

Climate Change and Our Regional Quality of Life



Emily Young, PhD
The Nonprofit Institute





San Diego, 2050 Is Calling.

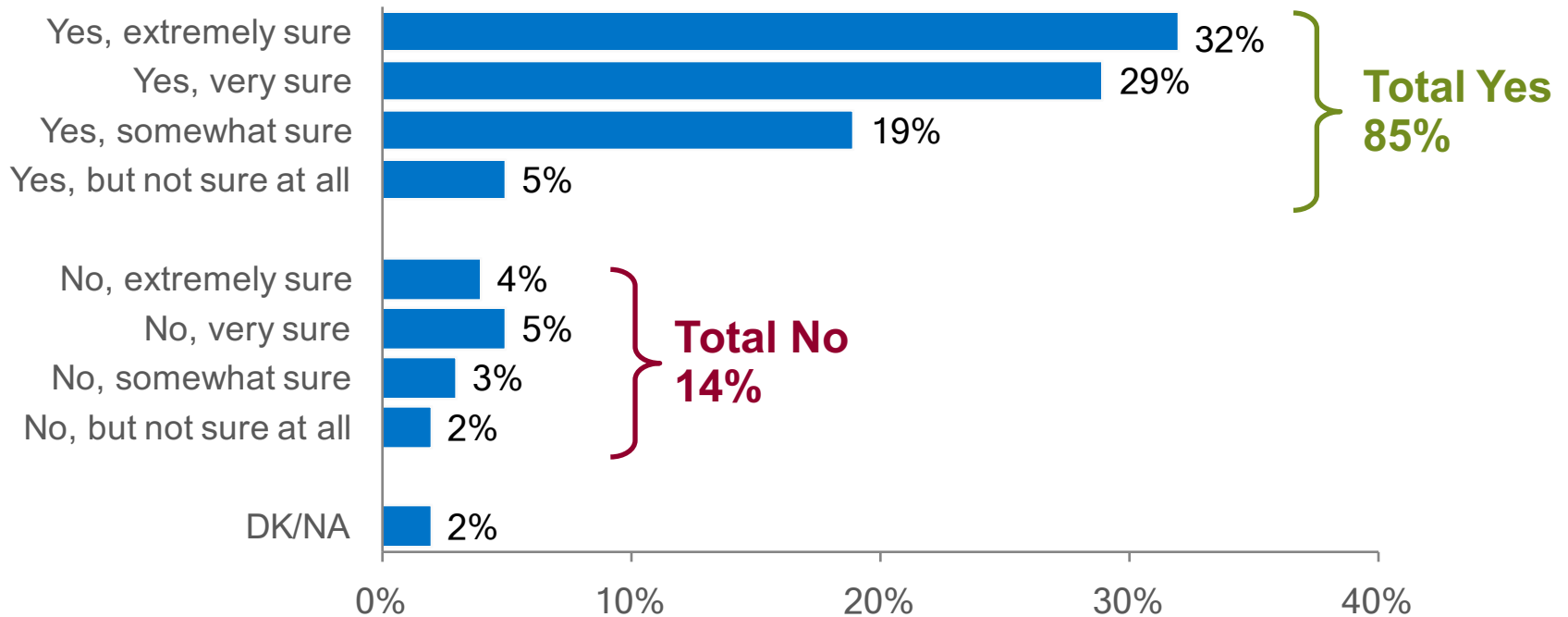
HOW WILL WE ANSWER?



FACING THE FUTURE:
How Science Can Help Prepare San Diego Regional Leaders for Climate Change

San Diegans Agree that Climate Change is Happening

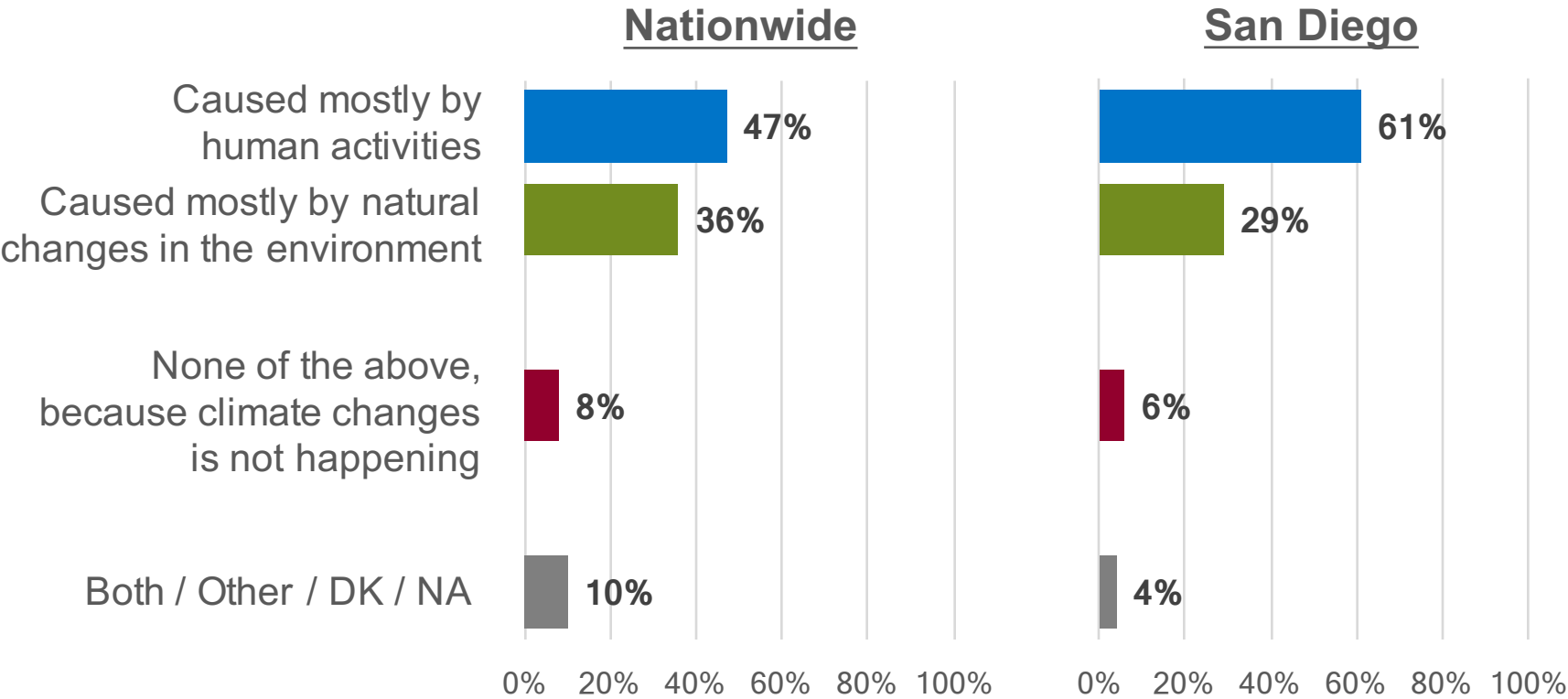
*Do you think climate change is happening?
Would you say you are extremely sure it **IS** / **ISN'T** happening,
very sure, somewhat sure, or not at all sure?*



Q14.

San Diegans are more likely than other Americans to know climate change is caused mostly by human activities.

Assuming that climate change is happening, do you think it is...



Q15.

Are **YOU** part of a community concerned about climate change in the San Diego region?



Do you think **YOUR PEERS** are part of a community concerned about climate change in the San Diego region?



