Our County

Energy and Climate Briefing

July 2018

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Introduction

The L.A. County Chief Sustainability Office, in partnership with BuroHappold Engineering, UCLA, and Liberty Hill Foundation, is hosting a series of workshops to inform Our County, the countywide sustainability plan. Our County is an effort to outline a bold, inclusive vision for the future that balances the co-equal values of environment, equity, and economy.

The objective for these workshops will be to discuss energy and climate issues and opportunities for the region, and take a deep dive into where and how energy and climate intersects with equity, public health, labor, housing, and other issues. This document is provided as background information to inform those workshops and presents draft goals and strategies as a starting point for discussion.

Energy is essential for the economic, social, and environmental vitality of Los Angeles County. The existing system is aging, inefficient, and vulnerable to system-wide outages. In addition, our reliance on fossil fuels produces greenhouse gas emissions, air pollution, negative land use impacts and significant resilience issues.

Governance Context

The energy network in L.A. County is governed by a complex set of agencies and providers depending on the energy source with most oversight coming from state and federal regulatory agencies such as the California Public Utilities Commission, the California Air Resources Board, the U.S. Environmental Protection Agency, and the U.S. Department of Energy.

The County of Los Angeles has relatively little direct control over the region's energy system. The Department of Regional Planning oversees land use planning in the unincorporated portions of the county and thus has a role in the siting of energy facilities. The Department of Public Health is responsible for ensuring that industrial facilities, including energy production facilities, operate in a manner that is protective of the public health. The Internal Services Department manages the Southern California Regional Energy Network to deliver energy efficiency services in the region and operates a Property Assessed Clean Energy (PACE) program that provides loans for energy efficiency and solar energy on residential and commercial properties. Finally, the County is a member of the Clean Power Alliance board of directors which oversees the community choice energy program for 31 jurisdictions in Los Angeles and Ventura counties.

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Definition of Key Terms

Term	Definition	Example
Organizing Principle	A core value at the heart of the plan - the "why"	Nurturing Healthy Communities
Goals	Broad, aspirational statement of what we want to achieve	Improve transportation-related health and safety outcomes
Strategies	Approach or approaches that we take to achieve a goal	Employ strategies to mitigate the negative health effects of transportation on adjacent neighborhoods
Actions	Specific policy, program, or tool we take to achieve a strategy	Accelerate the electrification of freight vehicles
Indicators	Quantitative and qualitative measures used to assess performance	Air quality (PM 2.5, ground level ozone)
Targets	Levels of performance that are sustainable	50% reduction from baseline year

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Where and How We Get Our Energy

Electricity Generation

Electricity is largely imported from outside L.A. County and a significant proportion of the energy consumed in the County comes from outside the State. Electricity derived from coal is still relied on throughout the County despite its general decline in use across L.A. County. As of 2016, 64% of Azusa's electricity, 40% of Pasadena's electricity, 30% of Burbank's electricity and 19% of LADWP's electricity was derived from coal sources.[i]

Energy generation is distributed throughout Los Angeles County, with concentrations in Long Beach and Lancaster (Figure 1). L.A. County is a leader in solar generation, producing and using more renewable energy than ever before. While utility-scale wind facilities are currently prohibited in all unincorporated areas within the county, utility-scale solar generation increased by over one million Megawatt Hours (MWh) between 2012 and 2015 and reached over 575 MW of capacity in 2015[ii]. A total of 475 MW of rooftop solar was installed in the County as of 2015, mainly in Southern California Edison (SCE) territory (Figure 2).[iii] Overall, approximately 14% of the electricity generated within the County came from renewable energy sources in 2015. While this represents an increase from years prior, it is equivalent to less than 5% of the County's electricity consumption.[iv] Utilities serving L.A. County show a gravitation towards renewable energy purchases with some cities representing nearly 35% of energy consumption with renewable energy purchasing (Figure 3).

Distributed Energy Resources

Locally produced renewable energy benefits L.A. County through reduced transmission losses and disruptions, reduced greenhouse gases (GHGs) and air pollution and increased resilience for local communities. According to estimates by the California Energy Commission,[v] the technical potential of Los Angeles County's residential and commercial rooftop PV capacity is almost 5 GW, suggesting a valuable role for distributed energy resources in the county's renewable energy future.

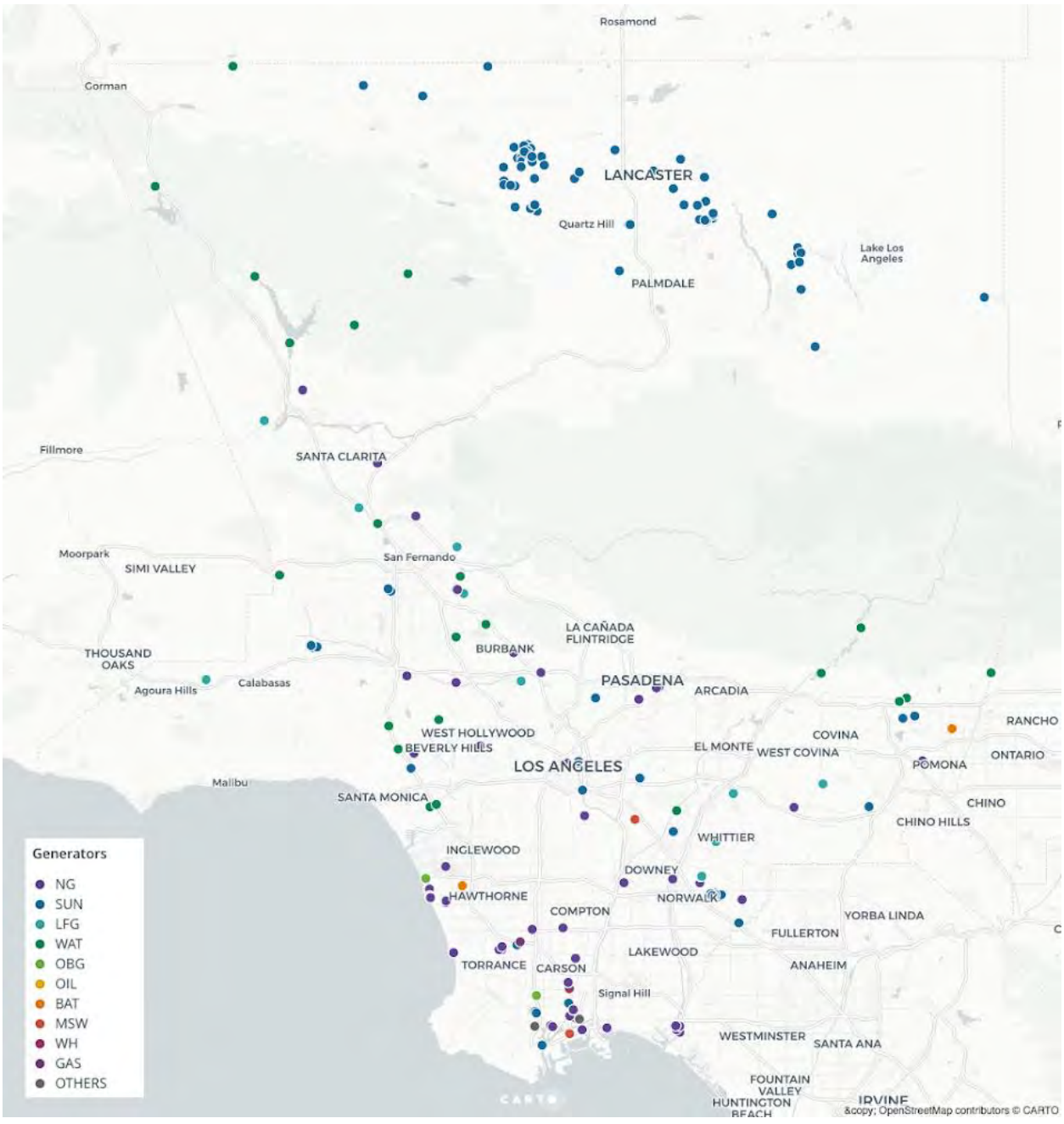

Figure 1. Generators in L.A. County.[vi]

