

## DOCKETED

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# Regional Collaboration & Climate Readiness

CPUC/CEC Workshop on Climate Adaptation  
Opportunities for the Energy Sector  
July 27, 2015

Kathleen Ave  
Climate Program Manager  
Energy Research & Development

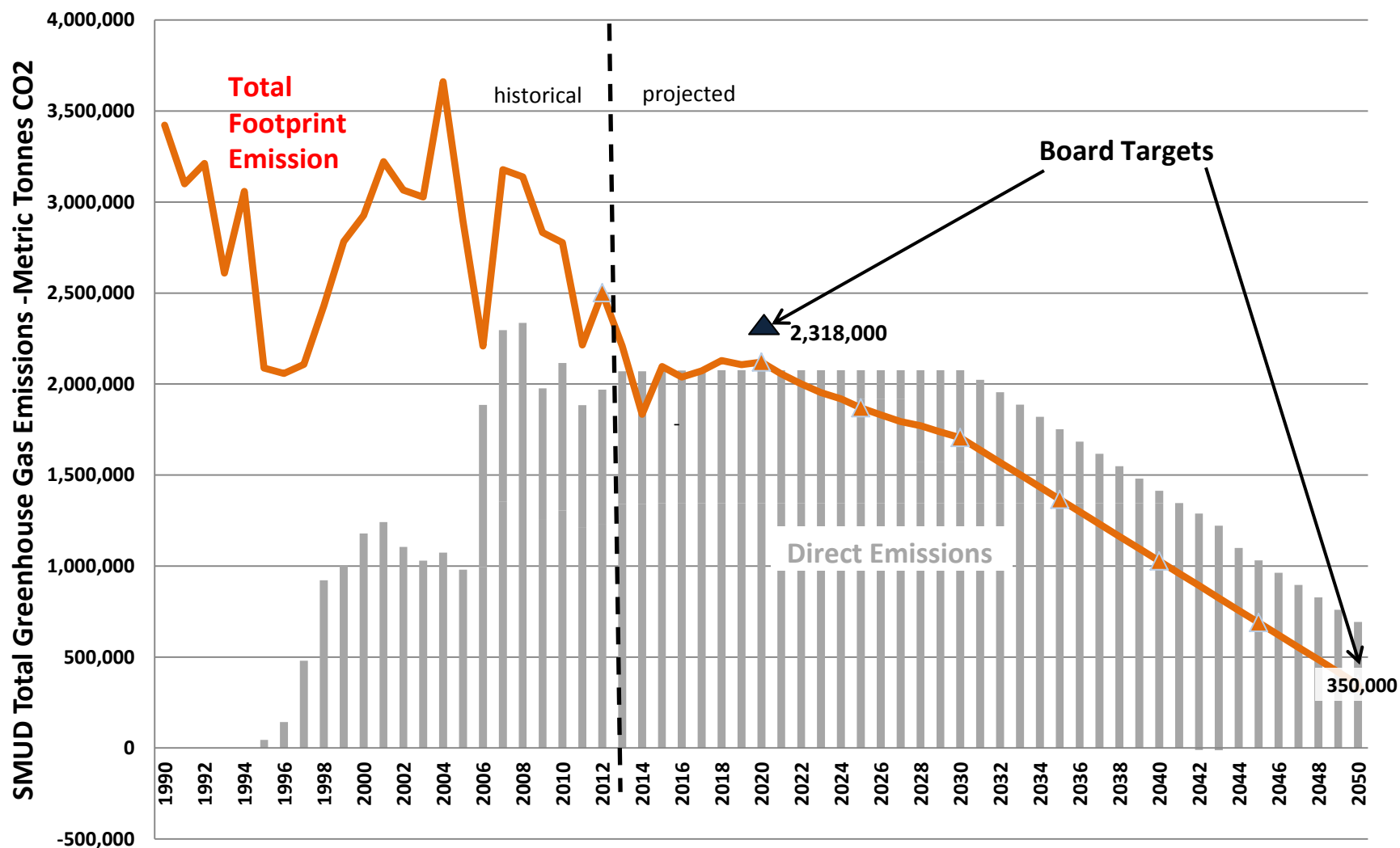
Powering forward. Together.



# Overview

- SMUD's Climate Readiness Effort
- Regional and Industry Collaboration
- Capital Region Climate Readiness Collaborative
- Projects & Funding
- Needs