Economic Resilience: Health

A HOTTER FUTURE POSES NEW HEALTH RISKS AND OPPORTUNITIES



High, dry daytime summer temperatures continue to make headlines. These headlines are about more than setting records. A healthy workforce is a critical part of any business' success...and its bottom line. Awareness of the impacts of our region's changing climate on our quality of life can help businesses better manage risks, maximize efficiencies and innovate ahead of the curve. Working together and investing today, businesses, scientists and regional leaders can identify how technology, talent and local expertise can ensure our region maintains a strong economy, healthy environment and vibrant quality of life not just for today's workforce, but for all future generations.



A Hotter Future Poses New Risks

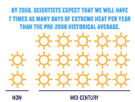
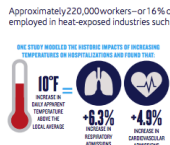
"Over the next 40 years global temperatures could increase twice as fast as they have in the last 40, and southern California temperature increases will likely follow this trend. In the San Diego region, rising temperatures pose significant challenges for our region's residents, businesses and communities that are accustomed to our mild Mediterranean climate."

Kristen Gulgah, PhD
Senior Instructor of Oceanography at the University of California, San Diego

FORECAST: Hotter and more humid heat waves

Why Should Our Businesses Care?

Our regional economy and the quality of life of our workforce are intimately connected to our mild climate. The businesses that make up our region's three major industries – tourism, innovation, and the military – as well as the local businesses that make up the other half of our \$200+ billion regional economy, should anticipate some changes to our climate despite best local and global efforts to reduce polluting greenhouse gas emissions.



Approximately 220,000 workers—or 16% of the regional workforce—are employed in heat-exposed industries such as construction, agriculture, transportation and manufacturing. When it is hot, employees find it harder to concentrate and work well. Greater demand for air conditioning to prevent worker exposure to warmer temperatures and maintain worker health and productivity will likely increase energy bills and the need for efficiency. Workers may also need to pay more attention to family members they care for such as children or elderly, who are more likely to be impacted by extreme heat days, similar to those that prompted school closures in the fall of 2014.

Economic Resilience: Water

A PARCHED FUTURE POSES NEW RISKS AND OPPORTUNITIES IN BUSINESS



Climate change. It's hard to deny something is happening in our region – higher tides, bigger storms, extended and drier heat patterns. Scientists from well-known Scripps Institution of Oceanography at the University of California, San Diego, housed right here in the San Diego region, tell us our world is changing.

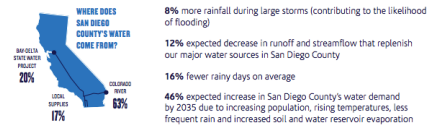


By being aware of how climate change is likely to affect our region, businesses, scientists and regional leaders are working together and investing today to identify how technology, talent and local expertise can ensure our region maintains a strong economy, healthy environment and vibrant quality of life not just for today's workforce, but for all future generations.

A Parched Future Poses New Risks

The San Diego region's primary water sources are impacted by a warming climate. Our two main sources – the Colorado River and Sierra Nevada (via the State Water Project) – are likely to be impacted as warmer temperatures and more extended droughts reduce the amount of snowpack and river flow.

FORECAST: Drier with a chance of flooding – Local rainfall patterns are also changing in ways that make both drought and flood events more likely. By mid-century, scientists project:



Why Should Our Businesses Care?

Water is the lifeblood of any regional economy. The businesses that make up our region's three major industries – tourism, innovation, and the military – as well as the local businesses that make up the other half of our \$200+ billion regional economy, all rely on clean and stable water supplies. Biotechnology and pharmaceutical businesses, a major part of our region's economy, also face a substantial risk because they need reliable access to clean water and must meet strict regulators on discharge limits. Water is a precious resource. Working together, we must adopt policies and strategies to ensure an abundant water supply for our economy, quality of life and future generations.

San Diego, 2050 Is Calling.

HOW WILL WE ANSWER?



FACING THE FUTURE:

How Science Can Help Prepare San Diego Regional Leaders for Climate Change

Climate Resilience: Vulnerable Populations

HIGHER TEMPERATURES, HEALTH RISKS, AND NEW OPPORTUNITIES

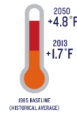


San Diego County is a beautiful place to live where one can enjoy the outdoor environment year round. However, temperatures have been steadily rising and this poses a threat to the natural beauty of our region and the health of our residents. If temperatures continue to rise at the current rate, the quality of life San Diegans are accustomed to will not be available for future generations.

Rising Temperatures in San Diego County

Global average temperature has been steadily rising. It is now 1.7°F hotter than it was in 1985, and it is expected to rise to 4.8°F by 2050. This changing climate brings with it new health risks which could be more problematic for our most vulnerable populations. This report identifies who our most vulnerable residents are and where they live in San Diego County, as well as summarizes the potential detrimental effects of rising temperatures on their health. We will also highlight solutions from local agencies and organizations that are working together to address these challenges.

ANNUAL AVERAGE TEMPERATURE IS INCREASING AND WILL CONTINUE TO INCREASE BETWEEN NOW AND 2050.



Perspectives from Local Leaders:

"In 2015, San Diego saw a greater number of heat alerts than in any other past years. The impact of extreme heat has a significant risk to our health, especially the most vulnerable populations. These incidents resulted in increased health-related illnesses for humans and animals, as well as damage to the environment by wildfires."

Wilma Wootton, MD, MPH
Public Health Officer, Health and Human Services Agency, County of San Diego

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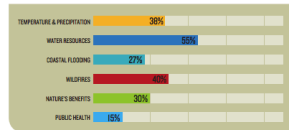
A BRIEF ANALYSIS FROM INTERVIEWS WITH THE SAN DIEGO REGION'S 100 KEY INFLUENTIALS



Scientists and San Diego regional leaders care about our quality of life and our local economy. While everyone is experiencing changes in our local climate, scientists expect the changes to become more unpredictable and pronounced by mid-century. Scientists know we will be affected in these critical quality of life areas if we don't take action now:

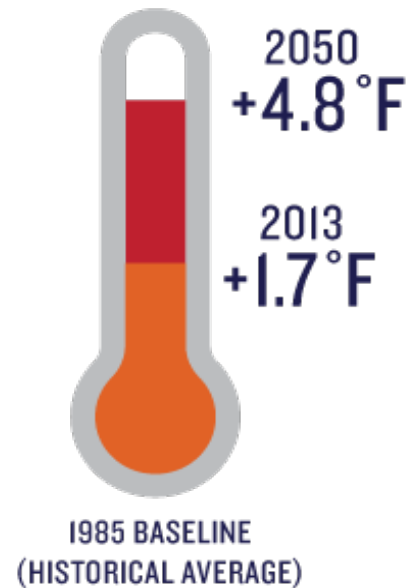


Unlike the scientists, our regional leaders are not quite so aware—yet! When Climate Education Partners surveyed 100 key influential leaders in the San Diego region, and asked how increased temperatures will impact our region for future generations, this is how they responded:





**ANNUAL AVERAGE TEMPERATURE IS INCREASING
AND WILL CONTINUE TO INCREASE
BETWEEN NOW AND 2050:**





**WE EXPECT TO SEE CHANGES IN OUR REGION'S
PRECIPITATION PATTERNS:**



16% FEWER RAINY DAYS



**8% MORE RAINFALL DURING
THE BIGGEST RAINSTORMS**

Climate Change Impacts on Communities are Not Equal

Health Impacts of Climate Change



AIR POLLUTION

- Reduced lung function
- Asthma
- Premature death from prolonged exposure
- Cardiovascular illness
- Respiratory illness
- Diabetes
- Absence from school/work