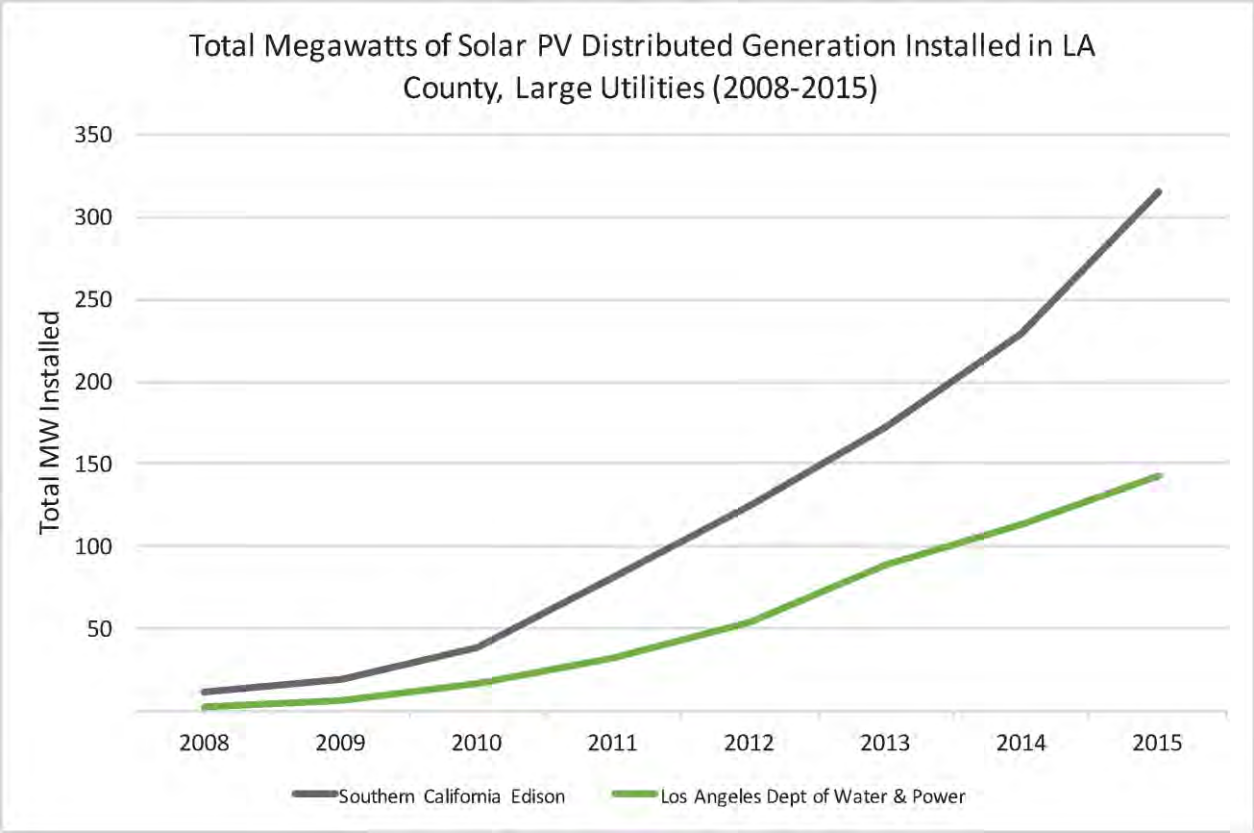

Figure 2. Total MW of Solar PV Distributed Generation Installed in L.A. County, Large Utilities (2008 – 2015).[vii]

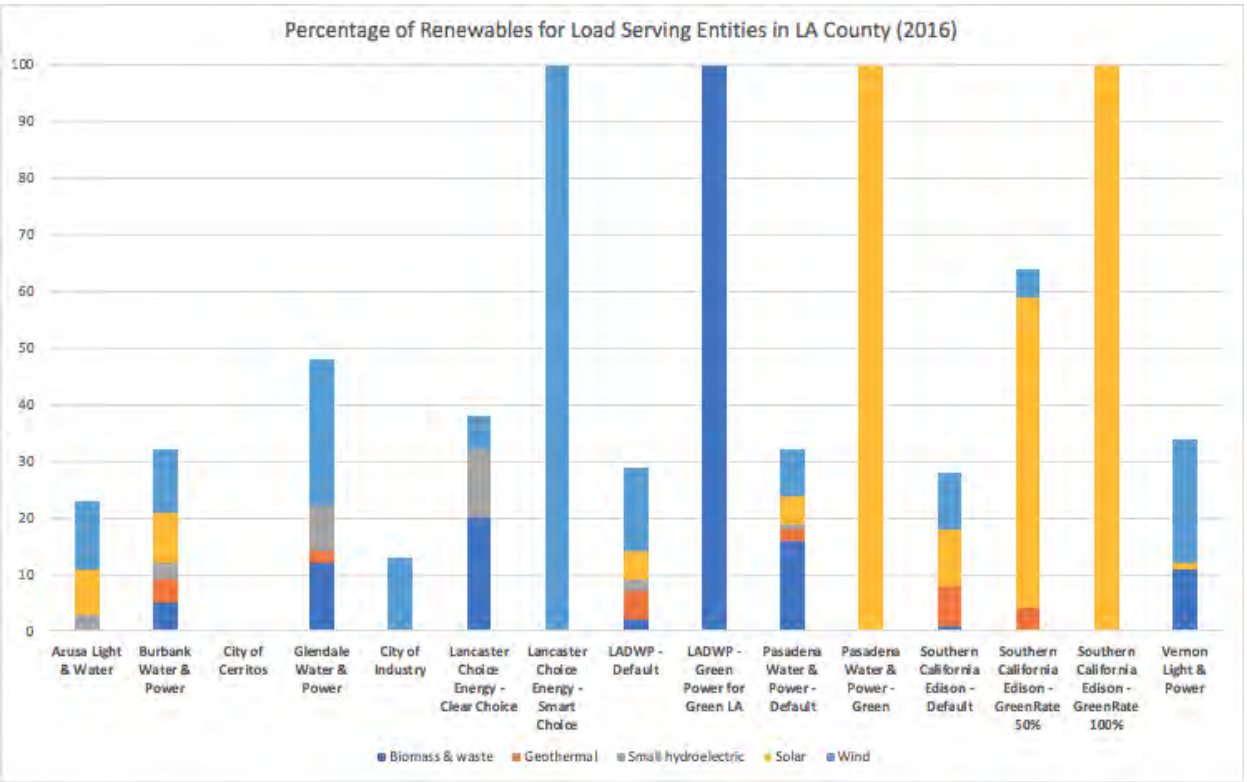

Figure 3. Breakdown of Renewables for Utilities Serving L.A. County (2016).[viii]

Oil and Natural Gas

L.A. County's relationship with oil – dating back to the late 1800s – continues to have a profound influence on the economy and environment of the region. L.A. County remains a major energy producer - the second largest oil producing county in California after Kern County. There are currently 68 active oil fields in the Los Angeles Basin, and thousands of active and inactive oil and gas wells countywide.[ix] L.A. County is also home of the two largest refineries in California (the Chevron Refinery in El Segundo and the Tesoro Refinery in Carson), as well as others (e.g., Torrance Refinery). Although these facilities generate significant employment, they also pose significant health and safety risks to communities in South Bay.