## SMUD Board Greenhouse Gas Emissions Targets for SMUD Retail Load through 2050 - 90% below 1990 levels

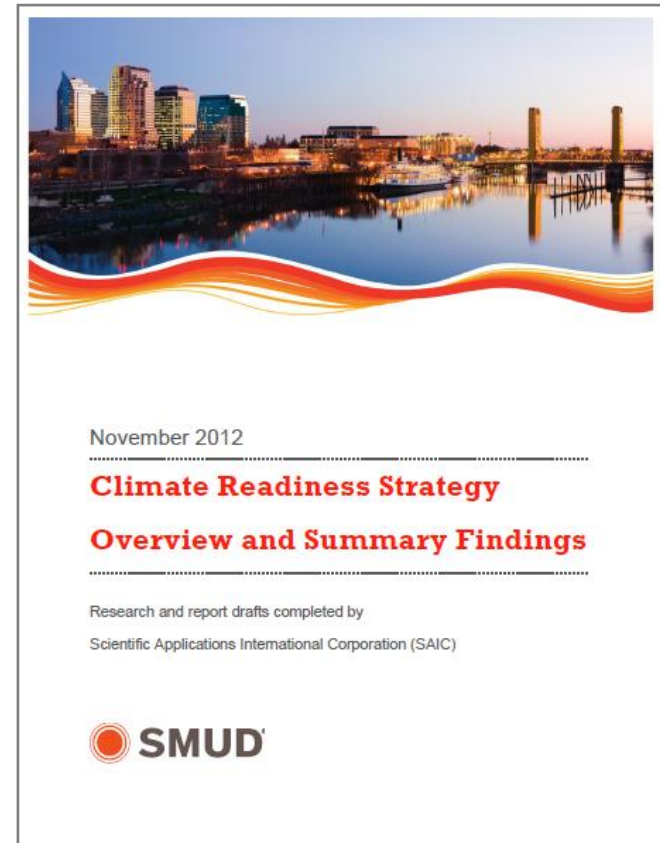
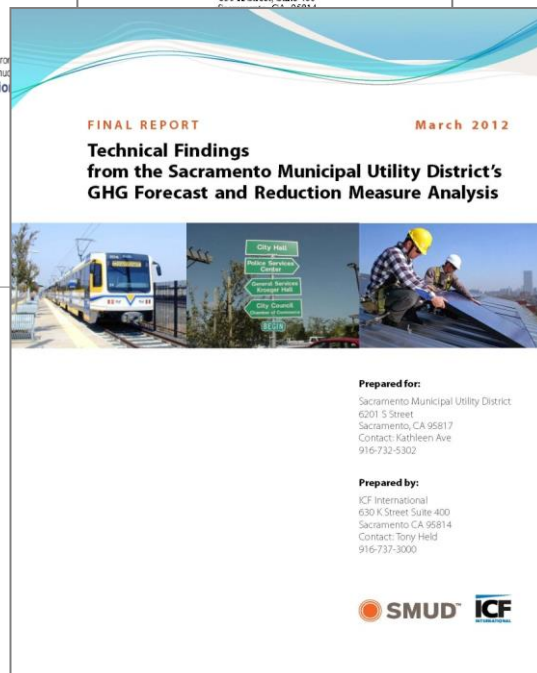
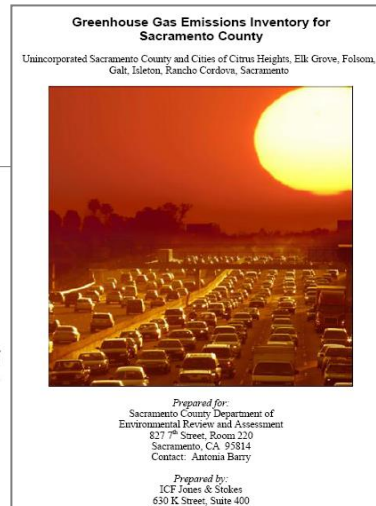
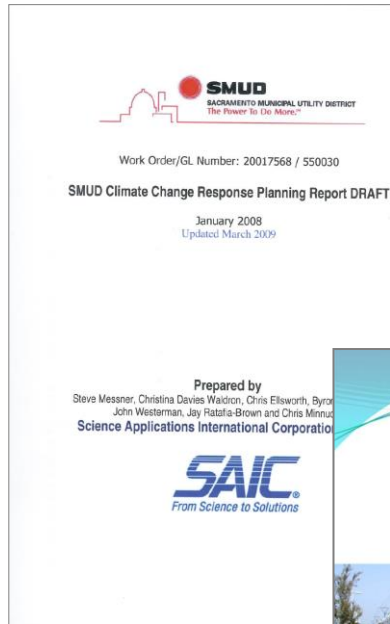


“...the way that I lost my health over time, that I became weaker with each battle, made me rely more on my skill than on any silly piece of armour or potion... the levelling up must come from within the player, skill is not a matter of more *loot*, but of *patience and smarts*.”



Emergency Response and Disaster Relief & Recovery cannot  
address long-term planning and infrastructure needs

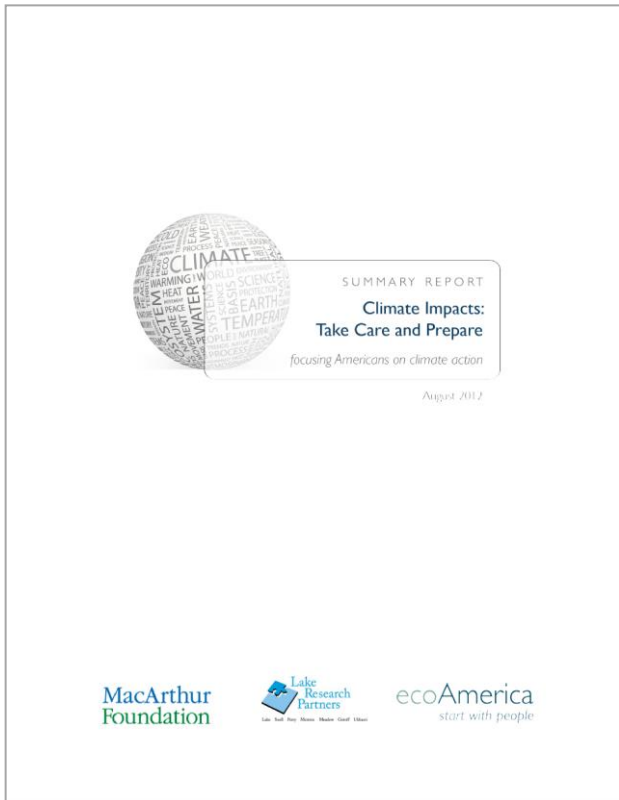
# Understanding Risks & Informing Decisions



Track as Enterprise Risk  
Use in all long term planning (> 5 yrs)  
Conduct additional R&D  
Participate in community collaborative  
4 year update cycle