EXTREME HEAT

- Heart related diseases & failure
- Kidney function
- Dehydration
- Gastrointestinal illness
- Preterm delivery
- Stillbirth
- Mental health stress
- Heat stroke
- Premature death
- Infant mortality

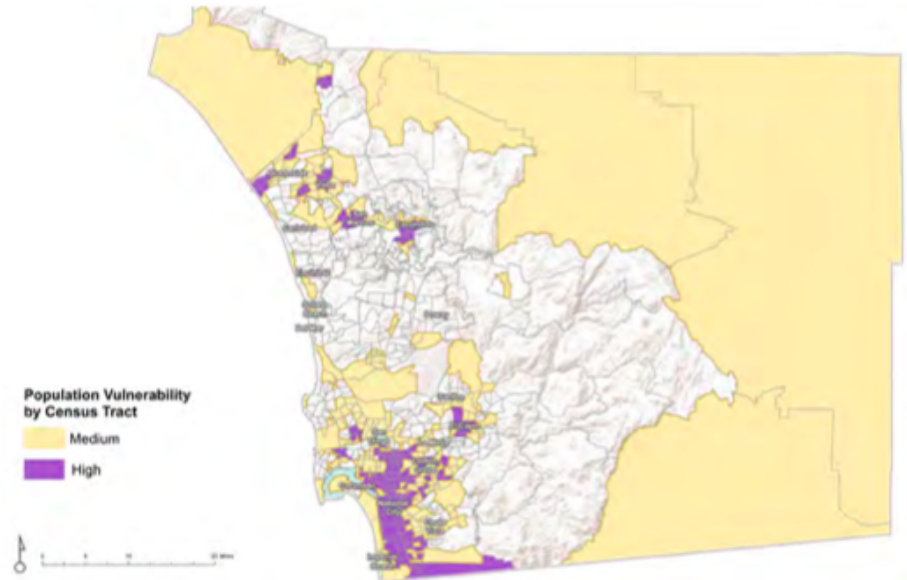


WILDFIRES AND SMOKE

- Burn injury
- Respiratory & cardiovascular illness
- Mental health stress
- Adverse birth outcomes

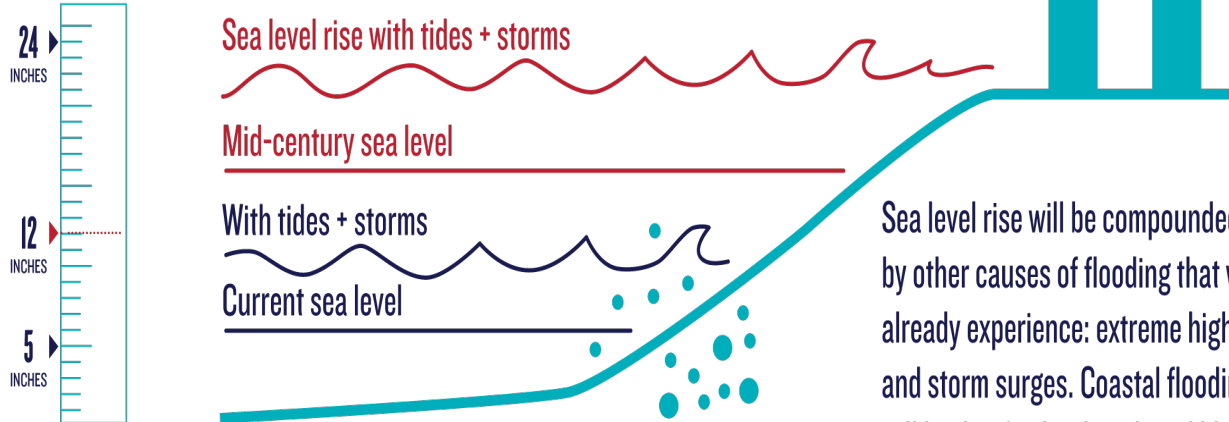
Vulnerable areas in San Diego County

Policy makers, community leaders, and decision makers are becoming more aware that climate change impacts on communities are not equal. Some communities need more education and resources to address their particular health risks. For example, cities having cooling centers available to residents in communities with fewer air conditioners help prevent heat strokes.



The colors indicate levels of population vulnerability to climate change, from high (purple) to medium (yellow).¹

HOW WILL SEA LEVEL RISE AFFECT COASTAL FLOODING?



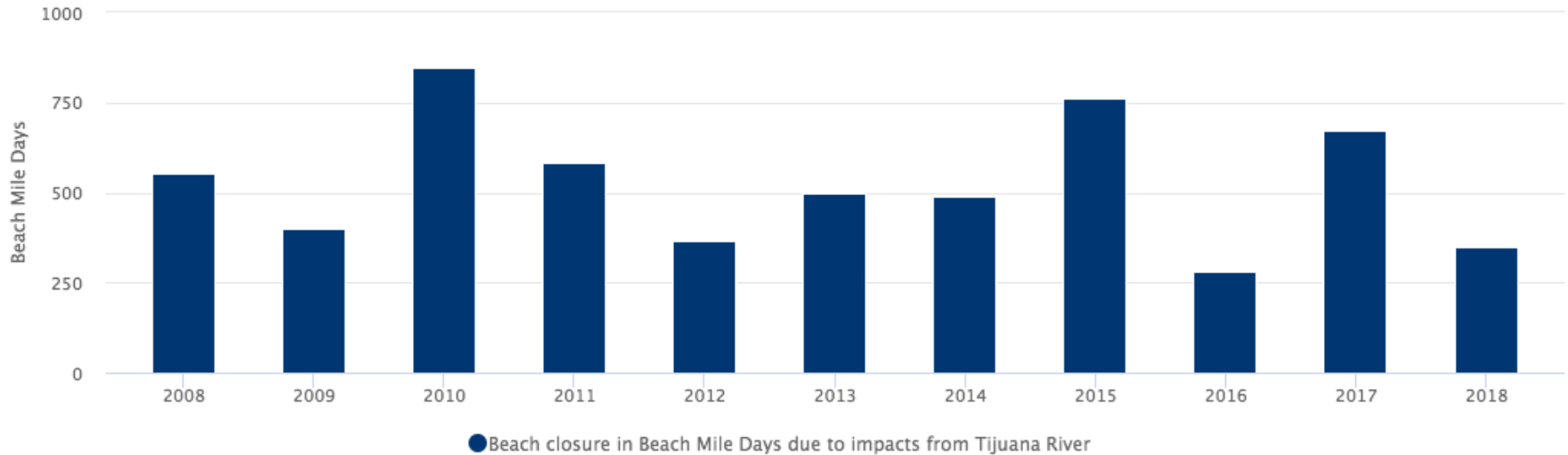
Sea level rise will be compounded by other causes of flooding that we already experience: extreme high tides and storm surges. Coastal flooding will lead to further beach and bluff erosion as well as runoff and drainage problems from intense storms.



San Diego County beaches are heavily impacted by sewerage flows from the Tijuana River



San Diego County beaches, 2008–2018



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Data Source: San Diego County Department of Environmental Health, 2018

Closures due to the Tijuana River reduced from 671 Beach Mile Days in 2017 to 348 Beach Mile Days in 2018. Despite this reduction, closures remain high and impacts from the Tijuana River continue to have a significant impact on San Diego's southern beaches.

