIMATE IMPACTS

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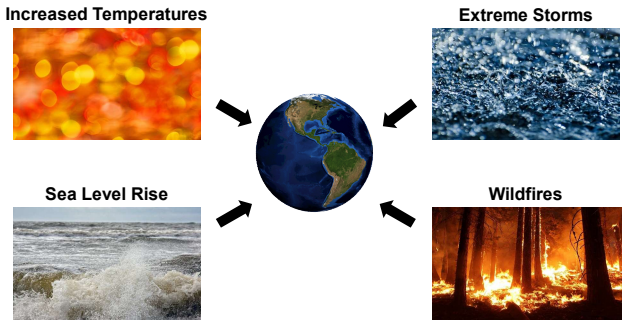
Range of Implications



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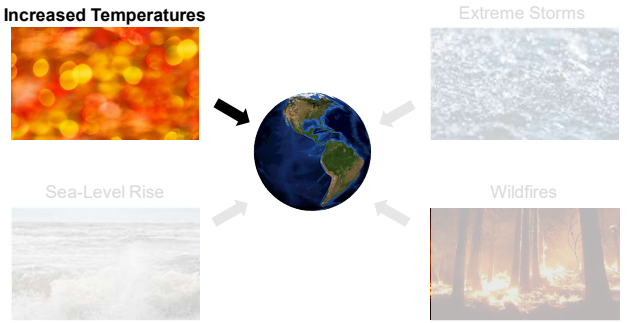
Range of Implications



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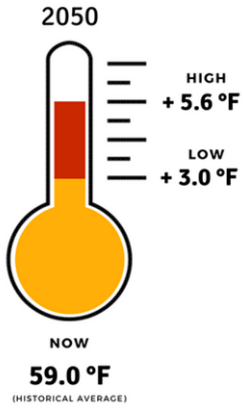
Increased Temperatures



Climate change will cause increases in average temperatures across the County.

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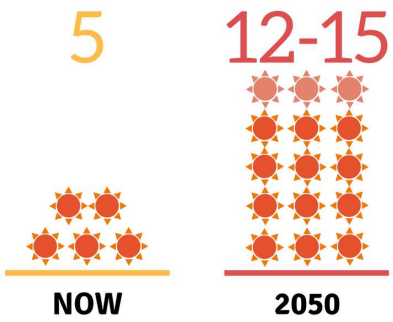
Increased Temperatures

Projected Number of Extreme Heat Days



The Impacts Can Already Be Felt

HEAT AND HEALTH

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Whose Health is Impacted?

People with Disabilities

Low Income Communities of Color

People living alone

Children

Elderly

What Factors Contribute?

- Unemployment
- People living in poverty
- Households without a vehicle
- Ozone
- Households without AC
- Households with limited English
- No Tree Canopy
- Impervious Surfaces

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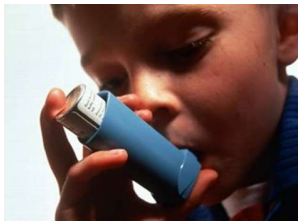
Example: How Does Heat Affect Health?

Children (≤ 5) are especially vulnerable to heat:

- Adjust less quickly to heat
- More susceptible to changes in air pollutants (hot environments favor formation)
- Less likely to seek help