# Why “Readiness”?



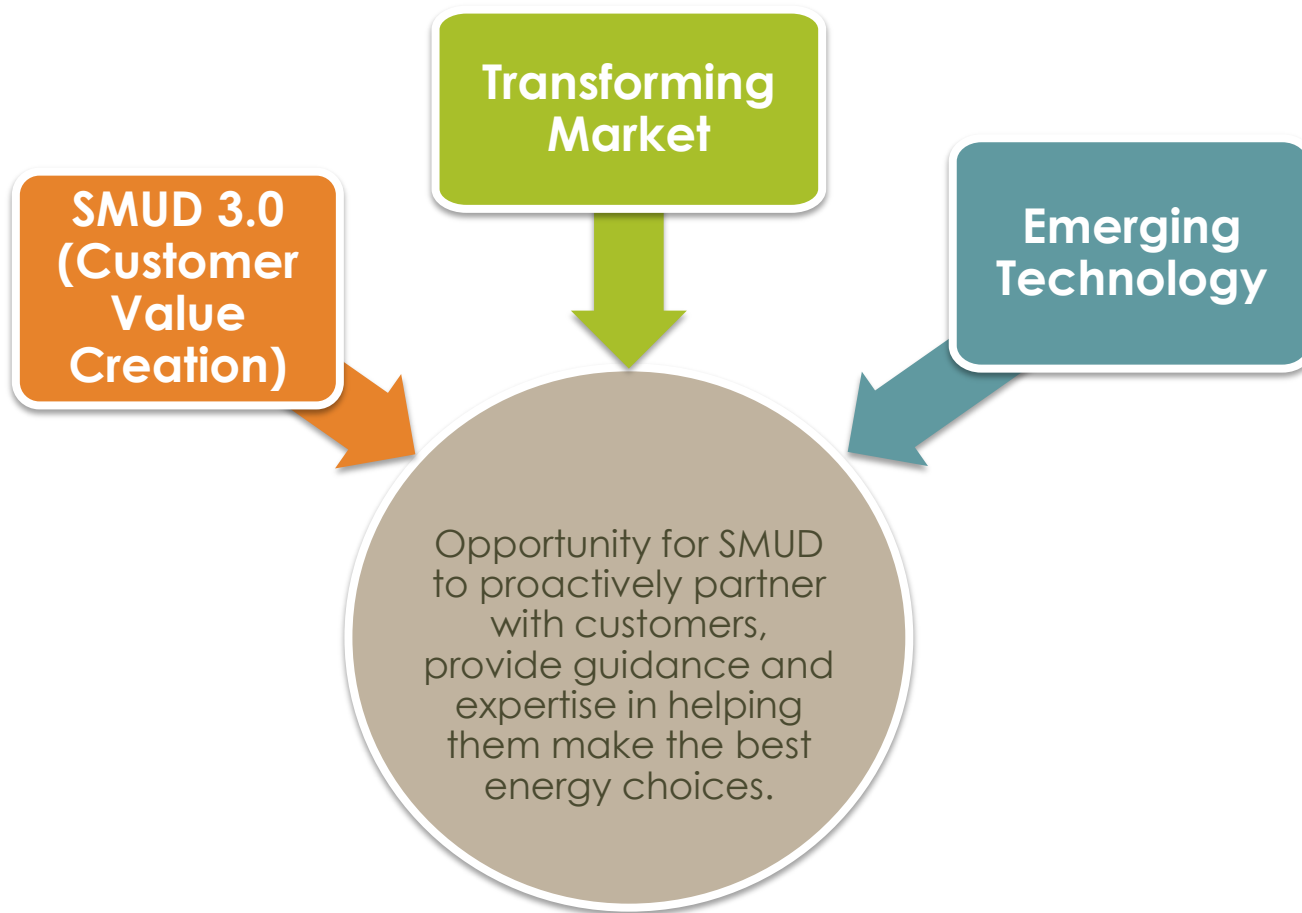
- Adaptation not well understood among general public
- “Readiness” better conveys the desired end state and that action is required (“Preparedness” is best)

# Why Prepare? Objectives

- To assist SMUD's workforce *and our community of customer owners* to prepare for changes in climate and weather in our region, some of which are already happening.
- To enable SMUD to manage many of these changes and prepare for those beyond our control, helping to prevent unnecessary risks.

