

Climate Readiness in the Capital Region

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and
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Powering forward. Together.



Agenda

- Context & Background
- 2016 Readiness Assessment & Plan
 - Process & Summary Findings
- Community Engagement via CRCRC



CALIFORNIA CLIMATE STRATEGY

An Integrated Plan for Addressing Climate Change



VISION

Reducing Greenhouse Gas Emissions
to 40% Below 1990 Levels by 2030

GOALS



50%
renewable
electricity

50%
reduction
in petroleum
use in vehicles



Double energy
efficiency savings
at existing buildings



Carbon
sequestration
in the land base



Reduce
short-lived
climate pollutants

Safeguard
California



SMUD Board Vision: to ‘...increase energy efficiency, **reduce global warming...**’

SD 7 (b) – Environmental Leadership (b): SMUD will provide **leadership** in the **reduction of the region’s total emissions of greenhouse gases** through **proactive programs** in all SMUD activities and development and support of national, State, and regional climate change policies and initiatives

SD 9 – Resource Planning: Includes Sustainable Energy Supply Goal equivalent to a 90% reduction below 1990 GHG levels by 2050, 30% by 2020

SD 17 - Enterprise Risk Management: Directs SMUD to maintain a risk management system that identifies, assesses, prudently manages and mitigates a variety of risks facing SMUD, **including climate change**