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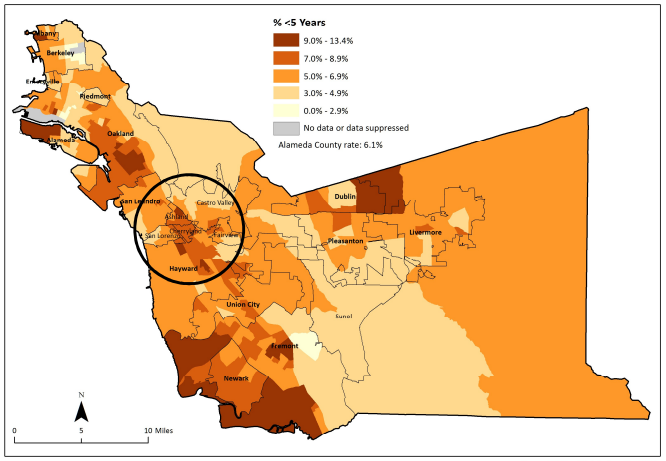
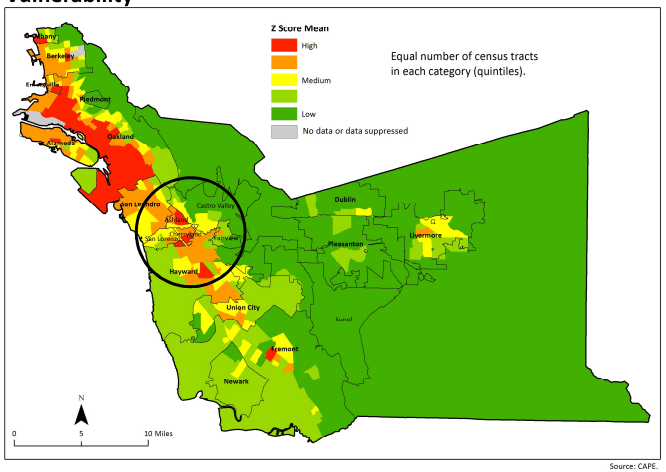
Persons <5 Years



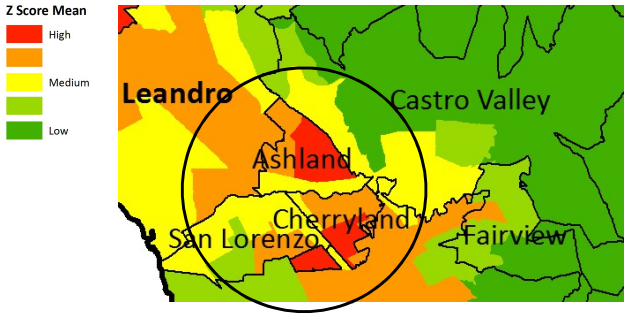
Source: CAPE, with data from Esri 2015.

Vulnerability



Source: CAPE.

Composite Vulnerability



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HEAT AND THE BUILT ENVIRONMENT

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When You Hear Heat Island You May Think of This…

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When in Reality, Heat Islands Also Appear Here…

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When in Reality, Heat Islands Also Appear Here…

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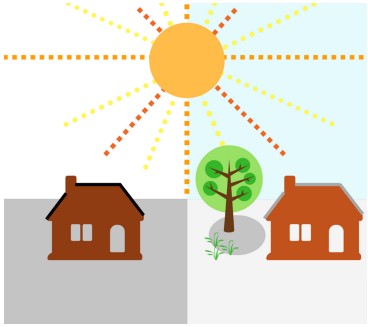
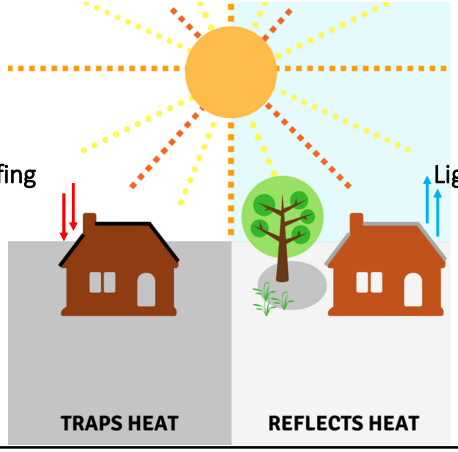
Defining a Heat Island

Urban and suburban built environment factors **trap heat**, making daytime temperatures **1-6 F⁰ hotter** and nighttime temperatures up to **22 F⁰ hotter** than rural areas