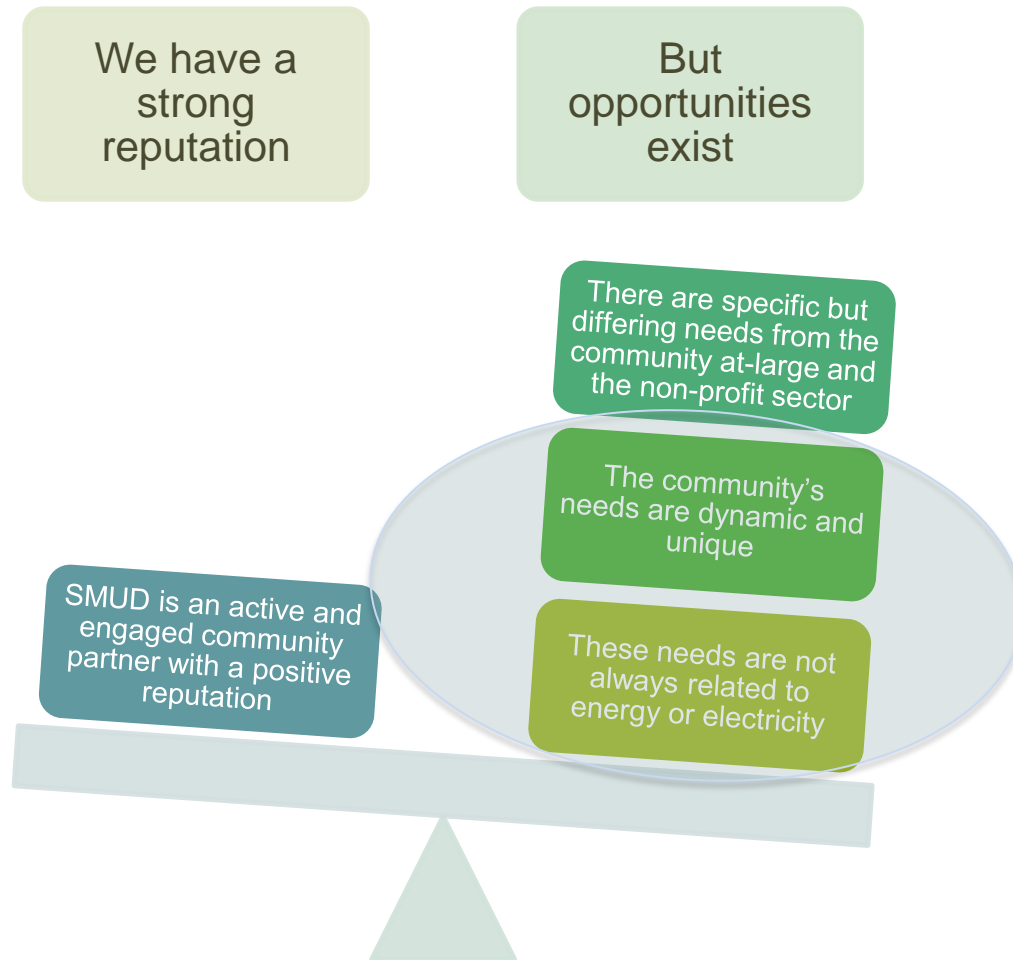


# Transitioning to a Future-Ready Utility



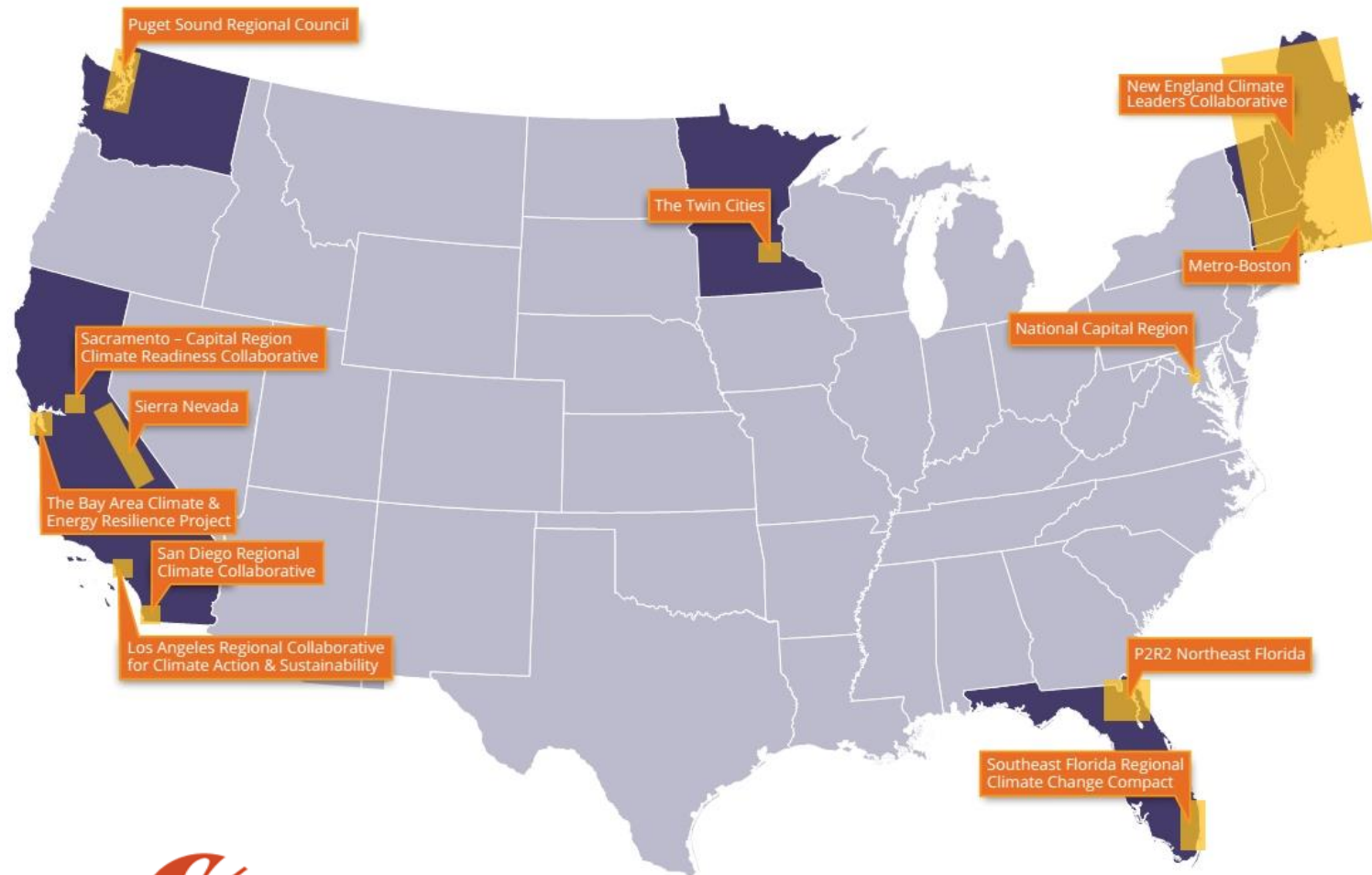
Sustainable Power Supply...RPS...EE...EV...DER...More than Smart  
Climate Readiness