**THREE OF CALIFORNIA'S 10 LARGEST WILDFIRES WERE
IN SAN DIEGO COUNTY AND BURNED 646,661 ACRES**



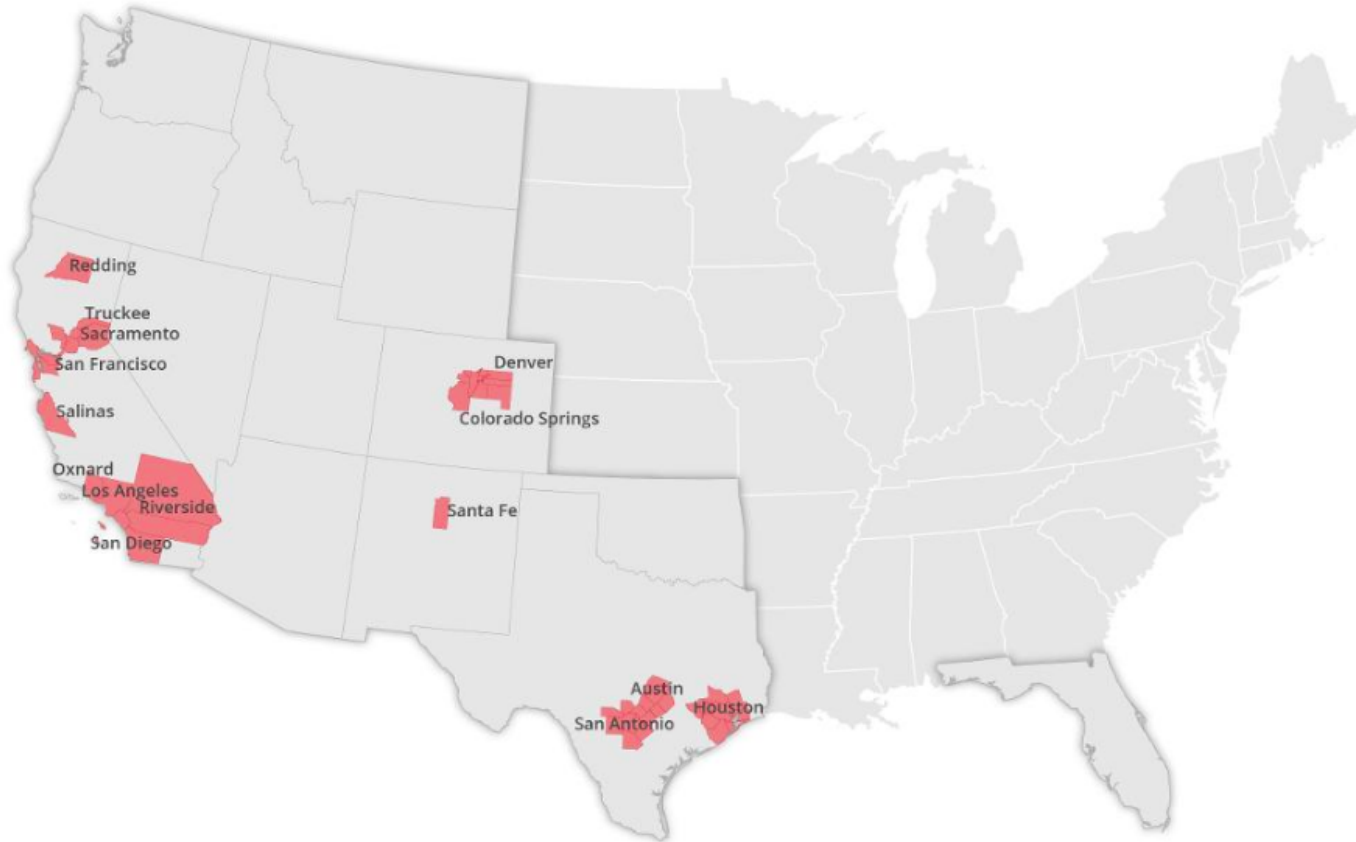
The wildfires of 2003 and 2007 together cost more than **\$4.5 BILLION** in damages and incalculable indirect costs in lost workdays, business shutdowns and decreased tourism.

**HOMES LOST ANNUALLY TO WILDFIRES
IN SOUTHERN CALIFORNIA**

Sprawling urban growth has given rise to a growing number of wildfires in the wildland-urban interface and increased loss of homes in Southern California.



San Diego Region Among Most Vulnerable Across the US



Source: CoreLogic, 2019

San Diego Region Wildfire Risks Among Most Costly Across the US

Table 9: Top 15 Metropolitan Areas for Wildfire Risk Ranked by Reconstruction Cost Value in Billions.

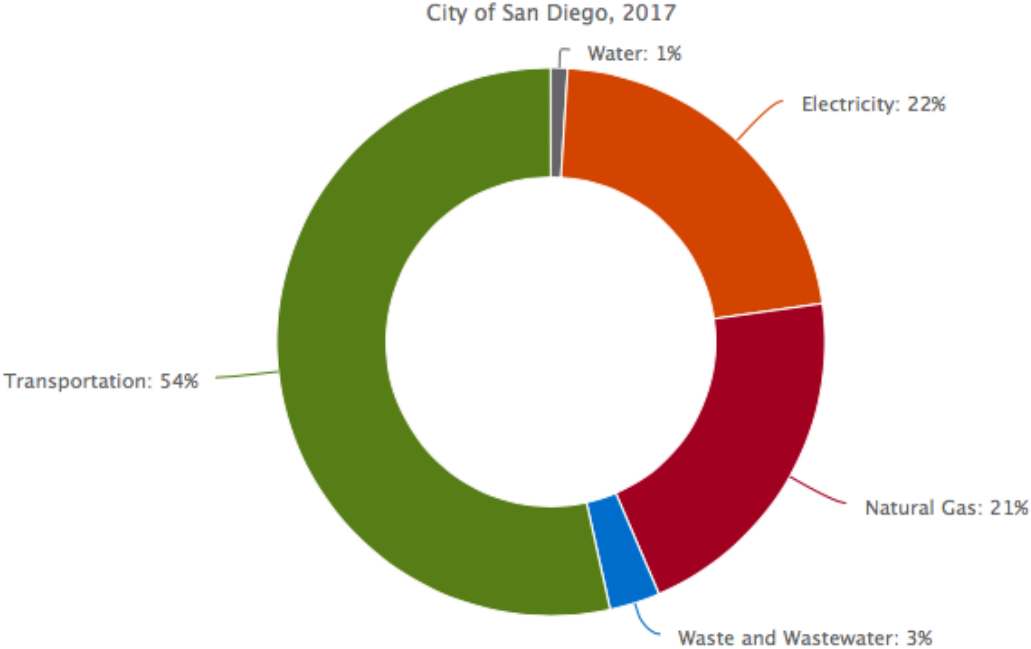
Metropolitan Area	Rank	High - Extreme-Risk Residence Count	High and Extreme Risk RCV
Los Angeles, CA	1	121,589	\$71.00
Riverside, CA	2	108,787	\$40.94
San Diego, CA	3	75,096	\$35.81
Sacramento, CA	4	68,056	\$27.50
Austin, TX	5	53,984	\$16.35
San Francisco, CA	6	32,174	\$16.32
Denver, CO	7	49,734	\$15.32
Truckee, CA	8	31,987	\$10.85
Oxnard, CA	9	19,555	\$10.17
Colorado Springs, CO	10	31,323	\$9.36
San Antonio, TX	11	30,696	\$8.43
Santa Fe, NM	12	23,546	\$7.28
Redding, CA	13	21,057	\$6.44
Salinas, CA	14	11,314	\$6.39
Houston, TX	15	36,004	\$6.27

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Human Contributions: Greenhouse Gas Emissions

Greenhouse gases (GHGs) include carbon dioxide, methane and nitrous oxide. [Accelerating GHG emissions](#) from human activities contribute to climate change impacts.