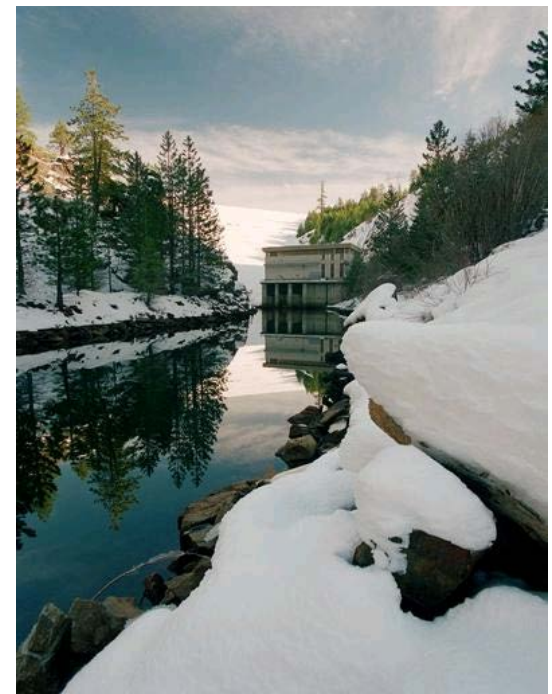
SMUD Energy Resources



Distributed Solar – 117MW
rooftop, 100 MW groundmount



COTP Transmission to NW –
1600 MW



Upper American River Hydro
Project – 688 MW



Biomass -203 MW

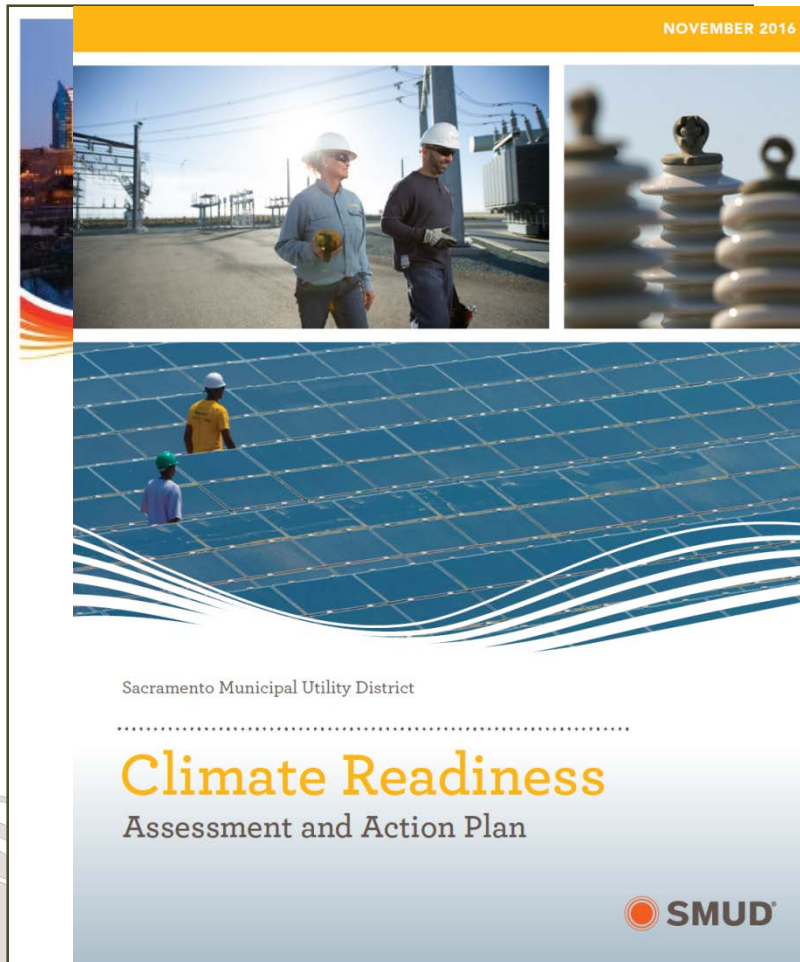


Solano Wind – 280 MW



Natural Gas Combined Cycle – 850 MW at 4
locations, NG Peakers 150 MW at 3 loc's

SMUD Climate Readiness Strategy



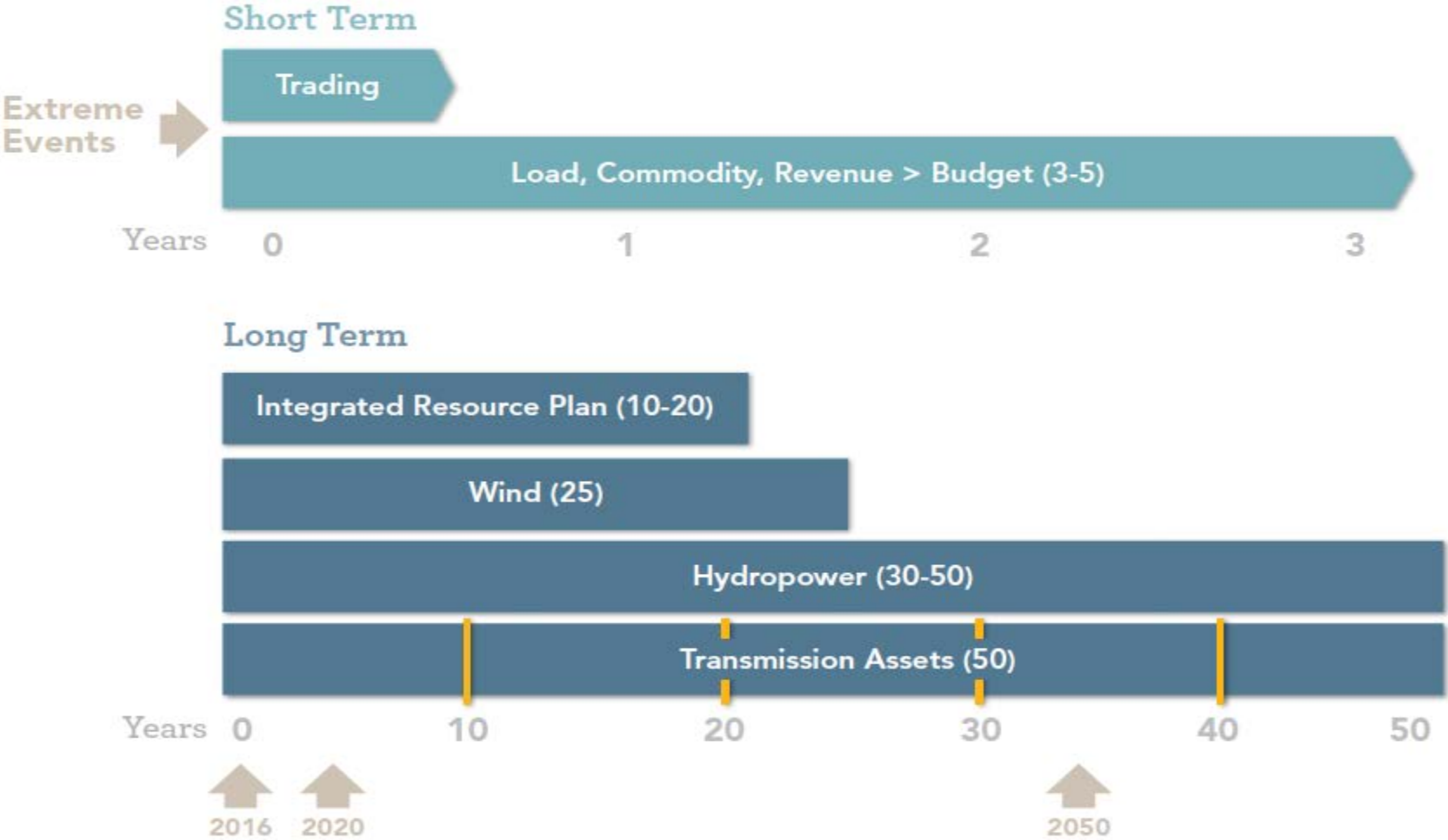
- Track Climate Changes as an Enterprise Risk
- 4 year science update cycle
- Use findings in all long term planning (>5 years)
- Perform additional research and **support regional readiness efforts**