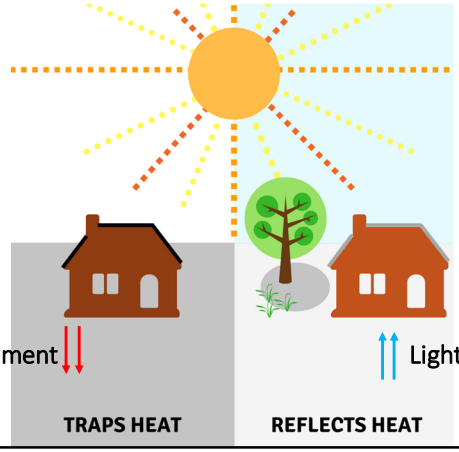
Two Scenarios



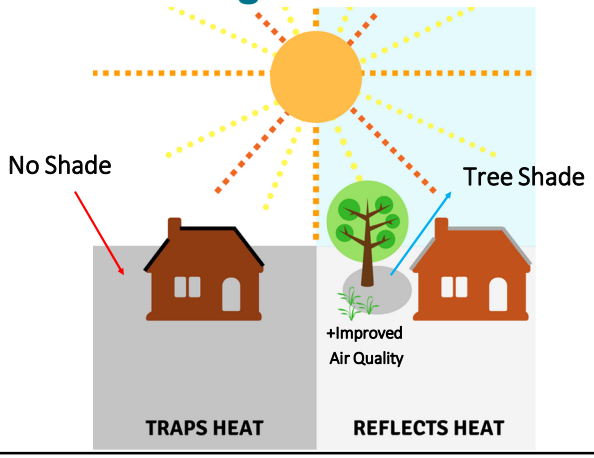
Defining a Heat Island



Defining a Heat Island

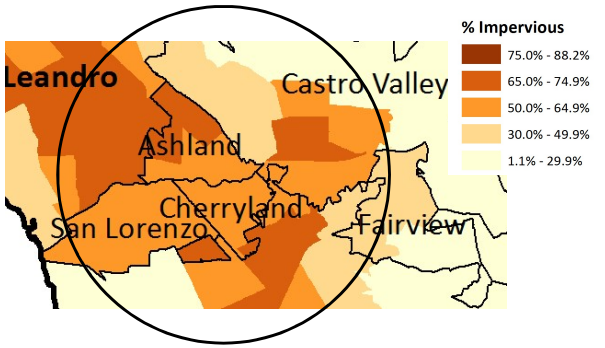


Defining a Heat Island



Built Environment Factors Contributing to Heat Islands

Impervious Surfaces



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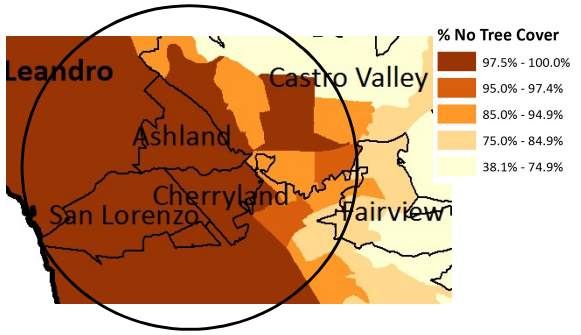
No Tree Cover



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Using the Built Environment to Cool Communities

Factors that mitigate against heat island effect, and cool down communities:

Vegetation & Tree Cover

Cool Pavements

Cool Roofs

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Cool Roofs

Benefits:

- Improved indoor comfort in non-a/c houses
- Reduced local air temperatures
- Reduced energy costs

Challenges:

- Can be more expensive
- Potential heat loss in winter

Cool/Pervious Pavements

Benefits:

- Reduced heat-related illness
- Decreased street lighting cost
- Increased storm-water management

Challenges:

- More expensive
- Newer technology

Increased Vegetation/Tree Cover

Benefits:

- Reduced energy costs
- Reduced air pollution
- Reduced UV exposure

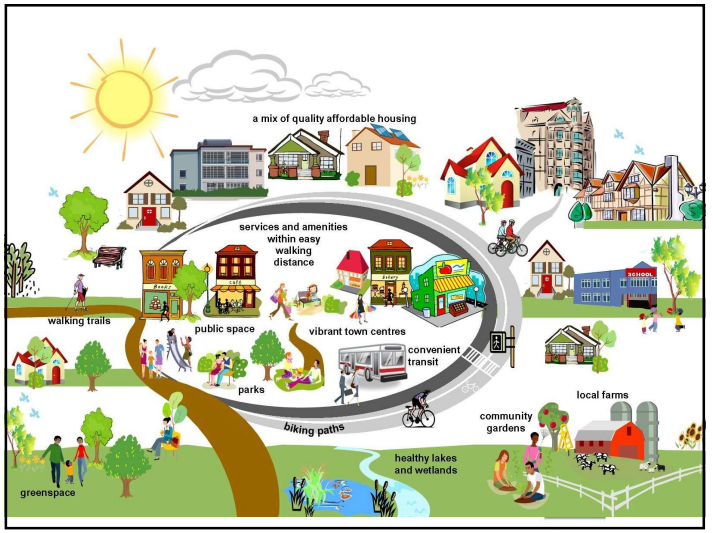
Challenges:

- Maintenance costs & ownership
- Tree Placement
- Initial Infrastructure

Co-Benefits to Cooling Strategies

Many of these cooling strategies have other planning benefits.

- Neighborhood character
- Visual Amenity
- Housing Density
- Energy Costs
- Walkability & Safety



Discussion

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CASE STUDY: SACRAMENTO COUNTY

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SACRAMENTO COUNTY

Cooling our Community

Integrated Strategies for Success

Office of Planning and Environmental Review

February 7, 2018

John T. Lundgren, lundgrenj@saccounty.net

Here, There, Everywhere

- The need to cool is not new
- Strategies already exist
- Motivations have changed
- Take stock of what you have
- Integrate your strategies

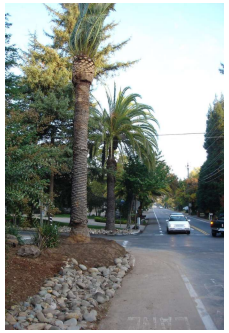
Sacramento County's Strategies

- Ordinance - Native Oaks
- General Plan – Tree Canopy
- Zoning Code - Dev. Stds.
- LHMP
- Landscape Architect

- SB 1000 / EJ Element
- Climate Action Plan
- Smart Growth Streets
- Complete Streets
- Design Guidelines

Core Strategy: Shade

- Enhance existing requirements
- More than just parking lots
- Identify co-benefits
- Utilize Multiple Approaches
  - Discretionary: CEQA Mitigation (e.g. canopy replacement)
  - Ministerial: Dev. Stds. (e.g. Zoning Code 50% @15 Yrs.)
  - Voluntary/Partnerships (e.g. Sac Tree, Utilities)



Horizontal (Time) Integration

- Pre-Application Review !
- CEQA Review !!
- Design Review !!!
- Approval !!!!?
- Maintenance ??
- Enforcement ???

It's Good Business – Don't Get Political

- Be politically aware but apolitical
- Develop a champion with broad appeal
- Educate don't indoctrinate
- Don't catastrophize

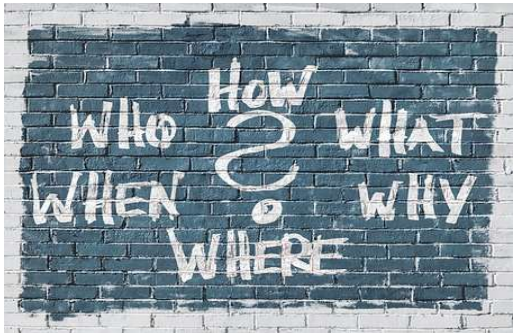
Challenges

- State Mandates
- Special Interests
- Lingering Effects
- Silos
- Budget
- Polarization

Duty of a Public Servant

- Whine in private
- Use EAP
- Focus on (ALL) the people we serve
- Consider alternative viewpoints
- Treat others as they want to be treated

Q & A



Visioning the Future

Thinking 50 years in the future…

with no limitations or constraints…

If cooling strategies were implemented, **what is one change you might see in the built environment?**

Break

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Breakout Groups

1 Building Materials

Roofing, etc.