The majority of greenhouse gas emissions come from vehicles and building energy use

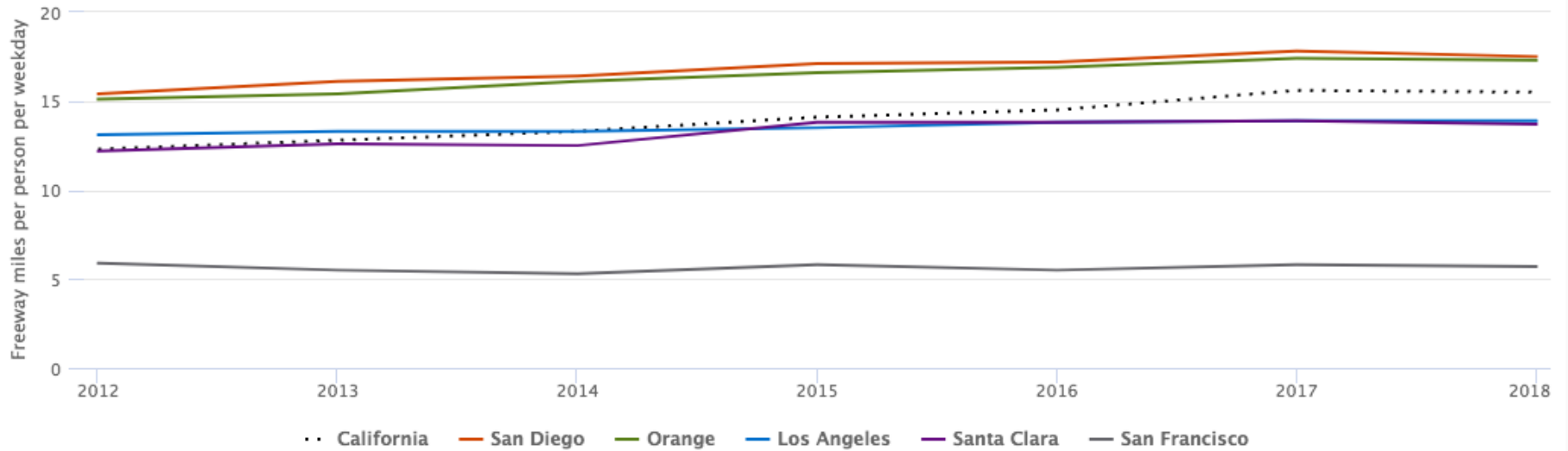


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Source: Energy Policy Initiatives Center at University of San Diego School of Law; City of San Diego 2018 Climate Action Plan Annual Report, 2018

San Diegans drive more per person on freeway than California average

(Select Counties and California, 2012–2018)



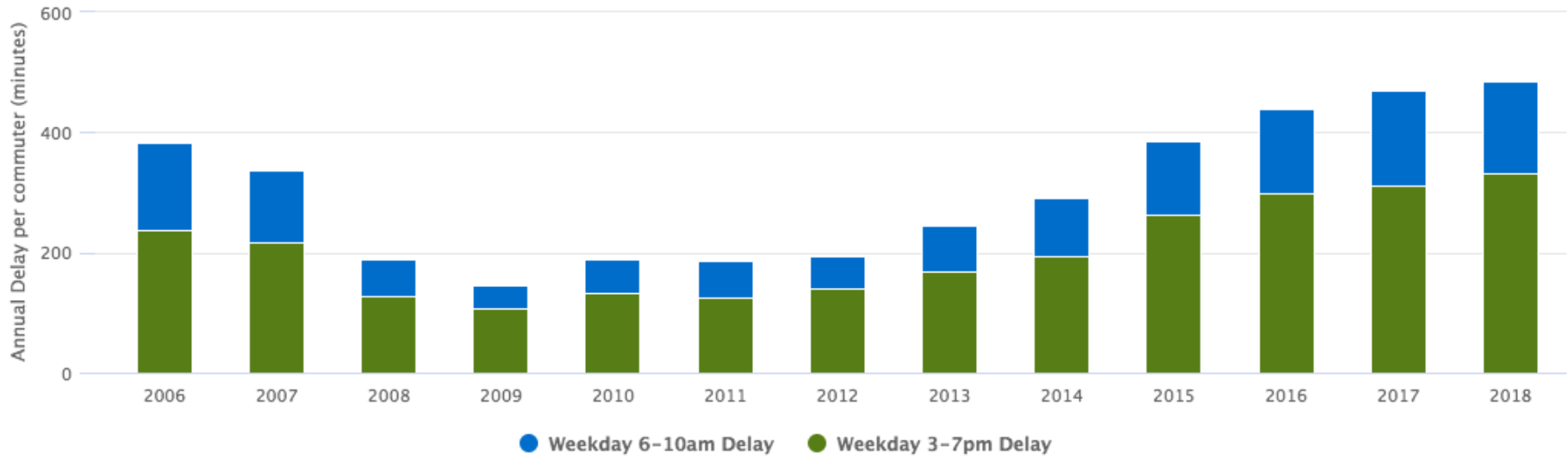
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Data Source: California Department of Transportation Performance Measurement System (PeMS)

San Diego freeway vehicle miles traveled (VMT) per person is about the same as in Orange County, and above the state average.

San Diego commuters are spending more time in freeway traffic

(San Diego County, 2006–2018)