L.A. County's reliance on natural gas for manufacturing, heating, cooking, and other uses provides employment in the region but similarly threatens public health and creates GHGs. The natural gas transmission and distribution system is prone to leaks due to the number of components within the system such as compressors, valves, pumps, flanges, gauges and pipe connectors, and the age and corrosiveness of some of the pipes. Also, the storage of natural gas poses a threat to communities. For example, the 3.5-month long Aliso Canyon gas leak in 2015-2016 emitted 2.7 million metric tons (MT) CO2e – an amount equal to about 13% of 2015 emissions from all refineries and electricity generators in L.A. County.[x] The leak also led to the temporary displacement of residents, the relocation of schools and health impacts.[xi,xii,xiii]

Electricity Service Providers

L.A. County's electricity grid is a complex system that transmits power generated at a variety of facilities and distributes it to end users, often over long distances. The grid provides electricity to buildings, industrial facilities, schools, and homes every minute of every day, year-round. Depending on a consumer's location, electricity in L.A. County was provided by one of eight electricity retailers in 2017 (Figure 4). This began to change as community choice energy programs were launched in Lancaster, Pico Rivera, and through the Clean Power Alliance. The Clean Power Alliance includes 3 million residents in 31 jurisdictions across Los Angeles and Ventura counties.

Structural barriers exist that limit access to clean energy for low-income customers such as low home ownership rates and complex ownership structures relating to multi-family housing, insufficient access to capital and building age. Through the Clean Power Alliance, L.A. County and other Southern California jurisdictions will be receiving guaranteed renewable content ranging from 36% to 100% renewable energy. The Clean Power Alliance has already begun service for municipal and commercial customers in unincorporated L.A. County, with service expanding to all customers beginning in early 2019.

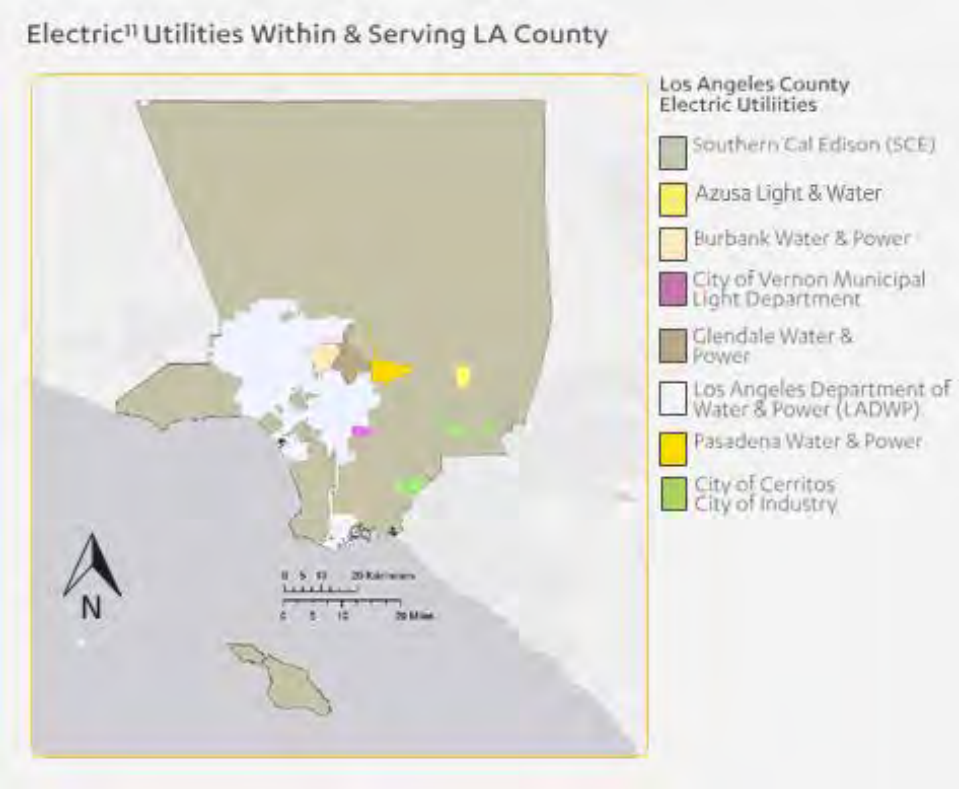

Figure 4. Electric Utilities Within & Serving L.A. County (2015).[xiv]

Energy Storage

Energy storage facilities are essential for effectively integrating intermittent energy sources such as solar and wind into the grid. However, energy storage has not increased at the same rate as new renewable energy generation. The majority of energy storage (approximately 98.4%) in L.A. County comes from a utility-scale, pumped-hydro storage facility in Castaic Lake[xv] while the remaining 1.6% is sources from small projects including batteries, flywheel and ice thermal storage.[xvi]

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Current Energy Consumption and Recent Trends

Building Energy Usage

California continues to lead the country through its ambitious energy efficiency policies. The State's building energy efficiency standards (Title 24) for new construction are one of the most ambitious in the nation. The California Energy Commission requires all new residential buildings to be zero net energy by 2020, and by 2030 for all new commercial buildings. California is also committed to doubling the energy efficiency of existing buildings by 2030 with the passage of SB 350 (de León, 2015). While L.A. County is making progress toward these targets (per capita consumption of L.A. County residents is decreasing), 40% of its carbon footprint comes from existing buildings and it must continue accelerating energy efficiency improvements to meet the aggressive goals.

	Electricity Use			**Natural Gas Use**			**Combined Consumption (Electricity + Nat. Gas)**		
	(Thousand GWh)		Change from 2006-2010	(Billion Therms)		Change from 2006-2010	(Trillion BTU)		Change from 2006-2010
	2006	2010		2006	2010		2006	2010	
All Building Types	55.6	53.4	-4.2%	2.39	2.47	3.0%	428.9	428.6	-0.1%
Residential	20.3	20.0	-1.6%	1.31	1.24	-5.7%	200.4	191.8	-4.3%
Commercial	15.4	14.5	-5.5%	0.25	0.29	18.6%	77.0	78.8	2.2%
Industrial	11.4	10.2	-10.2%	0.59	xx	xx	98.0	xx	xx
Institutional	2.53	2.42	-4.6%	0.086	xx	xx	17.2	xx	xx
Other / Uncategorized / Mixed Use	6.02	6.23	3.5%	0.16	xx	xx	36.2	xx	xx

Figure 5. Energy Use in L.A. County (2006 – 2010).[xvii]

Despite significant energy efficiency improvements across L.A. County, total electricity consumption has remained fairly consistent over the past ten years with only a 2% net decrease between 2006 and 2015 (a decrease of <1% for residential and 3% for non-residential)[xviii]. While this trend can be explained in part by sustained increases in population and economic growth[xix], an increase in size of single family homes, particularly in more affluent areas of the County, has served to limit the reductions in energy consumption resulting from energy efficiency improvements.[xx] The California Energy Commission has set net zero energy requirements for new residences by 2020 and commercial properties by 2030. However, few initiatives are set for the largest component of the building stock – existing buildings.