Includes supply chain analysis in addition to power generation contracts



SMUD Planning & Asset Horizons



2016 Update Working Group Members: Cross-Functional Expertise is Key!

Energy Research and Development (Lead)

Emergency Planning

Power Generation

Power Generation (Hydroelectric)

Environmental Management

Local Government

Resource Planning (Load Forecasting)

Resource Planning (Economic Analysis)

Treasury

Supply Chain

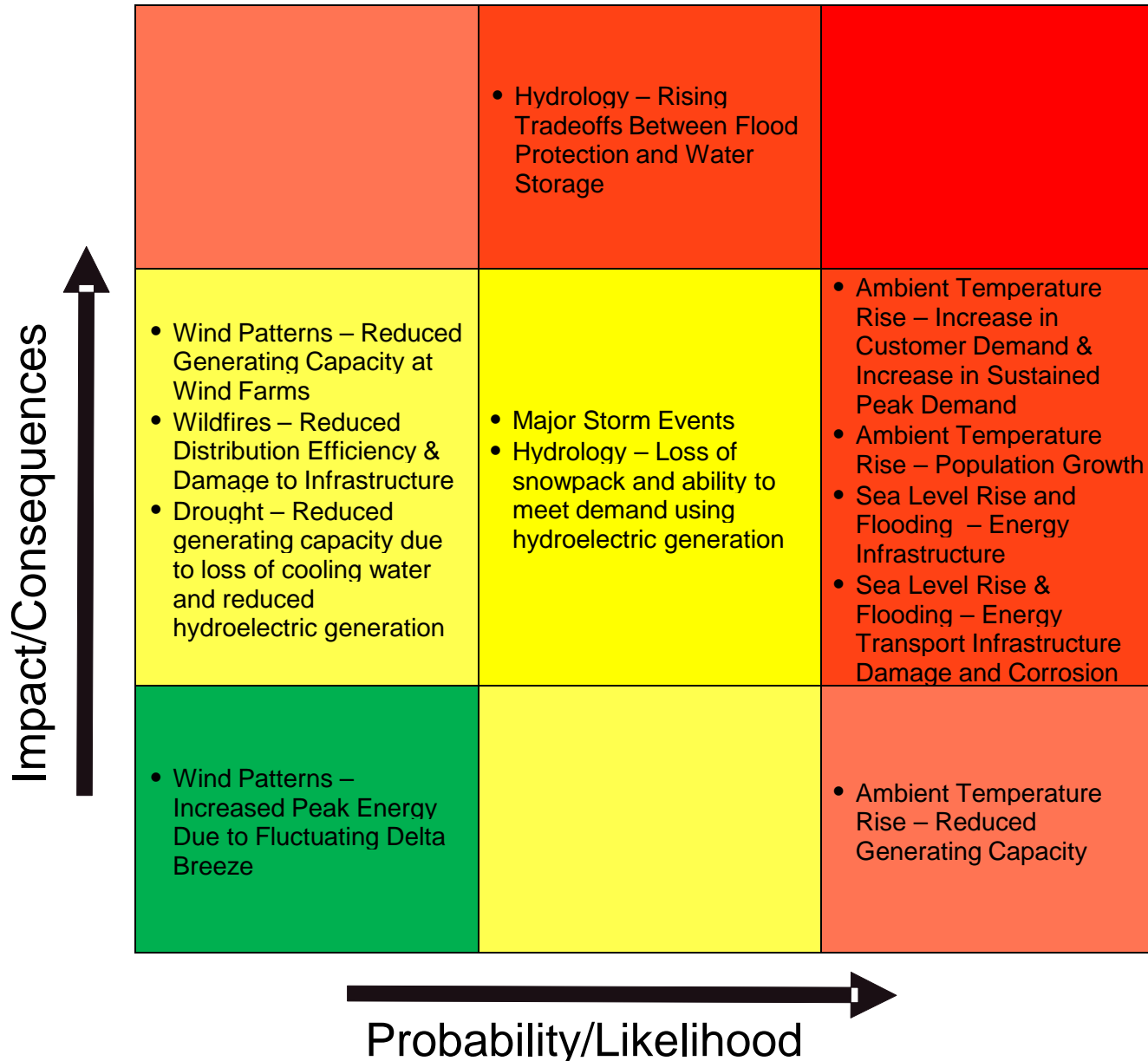
Grid Planning and Operations

Grid Assets

Energy Trading and Contracts

Enterprise Risk Management

Climate Risk Characterization



Action Plan Summary

| Plan Component | Title | Impacts Addressed | Timeframe |
|------------------------|---|------------------------------|--|
| Community Engagement | Capital Region Climate Readiness Collaborative | All | Ongoing |
| Community Engagement | Regional Urban Heat Island Initiative | Temperature | Beginning 2017 |
| Community Engagement | Regional Biosequestration | All | Begin Dec. 2017 |
| Enterprise Program | Sacramento Resilient Grid Initiative (REDI Grant) | Flooding | Complete Dec. 2017 |
| Enterprise Program | Climate Change And Enterprise Risk Management | All | Monthly Review |
| Enterprise Program | Customer Program Evaluation and Metrics Research | All | Complete 2017 |
| Enterprise Program | Environmental Sustainability | All | Complete Dec. 2020 |
| Enterprise Program | Long Range Asset Management Plan | All | Complete 2017 |
| Enterprise Program | Focused Climate Research | Hydrology, Wind | To be Determined |
| Enterprise Program | Contract Climate Exposure Evaluation | All | Pilot Launch 2017 |