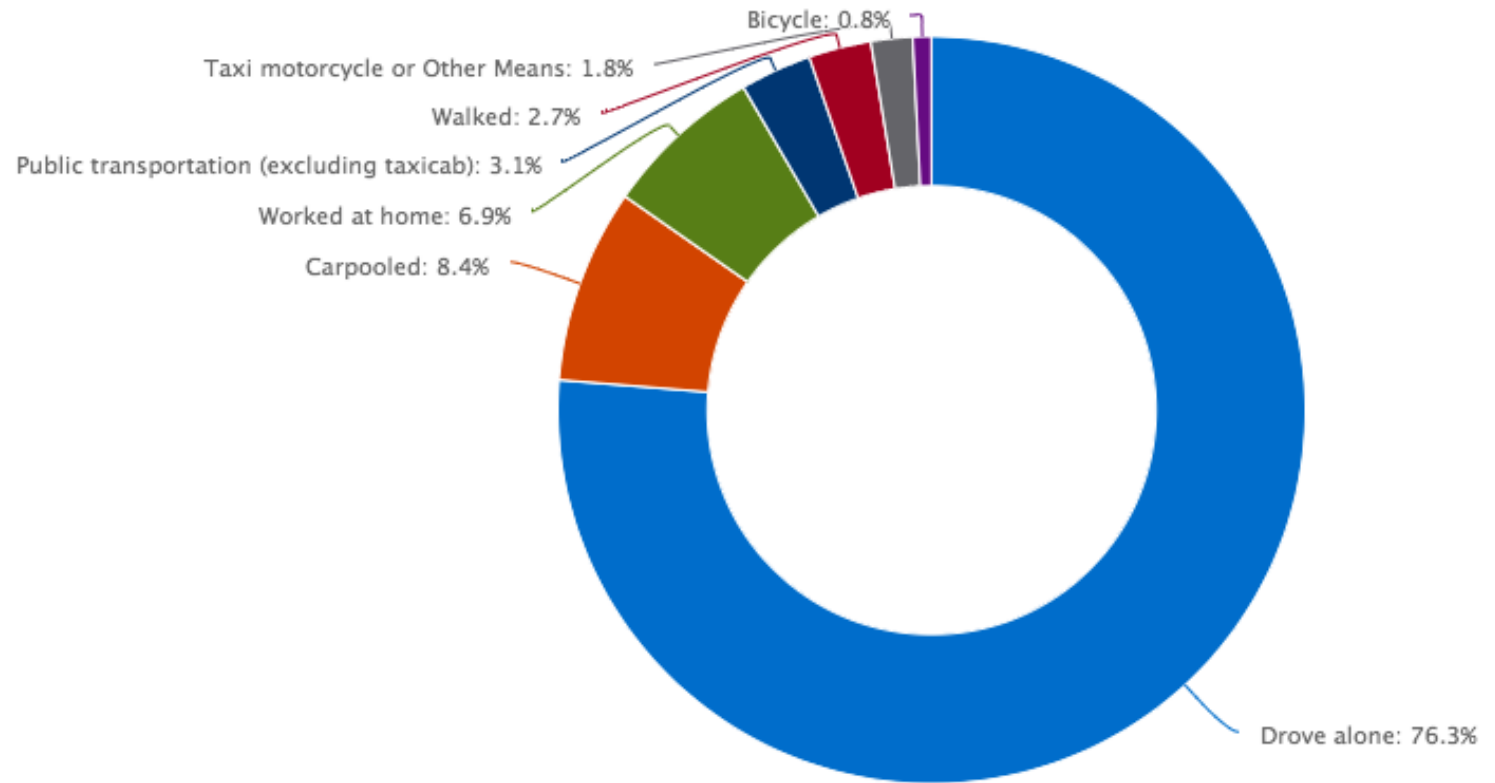
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Data Source: California Department of Transportation Performance Measurement System (PeMS)

San Diego commuters in 2018 spent more than 8 hours extra on the freeways due to delays during morning and afternoon commute hours, nearly an hour more than in 2016. The hour of delay reflects "stop-and-go" severe freeway congestion when the vehicle speed is below 35 miles per hour on the freeway.

San Diegans still mostly drive to work alone

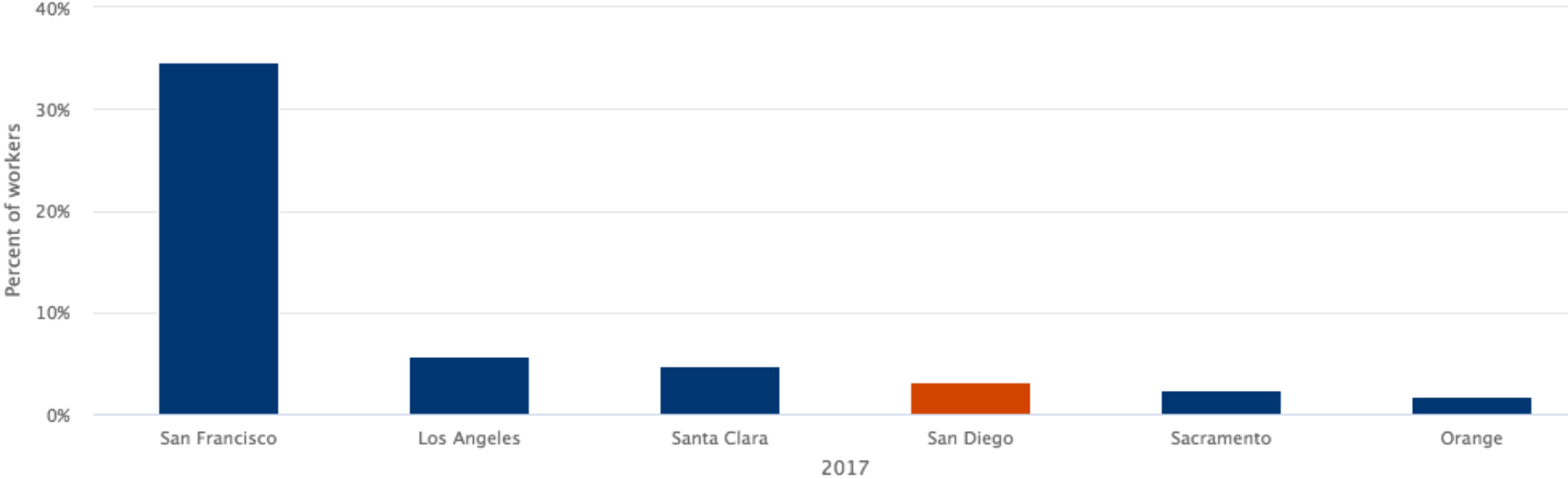
(San Diego County, 2017)



Data Source: U.S. Census Bureau, 2017 American Community Survey 1-Year Estimate, 2018

San Diego commuters' use of public transportation continues to be low

Select Counties, 2017



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Data Source: U.S. Census Bureau, 2017 American Community Survey 1-Year Estimate, 2018