Transportation Energy Usage

Transportation, and the fuels that power it, significantly contributes to GHGs (on-road transportation accounted for 33.5% of L.A. County's GHG emissions in 2010) and poor air quality across the Los Angeles basin. Electrification of the transportation system, combined with an overall reduction in the miles traveled per person, will reduce some of the negative impact of our car culture most notably reductions in air and climate pollution. The transition of the transportation system to electricity may create both potential opportunities (additional revenue streams, load balancing, etc.) and threats (increased demands, higher electricity prices, etc.) to the power grid.

Gasoline sales for vehicles are on the decline while diesel fuel sold has increased between 2010 and 2015. Generally, electric vehicles (EV) are on the rise, but ownership is concentrated in wealthier neighborhoods. In order to facilitate the growth of EV adoption, EV charging infrastructure needs to be expanded. As of 2015, there was only one charging station for every 195 plug-in EVs in L.A. County (Figure 6).[xxi]

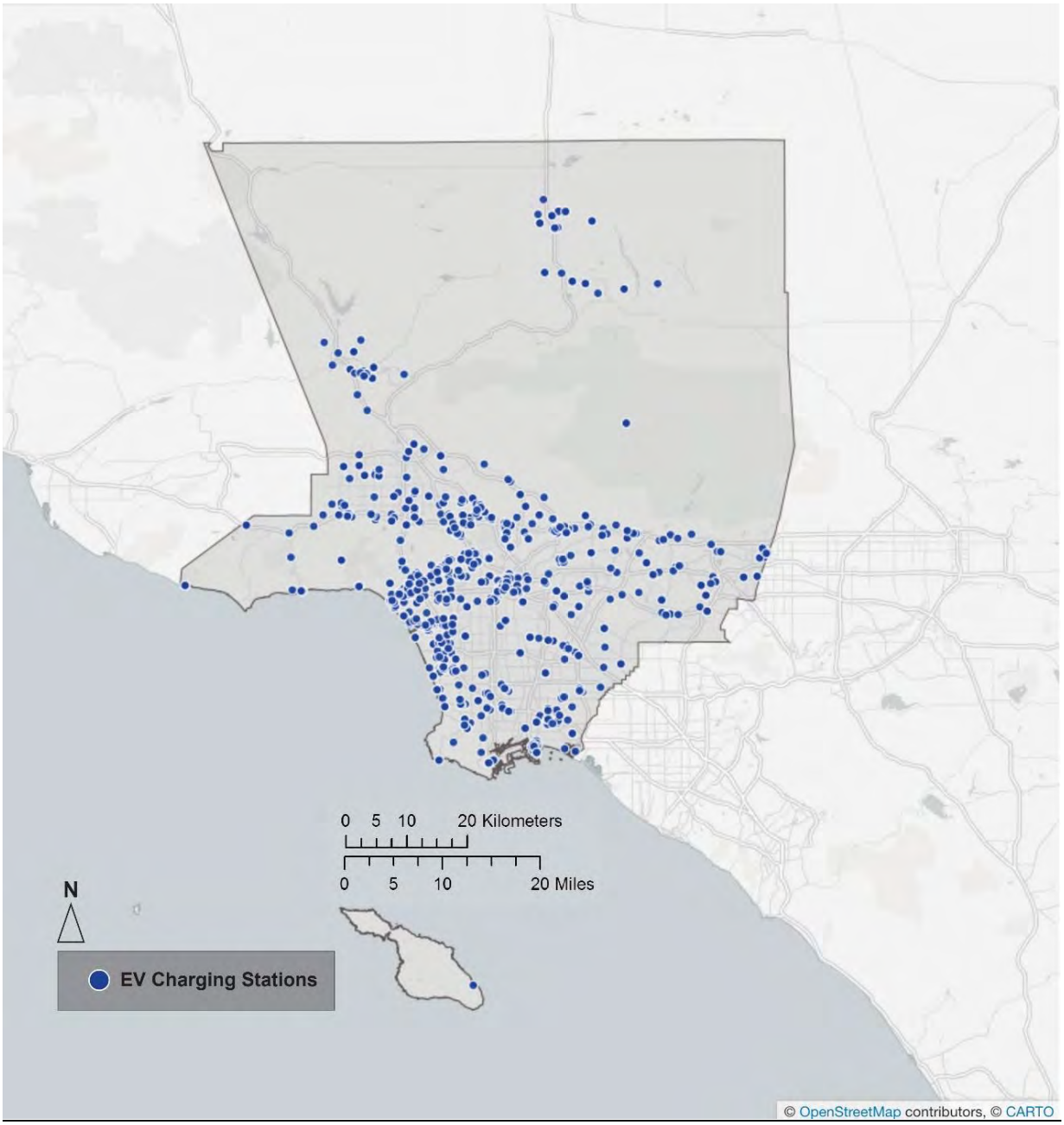

Figure 6. Electric Vehicle Charging Stations in L.A. County (2015)

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How Climate Change Will Affect Energy

Climate projections predict that air temperatures will increase by 1.8 - 7.2°F across the region, with the greatest average increases and increases in numbers of extreme heat days (> 95 °F) occurring in Palmdale, Lancaster, and the San Gabriel Valley.[xxii] Additionally, population forecasts suggest L.A. County will become home to an additional 1.2 million residents by 2060, with the largest projected increases occurring in the peripheral cities of Palmdale, Lancaster, and Santa Clarita.[xxiii] Combined, these factors are expected to result in higher summertime peak electricity demand and average energy usage due to more buildings, with a higher percentage of installed air conditioners, creating a significant strain on existing grid infrastructure serving the entire region.[xxiv]