| Enterprise Program | Flood Data Analysis and Preparedness Planning | Flooding | Complete 2017 |
| Enterprise Program | Emergency Preparedness | All | Ongoing |
| Capital Project | SPA County Recycled Water Project | Drought, Hydrology | Fall 2017 |
| Capital Project | SMUD Nature preserve Mitigation Bank | Native Species | Operational 2014 Monitoring Through 2017 |
| Capital Project | SMUD Headquarters Design and Renovation | All | Renovation Began 2016 |
| Operational Initiative | Forest Thinning, Stream and Revenue Flows in UARP | Wildfire | 2017 - 2021 |
| Operational Initiative | Unmanned Aerial Systems Risk Identification Program | Wildfire | Annual |
| Operational Initiative | Cloud Seeding | Drought | Annual |
| Operational Initiative | Hydropower Risk Mitigation Strategies | Drought, Hydrology, Wildfire | Ongoing |
| Operational Initiative | SMUD Cool Roof Incentive | Temperature | Ongoing |
| Operational Initiative | SMUD Shade Tree Program | Temperature | Ongoing |
| Operational Initiative | Savings By Design ILFI Incentive | All | Ongoing |
| Operational Initiative | AB327 / More than Smart Grid Modernization Research | All | 2016-2020 |
| Operational Initiative | Distributed Energy Resource Strategy | All | 2016-2020 |



Wildfire

California

Nevada

smoke

Lake Tahoe

Small burn area
increase through
2020

Leveling off
through end of
century



25 km



Northern Sierra Nevada Hydrology



Estimate Precip
total -3% by 2069

(Range +9% to -23%)

SWE -70% by end of century



Variable
precipitation

**More volume in Winter
Less in Spring and Fall**





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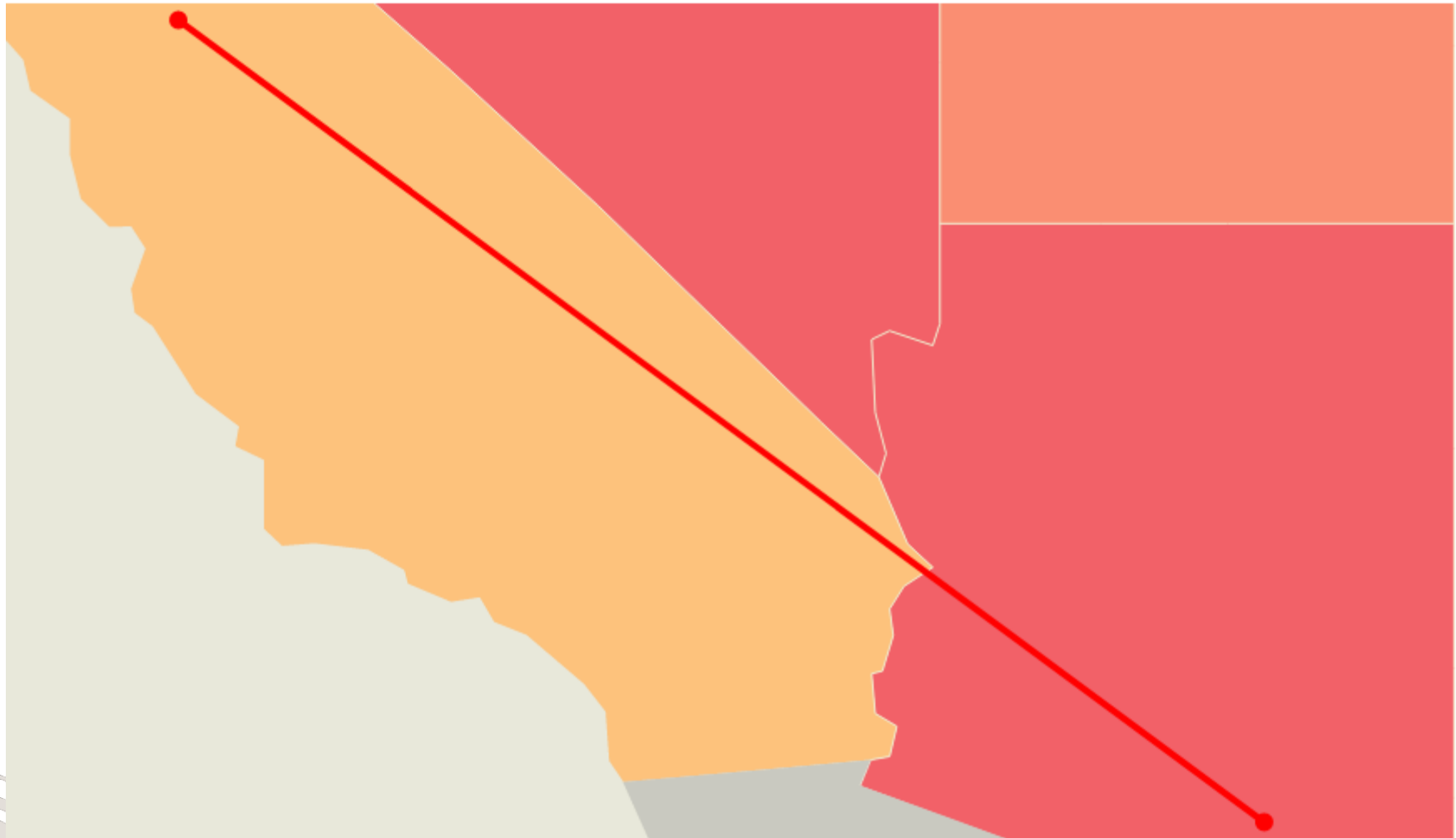
Average days over 101 F