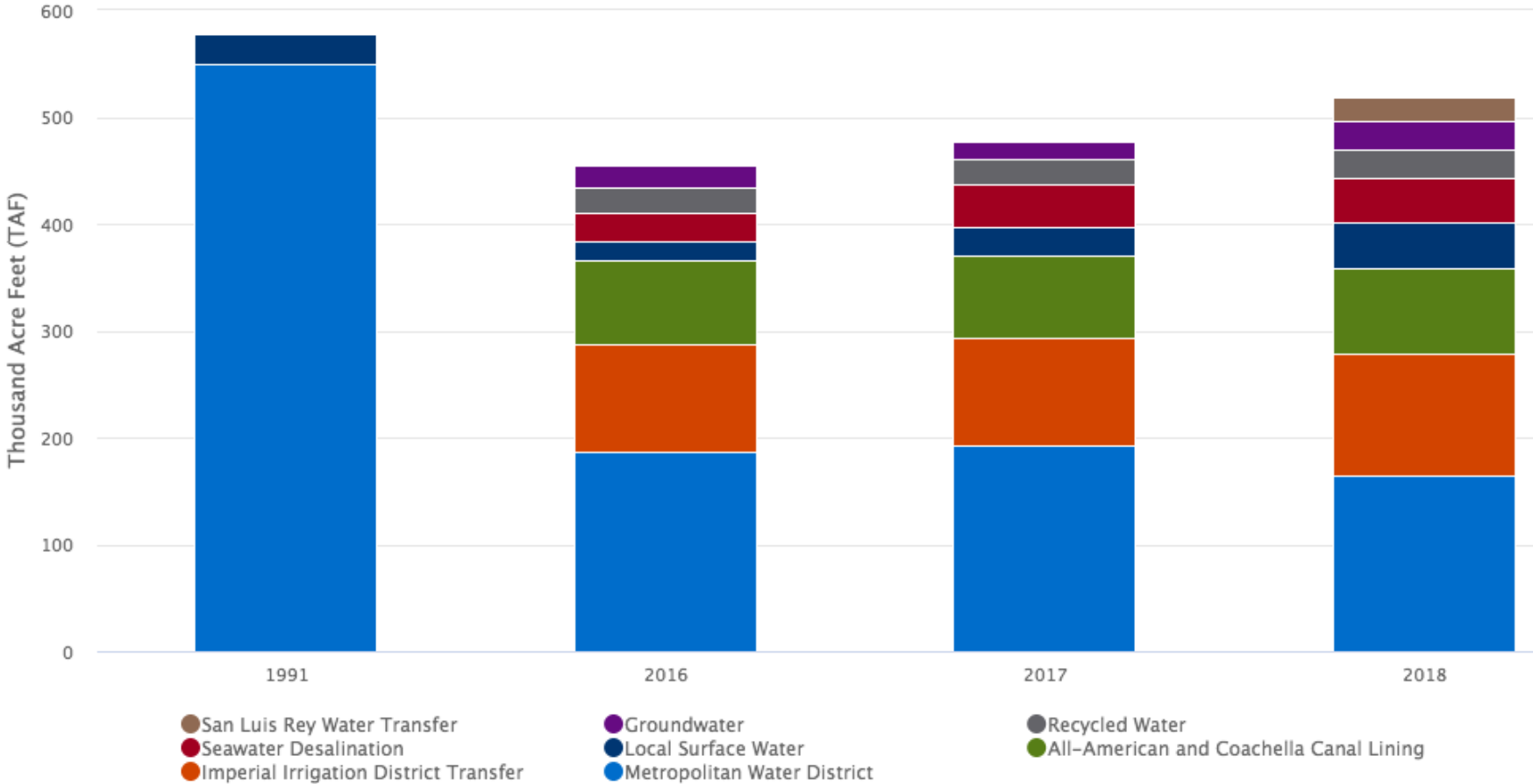
San Diego Climate Action Leadership

- 19 Green House Gas Inventories
- At least 18 Climate Action Plans Developed or In Progress
- City of Chula Vista
- Port of San Diego
- USD and other universities
- Climate Collaborative and climate adaptation



San Diego's water supply has diversified

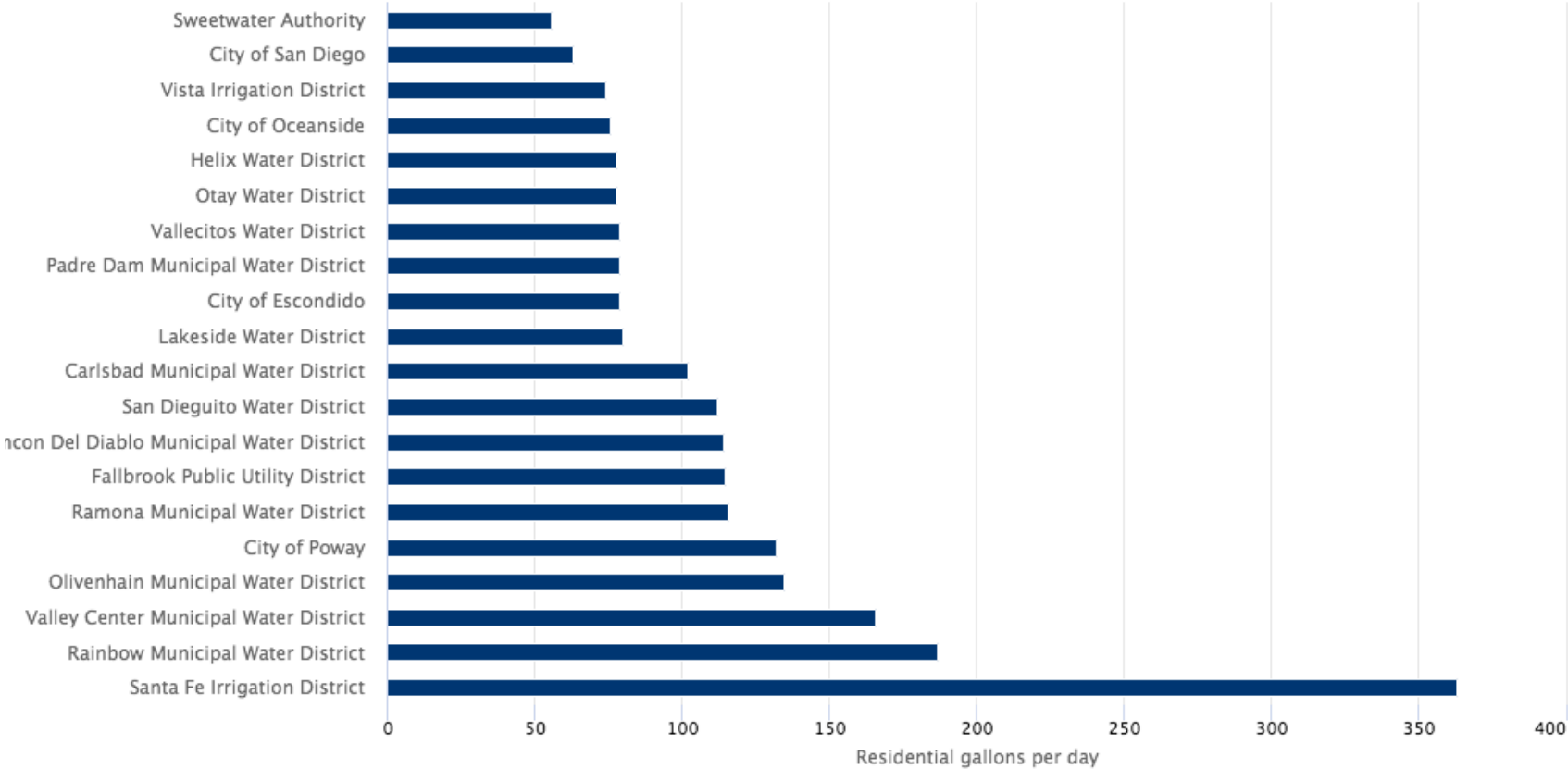
San Diego County, 1991, 2016-2018



Sweetwater Authority and the City of San Diego had the lowest residential water use per capita



San Diego County Urban Water Suppliers residential gallons per capita/day, Q4 2018