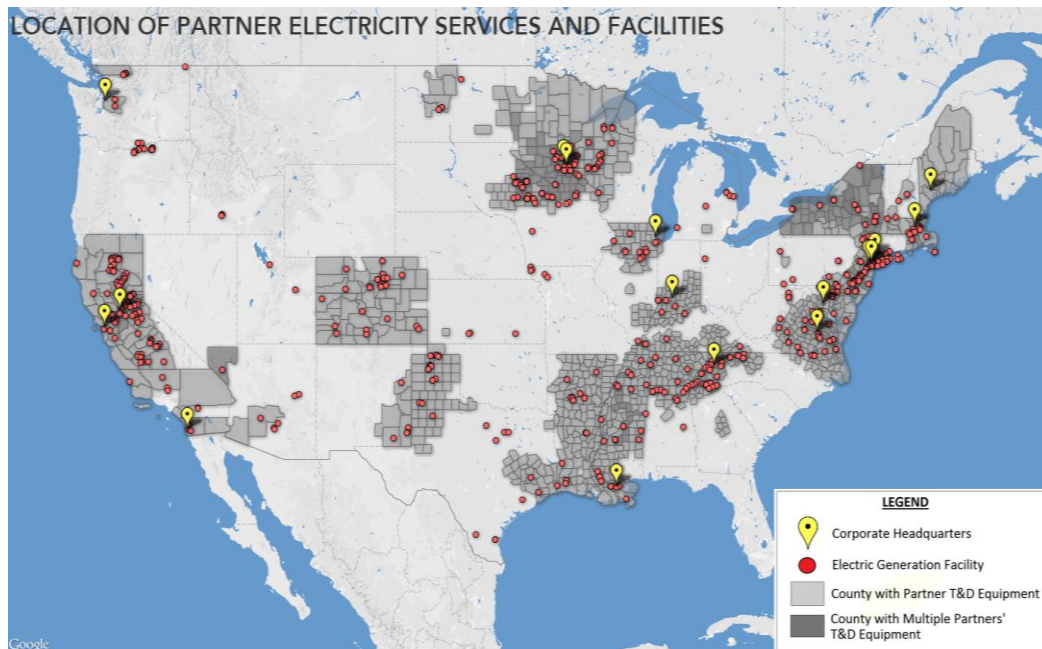
# From Community Partners:



# “Think Resiliently, Act Regionally”

## October 2014





## DOE Partnership for Energy Sector Climate Resilience



## Health Care Climate Council

## Healthcare Without Harm



CAPITAL REGION  
CLIMATE READINESS  
COLLABORATIVE

SACRAMENTO METROPOLITAN



Local  
Government  
Commission

**UCDAVIS**

**POLICY INSTITUTE** FOR ENERGY, ENVIRONMENT AND THE ECONOMY

*Leveraging university expertise to inform better policy*



VALLEY VISION



*Connect. Partner. Impact.*

City of  
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*Pacific Gas and  
Electric Company®*

*in progress:*



**SACRAMENTO**  
C O U N T Y







CAPITAL REGION  
CLIMATE READINESS  
COLLABORATIVE

# Goals

- **Protect and strengthen** the Capital Region's people, economy, resources, and heritage.
- **Build a network** for regional cooperation across sector and jurisdictional boundaries to share information and ideas
- **Amplify the voice** of the Capital Region at the state and national level in emerging and ongoing discussions and planning
- **Help members** identify, apply for and access funding for important regional priorities.





## CAPITAL REGION CLIMATE READINESS COLLABORATIVE

# Projects



### The Capital Region Business Resiliency Initiative Disaster Preparedness Toolkit

40% to 60% of small  
businesses **never reopen**  
after a major disaster

...and 57% of  
businesses have no  
disaster recovery plan

[resilientbusiness.org](http://resilientbusiness.org)



### Climate Ready Region: Cool Roof KickStart

For Discussion with the  
Capital Region Climate Readiness Collaborative  
July 9, 2015

Powering forward. Together.  
Photo credit: carbonboy



### Addressing Climate Change Adaptation in Water Resource Management: A Case Study of the Sacramento Region



Sacramento River (top); Folsom Dam and American River Watershed (bottom)  
Google Earth imagery (2014). SIO, NOAA, U.S. Navy, GNA, GEBCO, Landsat, Google, Map data. [April 28, 2014]

#### Advanced Policy Analysis

A study conducted for the Capital Region Climate Readiness Collaborative,  
Sacramento, California

Rapichan Phurisamban  
Goldman School of Public Policy  
University of California, Berkeley  
May 2014

UC DAVIS  
POLICY INSTITUTE FOR ENERGY,  
ENVIRONMENT AND THE ECONOMY

SACRAMENTO METROPOLITAN  
AIR QUALITY  
MANAGEMENT DISTRICT

CAPITAL REGION  
CLIMATE READINESS  
COLLABORATIVE



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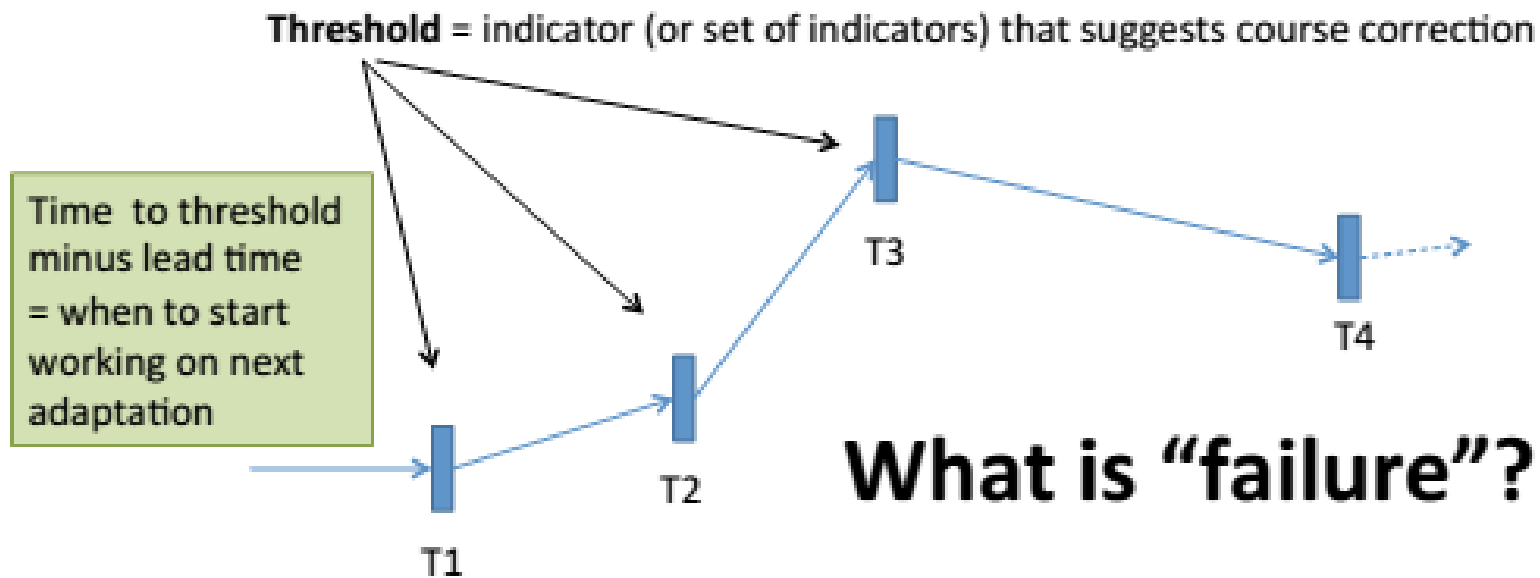
# Questions for the region to answer together