13 > 45 > 85



I live in

Sacramento, CA



By 2100 summers in

SACRAMENTO, CA

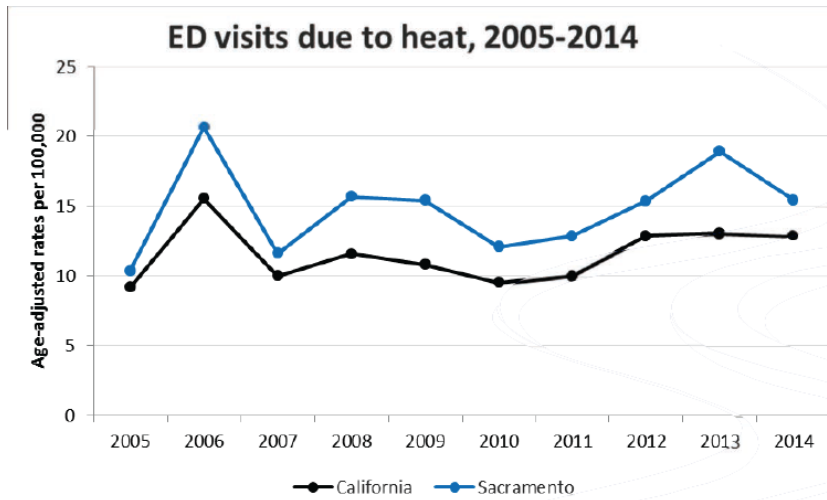
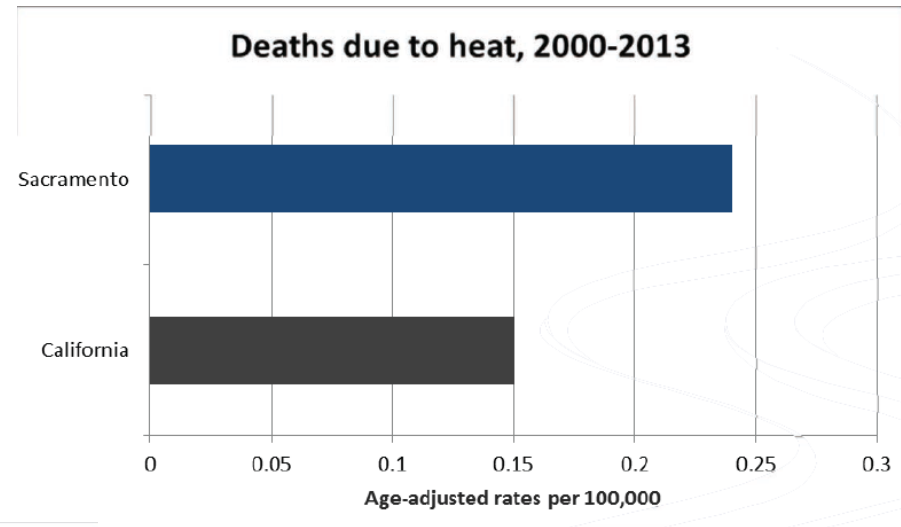
91.54 °F