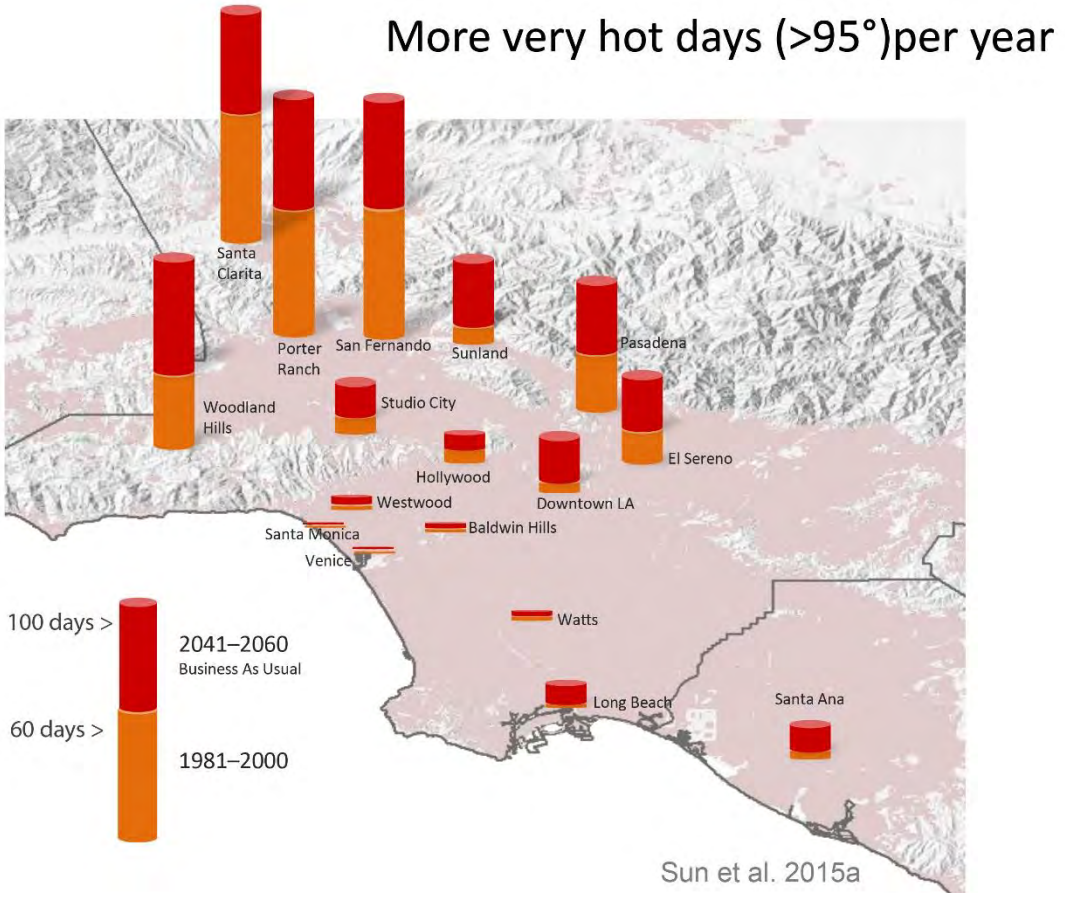

Figure 7. Projected increase in extreme heat days across L.A. County (2015)[xxv]

Other climate change projections that will impact energy include three to five more heat waves per year by 2050 (12 to 14 by 2100) and a decline in annual precipitation of two inches by 2050 in low-lying, coastal areas (four to five inches in high elevation areas). This will create significant stress on the energy system. Additionally, sea level rise of up to 66 inches by 2100 will expose energy system assets.[xxvi] Additional information about climate change and L.A. County are attached to the briefing note.

Other potential climate impacts to energy include:

- Reduction in water storage leading to less hydropower resources
- Heat impacts on power lines, transformers and other infrastructure
- Diminished output of solar panels at higher temperatures
- Changing wind patterns
- Wildfire impacts on energy production (efficiency and generating capacity), transmission and distribution lines and other electricity assets[xxvi]
- Less demand for natural gas for space heating
- Less water availability and higher water temperatures for power plants
- Sea level rise impacts on coastal fuel deliveries and storage, and energy assets

Twenty-five percent of California's total population lives in L.A. County; at the same time, L.A. County is home to 40% of the state's disadvantaged communities. Vulnerable populations, particularly the County's significant homeless population and those living in poor housing conditions without access to air conditioning, weatherized buildings, or quality transportation to escape harsh conditions may be at greater risk of health impacts from rising temperatures and potential system outages. Meeting future energy demand while limiting GHGs will require new and retrofitted electricity infrastructure, but also serious attention to patterns of urban development and its quality – including housing location, type, and size – in order to minimize potential vulnerabilities in the context of a changing climate.

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Draft Goals, Potential Strategies and Indicators

The following are major goals and some of the potential strategies in support of energy reliability and resilience. While there are hundreds of possible strategies related to energy and climate, we have focused on those that will benefit most from collaborative planning and implementation across the County. We also intend for each goal to center equity, so as to reduce disparate outcomes experienced by disadvantaged communities, particularly low-income communities of color, with respect to benefits, resources, and impacts, related to energy. Additionally, energy and climate goals and strategies must take resilience into consideration, including but not limited to the impacts of a changing climate. Economic benefits and risks are also key concerns. Please note that these goals and strategies are presented as a basis for discussion at the Energy and Climate workshop; our intention is that they be edited, removed, or added to as a result of stakeholder input.

Draft Goals and Potential Strategies

Goal A: Eliminate health related impacts of energy, especially on disadvantaged communities.

Potential Strategies:

- Accelerate the adoption of light, medium, and heavy duty zero emission vehicles.
- Provide low-cost, reliable, and clean mobility alternatives to privately owned vehicles.
- Ensure adequate buffers between residents and energy extraction and production facilities to reduce or eliminate exposure to harmful air pollutants.
- Support programs that retrofit existing buildings to increase resilience to future heat risks in vulnerable communities.

Goal B: Provide access to clean and affordable energy.

Potential Strategies:

- Ensure all eligible rate-support (CARE, etc.) customers are enrolled.
- Focus energy efficiency programs on rate-support customers.
- Implement energy efficiency measures in existing building stock, and ensure that disadvantaged communities are given affordable access to such improvements.
- Improve the adoption of PACE financing and community solar for eligible properties.

Goal C: Decarbonize our fuel sources.

Potential Strategies:

- Transition to renewable energy resources.
- Diversify the energy supply to reduce climate vulnerability and GHG emissions.

- Advocate for the continued adoption of clean renewable energy through the Clean Power Alliance, as well as through municipal and private utilities.
- Deploy EV charging stations throughout L.A. County, especially in disadvantaged communities.
- Develop and support zero emission vehicle technology.
- Support the development of clean energy technology businesses

Goal D: Modernize the local energy system and infrastructure.

Potential Strategies:

- Explore the use of alternative technologies using distributed energy resources to solve grid and reliability challenges.
- Support the retrofitting and installation of technologies to improve the resilience of energy infrastructure and adapt to average and peak temperature increases in L.A. County.
- Provide workforce training and development for energy sector jobs, including electric transportation manufacturing and maintenance.
- Address the vulnerabilities of natural gas transmission system and incorporate it into cost-benefit analyses for the energy transition.

Goal E: Reduce energy consumption and improve demand management.

Potential Strategies:

- Promote demand-side measures, particularly in the commercial, industrial, and institutional sectors, and energy conservation that support resilience and thermal comfort, and reduce GHG emissions.
- Favor the development of more energy efficient, multi-family dwellings throughout L.A. County.
- Promote the adoption of urban heat island reduction measures across the county such as cool roof ordinances and surfaces, specifically in areas where the negative impacts are the greatest.

Goal F: Improve energy governance structure for better accountability, transparency, and community involvement.

Potential Strategies:

- Leverage the Clean Power Alliance's authority to access energy consumption information that can be used to inform the implementation of programs and policies.
- Use data-driven analyses to address inequities in energy access, cost and reliability.

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Potential Indicators

All indicators apply to L.A. County unless otherwise stated.