- What are best practices for addressing climate challenges ?
- How will we deal with storms of increased strength?
- Where should we plan for growth and development?
- What is the value of improved stormwater systems and other resilient infrastructure?
- How will we ensure all communities stay safe and healthy?



# What does success look like?

Coping? Protection? Bounce back? Expansion of health?



Example: Setback ----- Seawall ----- Higher seawall ----- (Un)managed retreat --- ?



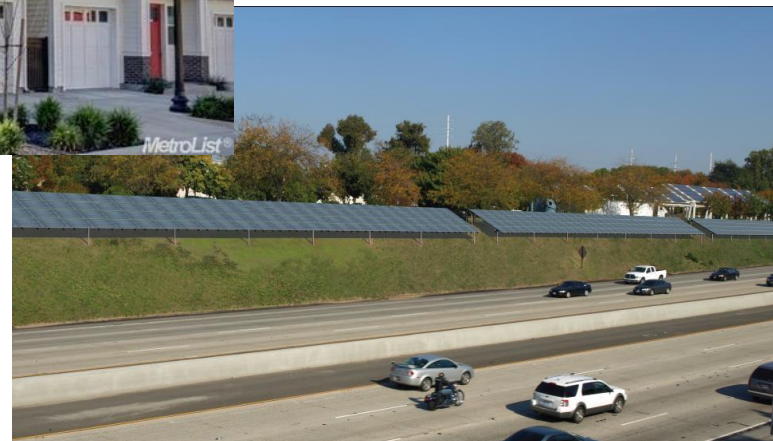
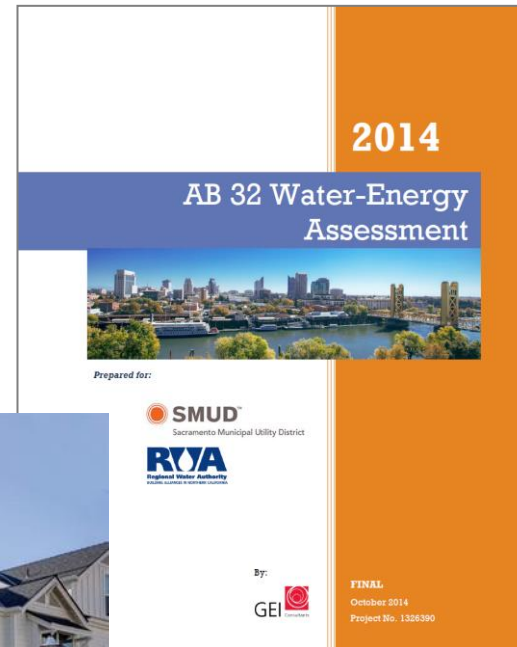
# Organizational Culture:

What people do when no one  
tells them what to do

- Geoff Colvin

# Integration must be engineered...





Contemporary Power Associates & P4P Energy

“opportunities to leverage SMUD capital investments to achieve broader community resilience, placemaking and infrastructure objectives”