will be like summers now in

TUCSON, AZ

99.63 °F

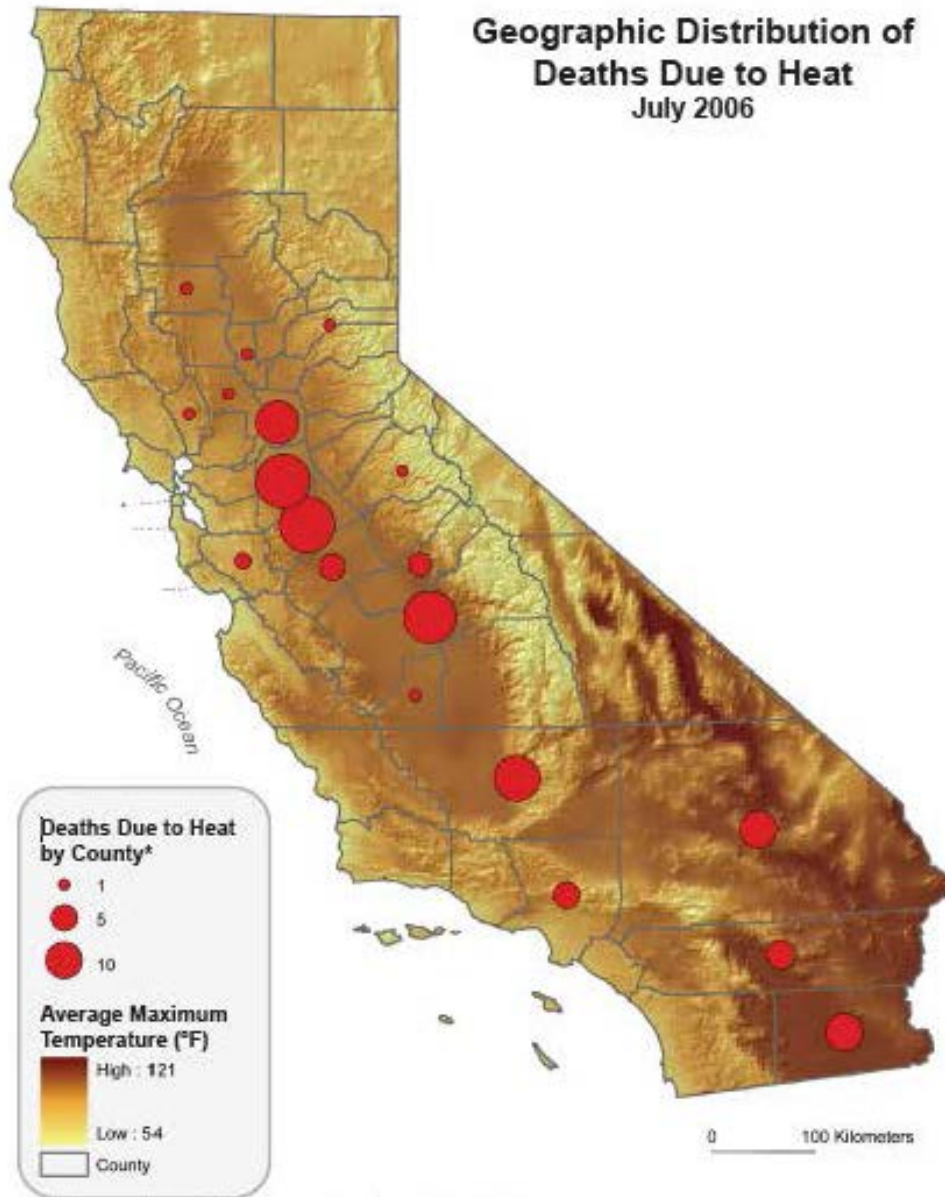
Sacramento Heat Illness & Death Exceed State Averages TODAY



Sources:

- Office of Statewide Health Planning and Development
- Office of Vital Statistics

Figure 6:



^aNote: Proportional circles representing the number of deaths per county have been placed at the counties' geographic centers.