Energy Generation and Supply	Renewable Energy Portfolio
	Energy Sourcing within and outside California and L.A. County
	Distributed Renewable Energy Generation
	Population Covered by Clean Power Alliance (CCA)
	Power Outages
	Power Outages related to Weather
Energy Consumption	Electricity Consumption (GWh)
	Natural Gas Consumption (billion therms)
	Population Receiving CARE/ FERA Rates
	Gasoline and Diesel Fuel Sold
	Energy Consumption at the Energy - Water Nexus
	Building Electricity Use (GWh)
	Building Natural Gas Use (billion therms)
	Cost of Energy/ Affordability
Energy Conservation	Cool Communities (Cool Pavement and Cool Roofs)
	Energy Efficiency Financing and Investments
	Number of EV charging stations (cross listed in transportation)
	Street Light Conversions to LED
	Jobs Related to Renewable Energy & Energy Efficiency Investments

Greenhouse Gas Emissions	Countywide GHG emissions by sector
	Countywide GHG emissions per capita
	Countywide GHG emissions per dollar of GDP

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Cross-Cutting Themes

Economy & Workforce Development

- Overall, L.A. County households spend 2.9% of income on energy, which is 32% higher than the average Californian household, despite lower electricity and natural gas usage by L.A. County residents. The higher percentage is due to both higher energy costs, as well as a lower median household income.[xxvii]
- Climate policies need to include social and employment dimensions to ensure a "just" transition. This transition should increase opportunities for fair-paid and decent jobs, economic prosperity and social justice.
- Total energy use per capita is highest in many wealthier communities, resulting from larger homes.[xxviii]
- Investments in renewable energy, energy efficiency and community choice aggregation can all generate jobs to boost local economies. Investments in these programs should consider ways to maximize economic and workforce development opportunities.

Public Health & Safety

- Vulnerable populations, particularly the County's significant homeless population and those living in poor housing conditions without access to air conditioning, weatherized buildings, or quality transportation to escape oppressive conditions may be at greater risk for health impacts from these events. Increased energy demand during heat events can cause brownouts and blackouts, which creates additional vulnerability.
- Oil and gas development in the Los Angeles Basin presents public health and safety concerns because some oil and gas reserves lie beneath densely populated urban areas. While some facilities have been subject to stricter design and mitigation measures, others have not been required to conduct health risk assessments or other environmental studies. In some neighborhoods, such as South Los Angeles, residences are located only several feet away from the boundary of a drilling site.[xxix]
- Air quality has improved significantly in the Los Angeles region since the early 1990s but the region continues to exceed Federal air quality standards and localized toxic air pollution remains a serious health threat. In particular, heavy-duty transportation sources such as trucks, trains, ships and aircraft have not seen the kinds of improvements as light-duty vehicles. Additionally, many energy-related facilities are a major source of toxic air pollution. For example, oil refineries rank in the top three of toxic emissions from stationary sources in L.A. County.[xxx]. Creating alternatives to fossil-fuels, strengthening regulations and enforcement will promote continued improvement in air quality.
- Energy intensive and/or polluting facilities such as refineries, railyards, factories, as well as highways are often located in close proximity to low-income communities of color in Los Angeles County. These communities face elevated health risks from pollutant exposure.

Housing

- While square footage and lot size vary across the County, single-family homes consume more energy per square foot (an average of 44,876 BTU per square foot) than multi-family homes (at 41,652 BTU per square foot) and condos (30,060 BTU per square foot). This relationship, however, varies across geographies and in some cities and neighborhoods the multifamily sector consumes more per square foot.[xxxi]
- Multiple family dwellings -- common wall buildings -- will be the most energy efficient and reduce unequal exposure to heat in neighborhoods that are walkable.
- Since new buildings make up a very small percentage of buildings throughout the state, the real potential for energy efficiency savings come from retrofits to existing buildings. California committed to doubling the energy efficiency of existing buildings by 2030 with the passage of SB 350 (de León, 2015), and the state's Energy Commission has an Action Plan for how that might happen over the next 10 years in residential, commercial, and public buildings.[xxxii]

Land Use

- Patterns of urban development have a profound impact on energy usage and GHG emissions. Los Angeles County's long history of decentralized development – characterized by a preference for single-family homes located a significant distance from places of employment and other amenities – has contributed significantly to energy use and GHG emissions in both the building and transportation sectors.
- The region's abundance of relatively inexpensive parking and polycentric land use patterns have contributed to the rise of energy consumption[xxxiii] and public health issues, as well as solo car trips.
- Current patterns of land use and development draw extensively on materials that require a significant amount of energy to produce. While these production processes and their associated energy consumption often occur beyond the County boundaries, considering such relationships is vital to ensuring that continued patterns of urban expansion do not lead to negative consequences elsewhere.

Water

Water is imported regularly from areas outside of L.A. County to provide to residents. This effort represented approximately 2,272 GWh of energy consumption in 2015, which is equivalent to just over 3% of the County's total electricity consumption (Figure 8). Water imports create four times more GHG Emissions per acre-feet of supplied water than utilizing groundwater and more than 13 times as high as from stormwater. While recycled water emissions are twice as high as groundwater, they are still less than half of imported water GHG emissions.[xxxiv]

Required Energy and GHG Emissions of Water Supply Portfolio (2015)

Water Source	LA County Water Supply (AF)	Energy use (GWh)	Required Energy (kWh/AF)	MT of CO2e	MT of CO2e per AF
MWD Imported Water	State Water Project: 443,617	1,150	2,593	695,758	0.89
	Colorado River Aqueduct: 341,263	683	2,000		
LADWP - LA Aqueduct	26,828	0	-	0	0
Groundwater	514,904	299	580	113,368	0.22
Recycled Water	120,320	138	1,150	52,526	0.44
Stormwater	12,799	2	174	842	0.07
TOTAL	1,459,731	2,272		862,495	0.59

Figure 8. Required Energy and GHG Emissions of Water Supply Portfolio.[xxxv]

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Local/Regional, State, National and International Targets

A number of regional planning efforts and state have established strategies and set targets around energy efficiency, energy sources and climate. These include:

Local/Regional

L.A. County Community Climate Action Plan	In 2015, the County has set a target to reduce GHG emissions from community activities in the unincorporated areas of Los Angeles County by at least 11% below 2010 levels by 2020.
City of Los Angeles Sustainable City pLAn	Sustainable City pLAn looks to cut GHG emissions by **45 percent by 2025, 60 percent by 2035, and 80 percent by 2050,** compared to 1990 levels**.**
L.A. City Council	The city council has charged LADWP with studying the possibility of reaching 100% renewable energy.
L.A. City Cool Roof Ordinance	Since 2014, Los Angeles Green Building Code requires that cool roofing material be used in residential buildings. Cool roofs lower roof temperatures on hot sunny days and therefore keep homes cooler inside, saving energy by reducing the need for running air conditioning systems.
Santa Monica Sustainable City Plan (updated 2014)	Santa Monica committed to a **10 percent reduction in overall energy use by 2020** in addition to its targets of **50% renewable energy production** and installation of **7.5 MW of local solar generation** in the same period.
LADWP Coal Divestiture	L.A. Department of Water and Power (LADWP) pledged to source **no energy from coal by 2025.**
LADWP Feed-in Tariff	LADWP operates a feed-in tariff program that pays small solar producers, including building owners who can produce between 30 kW and 3 MW from rooftop installations, for each kilowatt hour they generate
LADWP Consumer Rebate Program	LADWP offers rebates through its Consumer Rebate Program to promote energy-efficient housing installations, such as cool roofs.
San Jose Green Vision	Goal is for 2022. **Reduce per capita energy use by 50 percent**. Receive **100 percent of electrical power from clean renewable sources.** Reduce per capita energy use by 50 percent. Install 1.6 MW of solar on municipal sites.