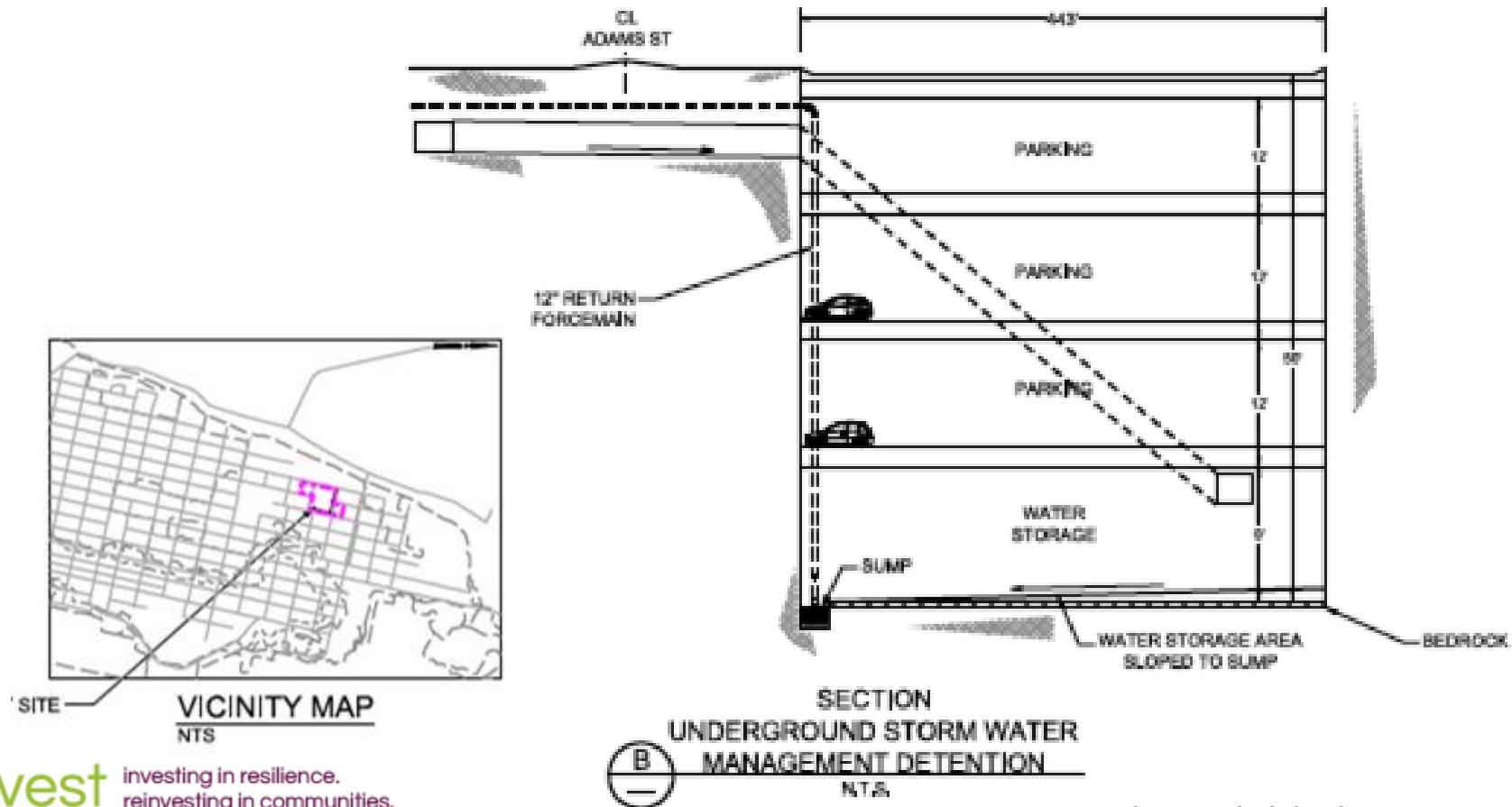




# HOBOKEN, NJ

re:fOCUS  
PARTNERS

## STORMWATER STORAGE + PARKING + GREEN INFRASTRUCTURE

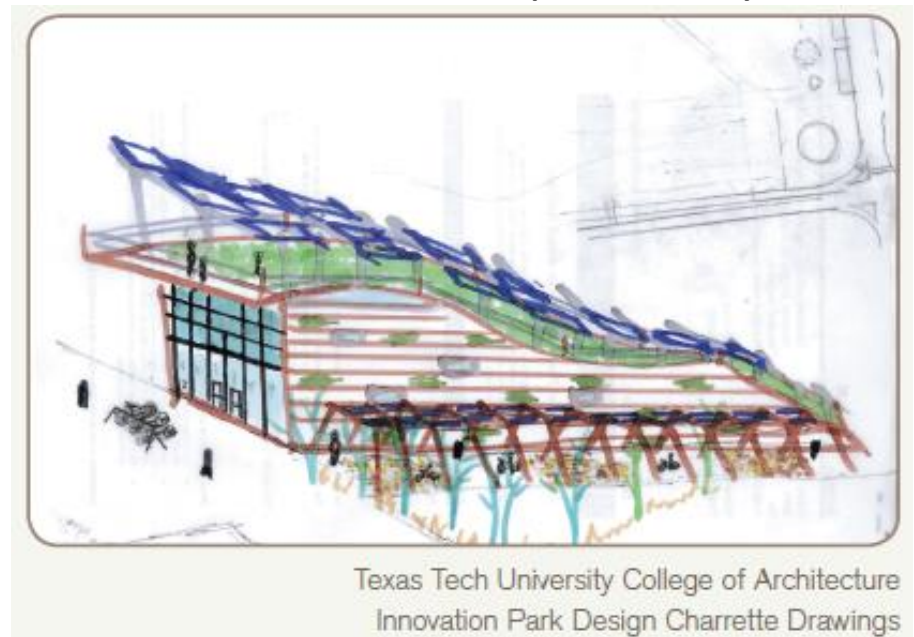




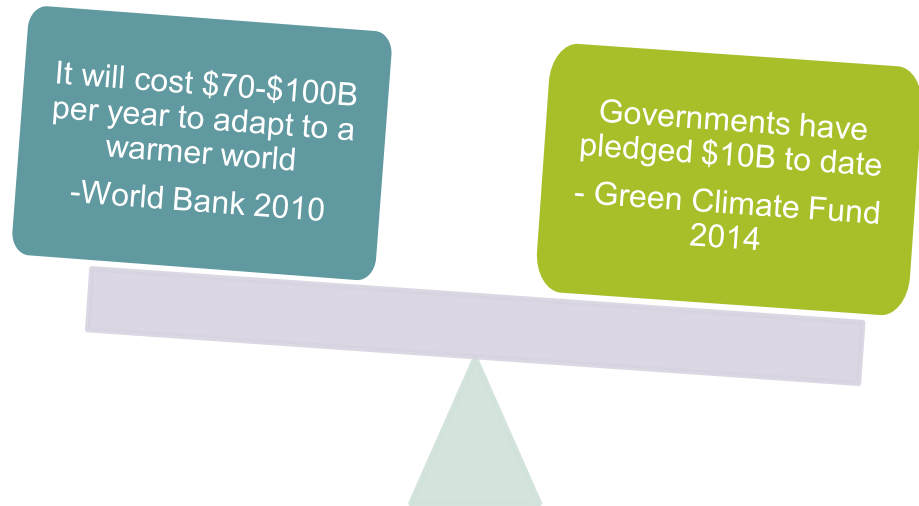


“COSMO” by architect andrés jaque is engineered to filter and purify 3,000 gallons of water over a four-day cycle and demonstrate that previously “hidden” infrastructure can be interesting and even beautiful. Installed at MOMA PS1 June 2015

El Paso, TX Innovation District, co-located with El Paso Water Utilities Desalination Plant and powered by solar



# Funding



- Mobilizing private capital is critical, but distributed and networked solutions are not well understood
- Multiple benefits can generate multiple revenue streams
- “Co-benefits” and risk avoidance represent value to be aggregated and monetized

# The Challenge



 **Local Government Commission**

**[www.lgc.org](http://www.lgc.org)**



# We need:



- Smarts:
  - Expanded utility participation in regional climate collaboratives
  - New models for interagency coordination that address shared risks and benefit common customers
- Patience:
  - Significant learning curves
  - Organizational culture shifts to expand focus beyond energy
  - Recognition that “failure” will happen
- Loot:
  - Coordinated funding sources that incentivize collaboration
  - New funding streams and financing options (monetization of natural capital and risk avoidance)
  - Mobilization of private capital for distributed & networked solutions

A photograph of a wind farm. In the foreground, a large white wind turbine stands on a grassy hill. In the background, three more wind turbines are visible on the horizon under a clear blue sky. The text is overlaid on the right side of the image.