Source: California Department of Public Health

2006 CA heat wave

655 excess deaths

16,166 excess ED visits

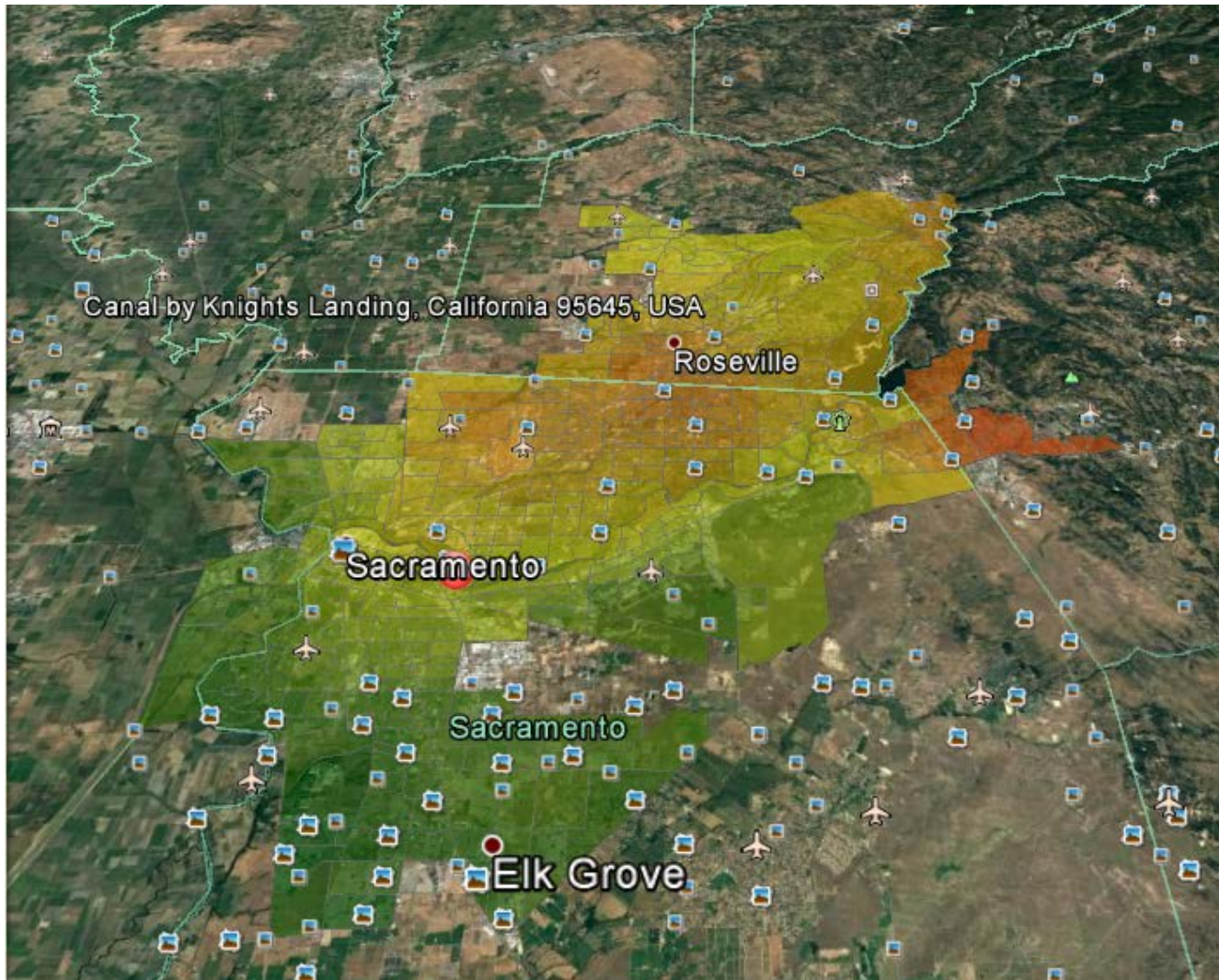
1,182 excess hospitalizations

Children, the elderly, and the poor were at greatest risk.