San Francisco	Former mayors Gavin Newsom and Ed Lee issued a challenge to the City: to have 100% of San Francisco's electricity demand be met with renewable energy. Current goal date is 2030.
San Diego Climate Action Plan	Increase the number of **zero emissions vehicles in the municipal fleet to 50 percent by 2020 and 90 percent by 2035**. Add additional renewable electricity supply to achieve **100 percent renewable electricity city wide by 2035.**

State

Senate Bill 350 (De León, 2015)	Aims to ensure that the state's annual CO2 emissions are 40% below 1990 levels by 2030. To help accomplish this, SB 350 increases the goal for purchasing renewable energy from 33 percent by 2020 to 50 percent by 2030 and 80 percent by 2050. The bill charges the state with a doubling of energy efficiency savings in electricity and natural gas end uses by 2030, which includes targeting existing buildings for a doubling in energy efficiency by 2030. In 2017, the California State Senate passed SB 100 a measure to aim for 50 percent renewable energy production by 2026 and 100% renewable energy production by 2045, but the measure did not clear the Assembly.
Governor Brown's 4th Inaugural Address, 2015	Stated goals of (1) cutting **use of petroleum in cars and trucks in half;** (2) **50% of energy production from renewables**; and **doubling the energy efficiency of buildings**, all by 2030.
California Energy Commission Standards	The CEC requires new residential buildings to be **zero net energy by 2020**, and by 2030 for all new commercial buildings, and recently approved a rule to require a**ll new single-family homes, and many multi-family ones, to have solar panels beginning in 2020.**
Executive Order B-48-18	Governor Brown set a target of 5 million electric vehicles on the road by 2030.
California Buy Clean Act, AB 262 (Bonta, 2017)	The act requires state authorities to only award state infrastructure contracts to construction contractors using low-carbon emitting versions of designated materials. This act, as currently passed, includes many construction materials but does not include limitations on concrete, the largest greenhouse gas emitter of all construction materials.

National and International Targets

Hawaii Renewable Portfolio Standard	Hawaii set a target of 100% renewable electricity sales by 2045.
Vermont Renewable Energy Standard	Vermont's target is **55 percent by 2017** and **75 percent by 2032**.
Energy Portfolio Standard	Aims for **25 percent renewables by 2025,** with a 6 percent annual requirement for solar for 2016-2025. The state has a credit multiplier for photovoltaics and on peak energy savings.
Paris Agreement	187 countries submitted plans to reduce emissions, in differing amounts, to comply with the greenhouse gas reduction goals of the Paris Agreement, which attempts to limit warming to 1.5 degrees Celsius.
European Parliament	Current 2030 target is 20% renewable energy production. EU is currently discussing targets for renewables production. The European Parliament has backed a 2030 **renewable energy target of 35%**, while the EU Council offered to back a **target of 30-31% or 32-33%**.
Denmark	Denmark, with ample wind energy, is looking to reach **50 renewable generation by 2030 and 100% by 205**0. Denmark also aims to **cut its greenhouse gas emissions by 34% by 2020 compared to 1990 levels** and **decrease energy consumption by more than 12% compared to 2006**.
Costa Rica	Costa Rica also has a goal of producing 100% of its energy from renewables, but without a timeline. In 2017 it concluded almost 300 days when the country ran entirely on renewables, relying primarily on hydropower.
Nicaragua Plan for Electric Generation Expansion	Nicaragua—already at 47% generation from biomass, geothermal, solar, small hydro, and wind—has made a non-binding resolution to hit **73% by 2030**.

Appendix

See Board Motion from July 3, 2012 on impacts of climate change based on the research of Dr. Alex Hall here at item 55-A: http://file.lacounty.gov/SDSInter/bos/sop/181067_07032012_siglinks.pdf

See consolidated reports of County departmental responses on impacts of climate change based on the research of Dr. Alex Hall on item 55-A here: http://file.lacounty.gov/SDSInter/bos/supdocs/69756.pdf

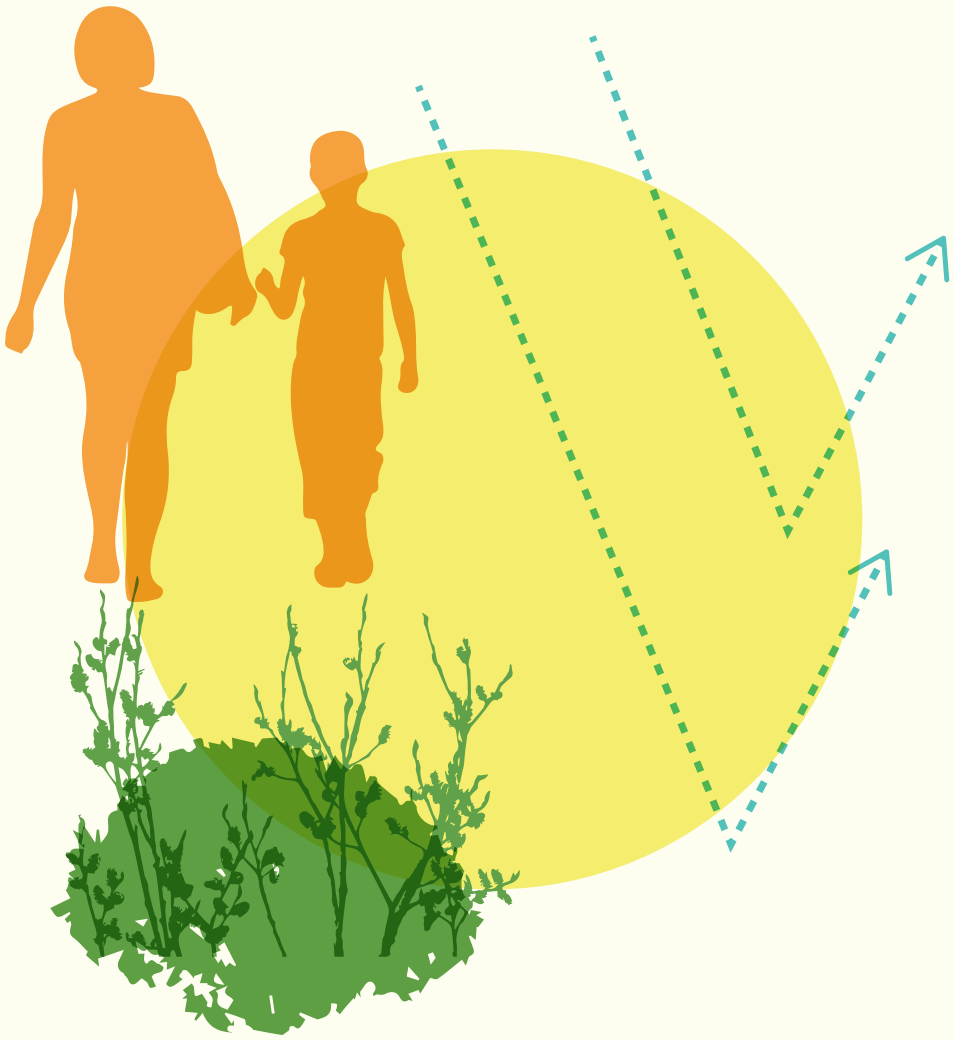
Green Streets

Cool Streets

Complete Streets

Living Streets

A Guide for Los Angeles



UCLA Temperature Study

Alex Hall

How is climate change affecting Los Angeles? By using an innovative technique for downscaling global climate models, Dr. Alex Hall and his UCLA research team have been able to provide assessments that detail how climate change will directly affect us at the local level. The team was able to predict how temperature, precipitation, and a diminishing snowcap will affect us in the future.