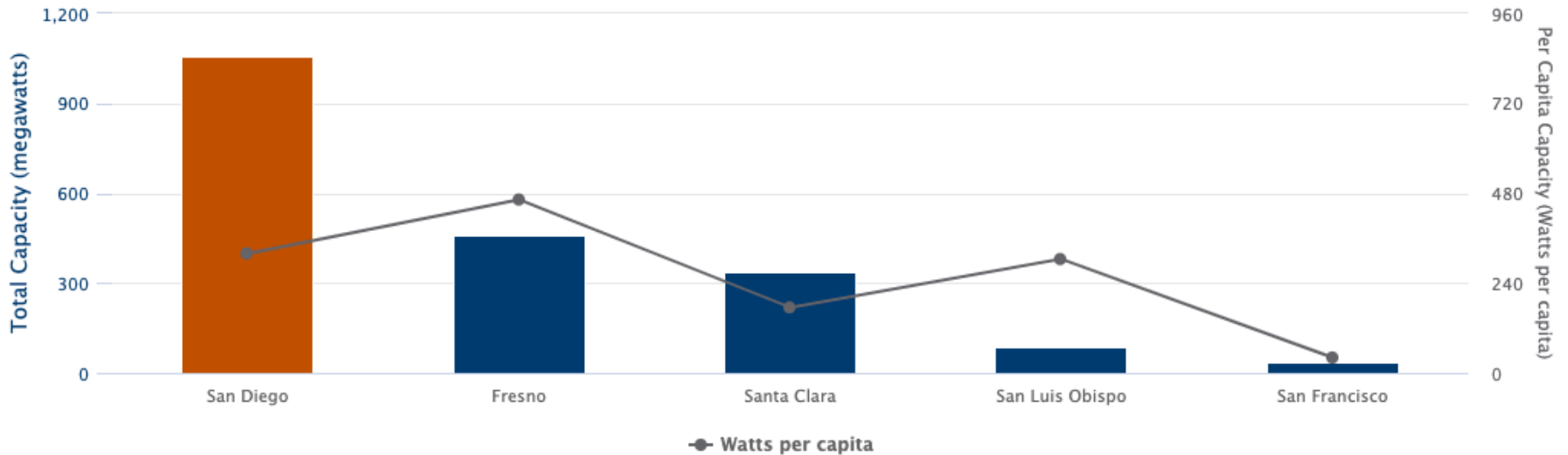


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Source: State Water Resources Control Board, Urban Water Supplier Report 2019

San Diego County has the highest solar installation in California counties

(Select Counties, through 2018)



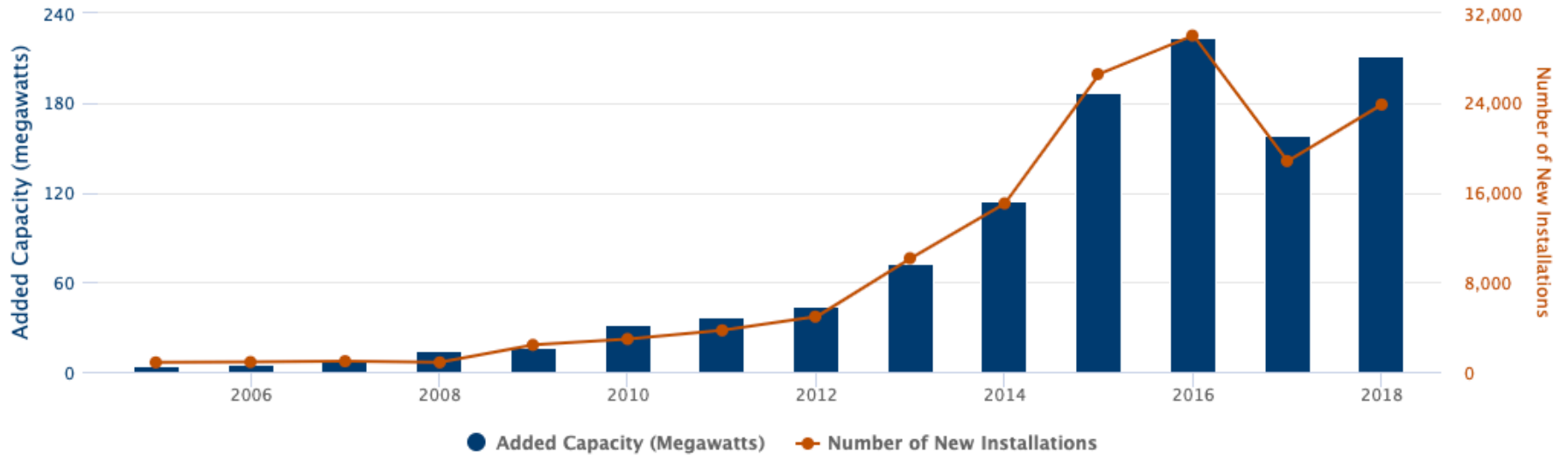
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Data Source: California Distributed Generation Statistics, Distributed Generation Interconnection Program Data, 2018

San Diego County has the highest distributed PV capacity in California with approximately 1,000 MW at the end of 2018. The PV capacities in four other counties (Fresno, Santa Clara, San Luis Obispo, and San Francisco) are shown on the graph and the average household electricity use in each of the counties is compared in the [electricity use indicator](#).

Solar installations in SDG&E service area increased from 2017 to 2018

(SDG&E Service Territory, 2005–2018)



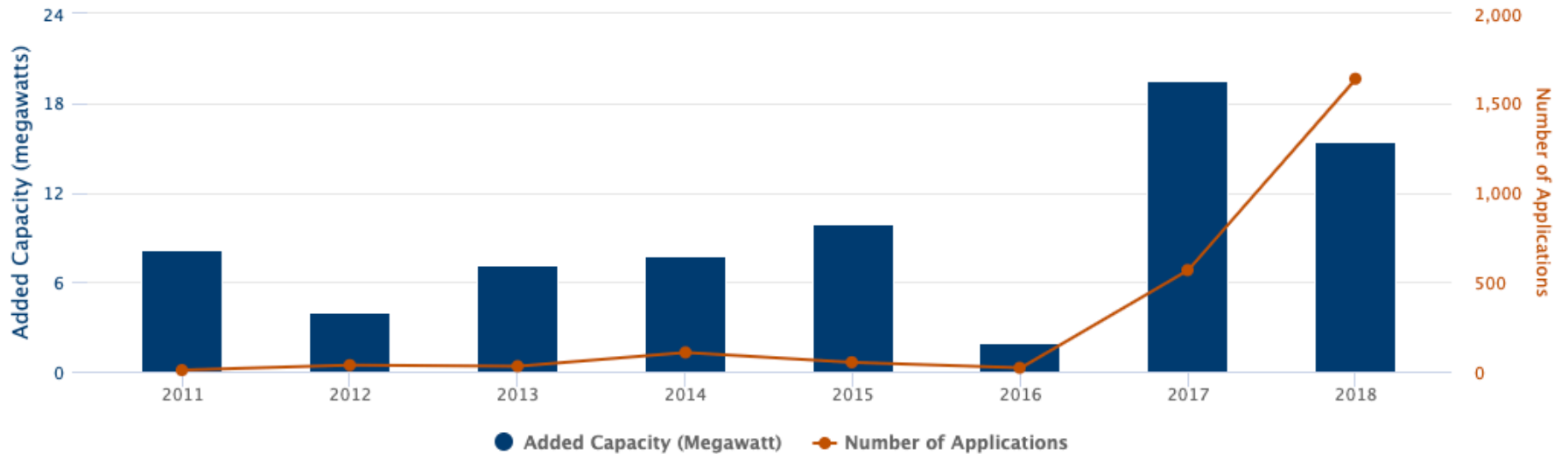
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Data Source: California Distributed Generation Statistics, Distributed Generation Interconnection Program Data, 2018

New solar installations in SDG&E service area increased 27% from 2017 to 2018, however, the number of new installations remains below 2016 levels. The majority of the new installations in 2018 are from residential rooftop solar systems.

Energy storage projects in San Diego County increased significantly in the past two years

(San Diego County, 2011–2018)



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Data Source: California Distributed Generation Statistics, Self-Generation Incentive Program Data, 2018

The data shows energy storage projects that submitted incentive applications through the California Public Utilities Commission's Self-Generation Incentive Program (SGIP) which incentivizes clean electricity production from new and eligible sources which today includes wind, fuels cells, combined heat and power and advanced energy storage. In SDG&E's service territory, SGIP applications more than doubled from 2017-2018 for an additional capacity of 15 MW. Over 95% of the applications are for residential battery storage projects, with approximately 9 MW capacity.