\$133 million in health-related costs

Agricultural losses exceeded \$1 billion

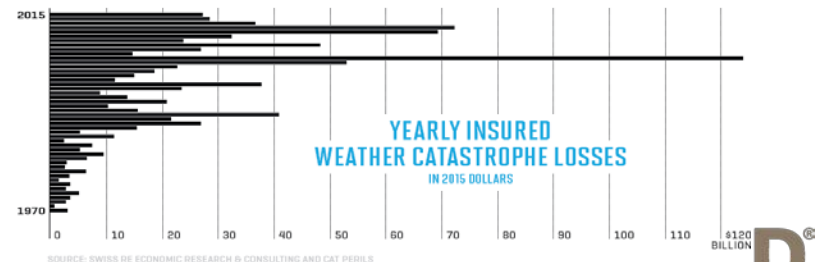
Capital Region UHI Heat Pollution



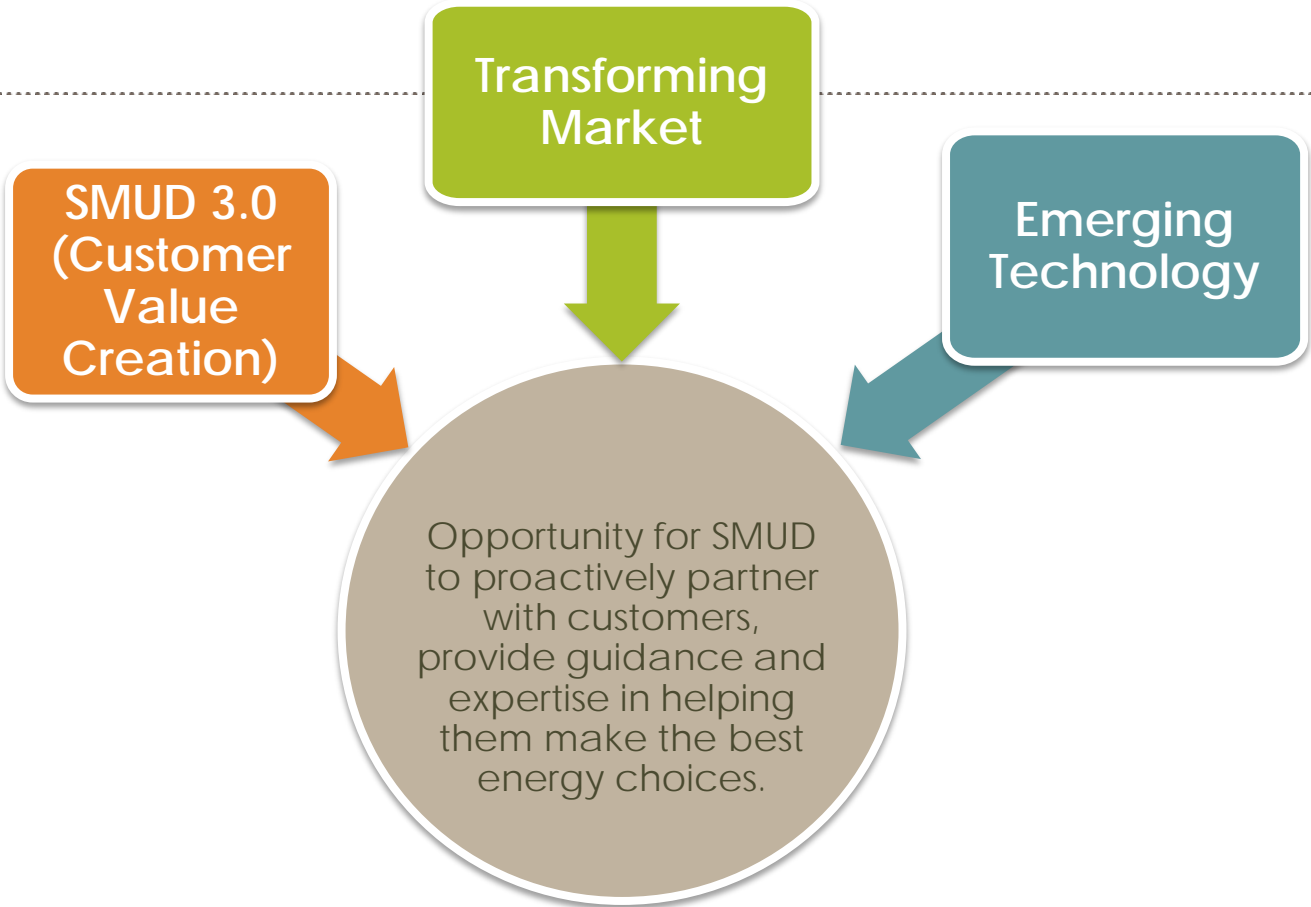
Source: CalEPA

Imperatives for Action

- Financial Disclosure – SEC, Bond Markets
- Insurance
- Investments > 5 years
- Critical Suppliers
- Emergency Response Analysis & Planning
- Local Hazard Mitigation Planning
- Employee Analysis & Education
- Public Health
- Customers!



Transitioning to a Future-Ready Utility



Sustainable Power Supply...RPS...EE...EV...DER...Storage...Grid Mod





Source: Daniel Neville <http://nevolution.typepad.com/theories/ludofication/>
Image: Superbrothers Sword & Sworcery



CAPITAL REGION
**CLIMATE READINESS
COLLABORATIVE**



CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE

Membership



CITY OF
FOLSOM
DISTINCTIVE BY NATURE



The Capital Region Climate Readiness Collaborative is a program of the Local Government Commission.

Channel Partners



Local Government Commission
Leaders for Livable Communities



American Planning Association
California Chapter
Sacramento Valley



Franciscans
For Justice





CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE

Participation Benefits

- **Build connections:** Stay connected to cities and counties actively working to address climate impacts
- **Regional climate network:** Reach out more effectively to a regional network
- **Smart partnerships:** Work with local jurisdictions on programs and projects of shared interest.
- **Adaptation leadership:** Help influence and support future projects and direction for regional climate adaptation.
- **Opportunities for Collaboration:** Vibrant statewide network of professionals working on climate resiliency in their regions.

ARCCA

Alliance of Regional Collaboratives for Climate Adaptation

Formed in 2012, ARCCA is a network of regional collaboratives in California coordinating and supporting climate adaptation efforts to enhance public health, protect natural systems, build economies, and improve quality of life.

ARCCA encompasses over 80% of the state's population



What's Next

- Action Plan Execution & Tracking
- Major Collaborative R&D / Pilot Efforts:
 - Forest health & stream flows / Upland-Lowland Working Group
 - Regional Biosequestration Analysis
 - ILFI/Arch Nexus “kick start”
- CRCRC Regional UHI Initiative
- Economic Cost Assessment with Local and Regional Partners?

Thank you!



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Powering forward. Together.