Thank you  
[kathleen.ave@smud.org](mailto:kathleen.ave@smud.org)  
[@AveKathleen](#)

# SMUD Energy Resources



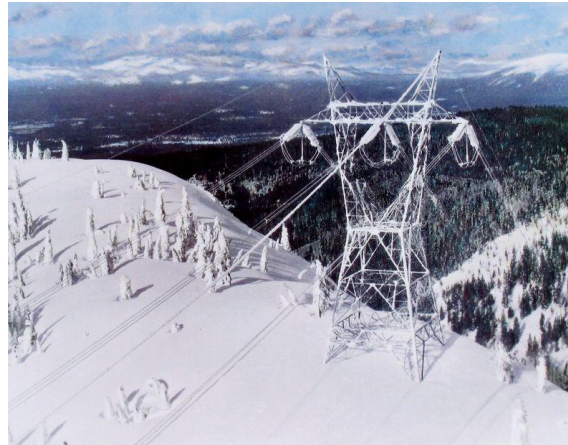
Distributed Solar – 50MW  
rooftop, 100 MW groundmount



Biomass -203 MW



Solano Wind – 230 MW



COTP Transmission to NW  
– 1600 MW



Upper American River  
Hydro Project – 688 MW



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

- 900 square mile service territory
- 477 miles of transmission lines
- 9736 miles of distribution lines





# Potential Climate Impacts to SMUD Infrastructure and Operations

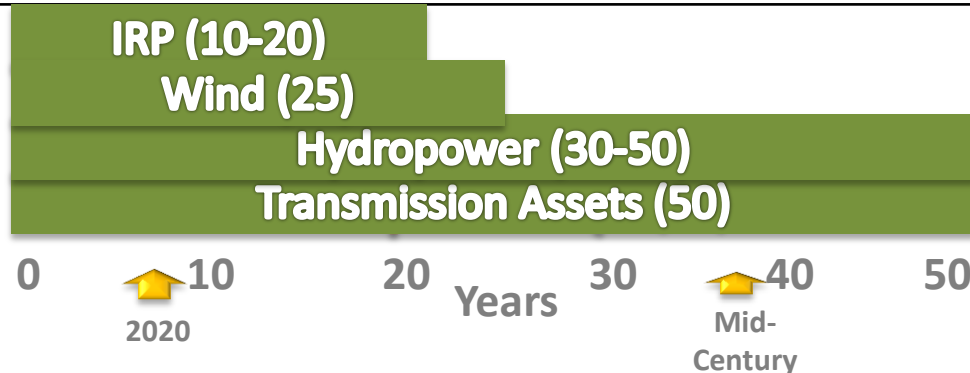


<b>Ambient Temperatures</b>	<ul style="list-style-type: none"> <li>• More extreme summertime high temperature events, including daytime and nighttime heat waves</li> <li>• Increased warm season electrical load and peak demand</li> <li>• Reduced thermal and hydroelectric generation</li> <li>• Extreme temperature and variability impacts on system reliability</li> <li>• Increasingly severe “one-in-ten” heat storms effects on overall system reliability</li> <li>• Less efficient operation of transmission and distribution systems, including decreases in facility ratings and loss of operating life</li> </ul>
<b>Wildfires</b>	<ul style="list-style-type: none"> <li>• Projected increase in wildfire frequency and intensity</li> <li>• Potential wildfire impacts to transmission and out-of-district generation sources</li> </ul>
<b>Wind Patterns</b>	<ul style="list-style-type: none"> <li>• Increases or decreases in wind energy production and timing</li> <li>• Increases or decreases in delta breeze cooling capacity</li> </ul>
<b>Regional Hydrology</b>	<ul style="list-style-type: none"> <li>• Effects of changes in temperature and precipitation on snowpack in the Sierra Nevada mountains</li> <li>• Changes in timing and volumes of streamflow and impacts on hydroelectric capacity</li> </ul>
<b>Flooding</b>	<ul style="list-style-type: none"> <li>• Sacramento flood threats</li> <li>• Localized impacts on electricity infrastructure</li> <li>• Indirect impacts on gas transmission infrastructure in the San Francisco Bay Delta region</li> </ul>

Climate Region 2



Climate Region 5



US DOE Partnership for Energy Sector Climate Resilience

<http://www.energy.gov/epsa/partnership-energy-sector-climate-resilience>

Institute for Sustainable Communities – Regional Climate Collaboratives

Link to participants in the Think Resiliently, Act Locally Leadership Training (October 2014)

[http://www.sustainablecommunitiesleadershipacademy.org/resource\\_files/documents/Think%20Resiliently,%20Act%20Regionally%20\(web\)%20NO%20BIOS.pdf](http://www.sustainablecommunitiesleadershipacademy.org/resource_files/documents/Think%20Resiliently,%20Act%20Regionally%20(web)%20NO%20BIOS.pdf)

Water Utility Climate Alliance

<http://www.wucaonline.org/html/>

Health Care Without Harm

Leading the newly formed Health Care Climate Council

<https://noharm-uscanada.org/>

US DOE Climate Champion Cities

<http://energy.gov/epsa/climate-action-champions>

Western Adaptation Alliance

<http://www.iscvt.org/program/western-adaptation-alliance-waa/>

Great Lakes Forest Alliance

<http://www.forestadaptation.org/node/90>

Urban Sustainability Directors Network Regional Collaboratives

<http://usdn.org/public/about-us.html>