Temperature:

The Facts

Los Angeles is sure to face a warmer future as a result of climate change. Just how warm and different the future Los Angeles will be as compared to today's Los Angeles depends on what action is taken to reduce greenhouse gas emissions.

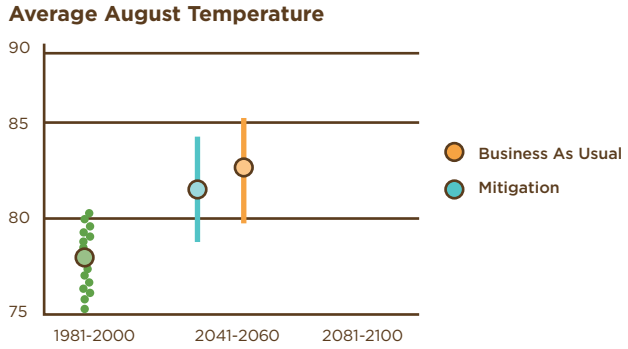
The Good News

If the world takes action to reduce greenhouse gas emissions, Los Angeles will only be moderately warmer by the end of the century—only about as much as the warmest temperatures we experience today. However, if we don't reduce global greenhouse gas emissions, Los Angeles is likely to have a new climate system by the end of this century—one where winter is replaced by spring, and summer starts earlier, extends longer into fall months, and reaches temperatures unlike any we experience today. Effectively, Los Angeles will have a new season—a "super summer" of extreme heat—and winter as we know it today will be lost. The results of this two-part study indicate specific temperature changes in Los Angeles, and demonstrate the importance of global greenhouse mitigation in preserving a livable future in Los Angeles.

How Much Warmer Will Los Angeles Get?

By mid-century, the Los Angeles region will be about 3°F warmer, regardless of global action to reduce greenhouse gas emissions.

We will experience hotter than normal temperatures mainly in the late summer and early fall. Trends for the month of August show just how much temperatures will change during those hotter than normal times. A future with mitigation, meaning global efforts at reducing greenhouse gases, will help us avoid some warming by mid-century, but warming is inevitable nonetheless.



Legend: *The big green dot shows present day average temps in August in Los Angeles based on several years of monthly average (green dots). The blue dot shows the expected future average temperature in August under a scenario where there is global greenhouse gas mitigation and the blue bar shows the range of possible future temperatures within which there is a 95% chance the actual future temperature will fall. The orange dot shows expected future average August temperature under a scenario where there is no major global effort to reduce greenhouse gas emissions, with the bar showing the 95% confidence range of possible temperatures.*

Without mitigation of greenhouse gas emissions, the Los Angeles region will be more than 7°F warmer on average by the end of the century.

Looking again at the month of August, we can see just how much more temperatures could change by the end-of-century as a result of climate change. It is clear that global action to reduce greenhouse gas emissions will be extremely important to the climate in Los Angeles. It will help us avoid several degrees of warming as shown by the difference between the orange and the blue data points

over the end-of-century time period. The temperature studies show us two possible futures, one with average monthly temperatures of ~81°F with global climate action or ~87°F without it. At the extremes of the possibilities, global climate action could help us return the climate system to current temperatures (bottom of the blue line) or, with no action, make August 10°F warmer than it is today.

The temperatures studies also reveal that in all cases (mid-century and end-of-century, with and without mitigation), coastal areas will warm less than inland areas, and mountain peaks will warm the most. Warming is most extreme on mountain peaks because loss of snow cover causes even more warming. When present, snow cover has a cooling effect due to its reflective surface (known as the "snow-albedo feedback").

How Different Will the Future Be?

By mid-century, Los Angeles will experience temperatures similar to what we experience today about 75-80% of the time (274-292 days a year), with hotter than normal temperatures occurring mostly in the late summer and early fall. But, if we don't reduce global greenhouse gas emissions, Los Angeles will continue to get warmer. And, by the end of the century, temperatures will be like they are today only 50-65% of the time (183-243 days a year), with December to January and July to August changing the most relative to today.

Snowfall & Precipitation:

Overview

Highs and lows, but little to no change in total precipitation

Los Angeles can expect roughly the same amount of total precipitation throughout the 21st century as it received in the last few decades of the 20th century. In the present-day climate, the region experiences wide swings in precipitation from year to year, and the UCLA researchers behind the study expect this variability to continue under climate change.

Snowfall

By 2050, Los Angeles area mountains will lose a substantial amount of snowfall. The region's mountains may see a reduction in snowfall of up to 42% of their annual averages, if greenhouse gas emissions continue to increase. If immediate efforts are made to substantively reduce emissions through mitigation, mid-century loss of snow will be limited to 31%.

The study's results indicate that whether or not we take action to rein in greenhouse gas emissions, substantial snowfall loss by mid-century is inevitable, and we have to adapt to these changes. However, by end-of-century, cutting greenhouse gases curbs further loss of snowfall—indicating that mitigation is an important strategy for preserving snow in the region.

End-Century Snowfall (2081-2100) **Business As Usual**

End-Century Snowfall (2081-2100) **Mitigation**

More Rain Than Snow

Over this century, Southern Californians may be at an increased risk of flooding and will have smaller windows of time to capture local water because, although the UCLA researchers found that the amount of precipitation is expected to remain nearly the same, more will fall as rain instead of snow. “Although we don’t expect the total amount of precipitation to change much, we know from the snowfall study that warmer temperatures will cause less of that precipitation to fall as snow,” says Dr. Hall.

Preparing for the Future

While snow stored in the mountains generally melts in the spring, rainfall runs off the mountains immediately, which poses a greater risk of flooding and shortens the chance to capture water.

As we see here Los Angeles is expected to grow warmer, with less snowfall in the local mountains while becoming more prone to drought and heavy rains in short periods. **The following sections will describe each element of a Living Street and how they could be important climate resilience strategies that can prepare us for this new climate reality while helping slow global climate change.**

http://www.kcet.org/news/climate_change_la/climate-studies/

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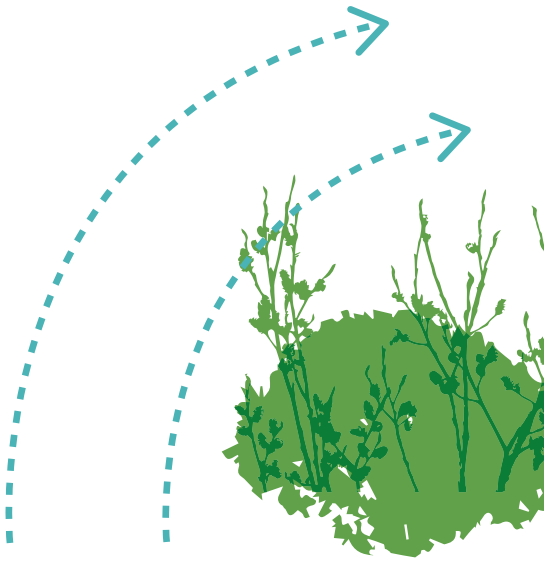

Our County

Endnotes

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