2 Pavement & Hard Surfaces

3 Vegetation & Landscaping

4 Transformative Built Environments

Thinking big, incorporating co-benefits

Breakout Groups

Tips

- Work with new faces
- Build on what we've heard, but add your new thinking
- Don't be concerned about committing resources
- Don't limit yourself to your role or expertise
- **Think outside the box!**

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Breakout Groups

Instructions

- Choose a group
- Brainstorm as many ideas as you can
- Select one "straightforward" idea and one "creative" idea to flesh out
- Answer questions on the worksheet
- Select a "reporter"
- Write up 2 ideas on flipchart

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Breakout Groups

1 Building Materials

Roofing, etc.

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Break

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Report Outs

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Post-Its: Support & Suggest

ROSE

Favorite feasible idea

THORN

Good idea with key obstacles

BUD

Idea with potential

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Post-Its: Support & Suggest

ROSE

Favorite feasible idea

(suggest first step)

THORN

Good idea with key obstacles

(suggest what to consider)

BUD

Idea with potential

(suggest how to develop further)

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Discussion

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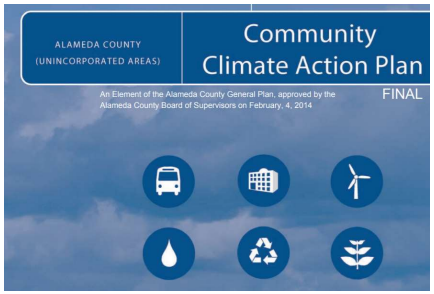
What Will Happen Next

- Consideration
- Integration
- Additional ideas



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Next Steps

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Adaptation Across the County… and Beyond

General Services Agency County of Alameda

Alameda County Public Health Department

Alameda County Library

Governor's Office of Planning and Research State of California

Resources

Governor's Office of Planning and Research Adaptation Clearinghouse

US EPA's Heat Island Compendium of Strategies

Georgetown Climate Center's Adaptation Clearinghouse

Reflection

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Thank You!

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- Low Income Communities of Color: *Gerald Wildmoser, Noun Project (Slide 18)*
- People Living Alone: *Seona Kim, Noun Project (Slide 18)*
- Children: *Gilad Fried, Noun Project (Slide 18)*
- Elderly: *Marie Van den Broeck, Noun Project (Slide 18)*
- Vulnerability Maps (Children, Composite, Impervious Surfaces, Tree Cover): *Courtesy of Matt Beyers, Alameda County Public Health Department (Slides 21, 22, 23, 36, 37)*
- Vulnerability Table: *Courtesy of Matt Beyers, Alameda County Public Health Department (Slides 24, 25, 35)*
- Vegetation: *Blaise Sewell, Noun Project* (Slide 34)
- Roofing: *Luke Patrick, Noun Project (Slide 34)*
- Pavements: *Viktor Fedyuk (Tim P), Noun Project (Slide 34)*
- Design & Materials: *zidney, Noun Project (Slide 34)*
- Building Density: *Laurene Smith, Noun Project (Slide 34)*
- Los Angeles Cool Roof: *Climate Resolve (Slide 39)*
- Evanston Pervious *Paving: Bill Smith, EvanstonNow.com, Newstory (2015) (Slide 40)*
- Davis Parking Lot: *Arbor Day Foundation, Alliance for Community Trees (2014) (Slide 41)*
- Charleston Sustainable Living Community: *Chrys Rynearson. Oak Tree Preserve (2012) (Slide 42)*
- Transformative Built Environment: *Coalition for a Livable Sudbury (Slide 43)*