

# Energy Atlas

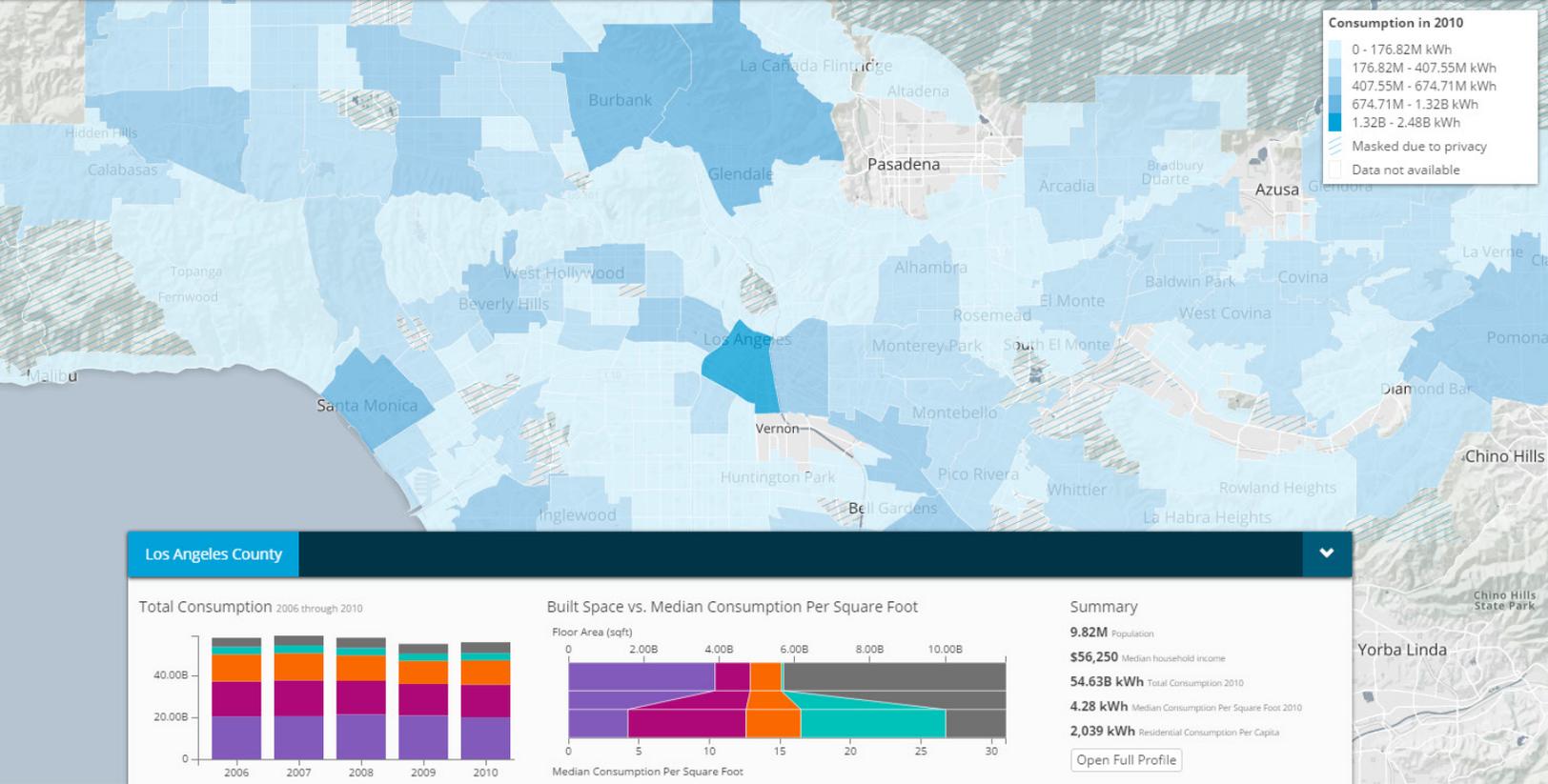
## 2016 Report

UCLA California Center for Sustainable Communities



**UCLA** Institute of the Environment and Sustainability

[ccsc.environment.ucla.edu](http://ccsc.environment.ucla.edu) | [energyatlas.ucla.edu](http://energyatlas.ucla.edu)



Energy Atlas 1.0 Map View

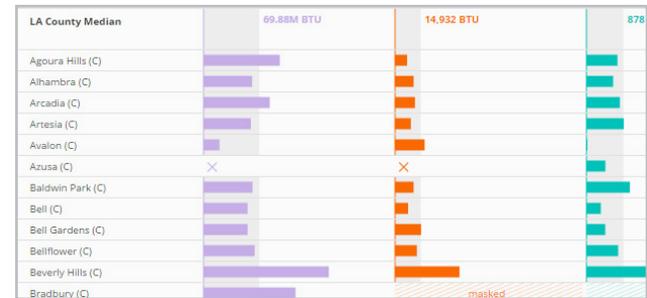
## Overview

In 2016, the California Center for Sustainable Communities (CCSC) at UCLA worked to expand the Energy Atlas coverage from Los Angeles County to most of Southern California. The Energy Atlas, a first-of-its-kind interactive web tool, is one of the largest disaggregated sources of building energy data in the nation. Account-level electricity and natural gas data is linked to building characteristics and demographic information to create a robust database for building energy analysis.

While expanding and updating the geographical and time scales of the Atlas was a primary focus, CCSC energy data research also played an integral role in better understanding local and regional energy challenges.

This summary will highlight some of CCSC's Energy Atlas achievements of 2016, including:

- Processing and mapping over 27 million utility accounts in Southern California.
- Building a database server to host over one billion energy records.
- Aggregating utility consumption data by 335 neighborhoods, 225 cities, 6 councils of government, and 7 counties.
- Planning and improving the next-generation Energy Atlas 2.0.
- Researching grid vulnerability due to climate change, advanced energy communities, energy efficiency programs, and contributing to other relevant research projects.
- Outreach and promoting the Energy Atlas tool and its significance for policymakers, researchers, political leaders, and community stakeholders.



Energy Atlas 1.0 Table and Profile Views

# Energy Atlas for Southern California

Expanding the geography and timeline of energy data from Los Angeles County to most of Southern California is a main priority of the Center. From November 2015 through April of 2016, CCSC received account-level natural gas and electricity consumption data and energy efficiency program participation data from CPUC consultants for Southern California Gas, Southern California Edison, and San Diego Gas and Electric territories. These records contain customer account information, monthly energy consumption records, and energy efficiency program data from 2011-2014.

The massive datasets of over 27 million addresses were “cleaned” and geocoded to the parcel, street, and zip code levels in seven counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura, Imperial, and San Diego. Geocoding accounts to the parcel level, or spatially matching addresses to their parcel centroid location on a map, allows account-level consumption to be measured and linked at the parcel level. This process enables the analysis of energy consumption based on important building characteristics from county assessor parcel data, such as year built, square footage, and the building’s use type.

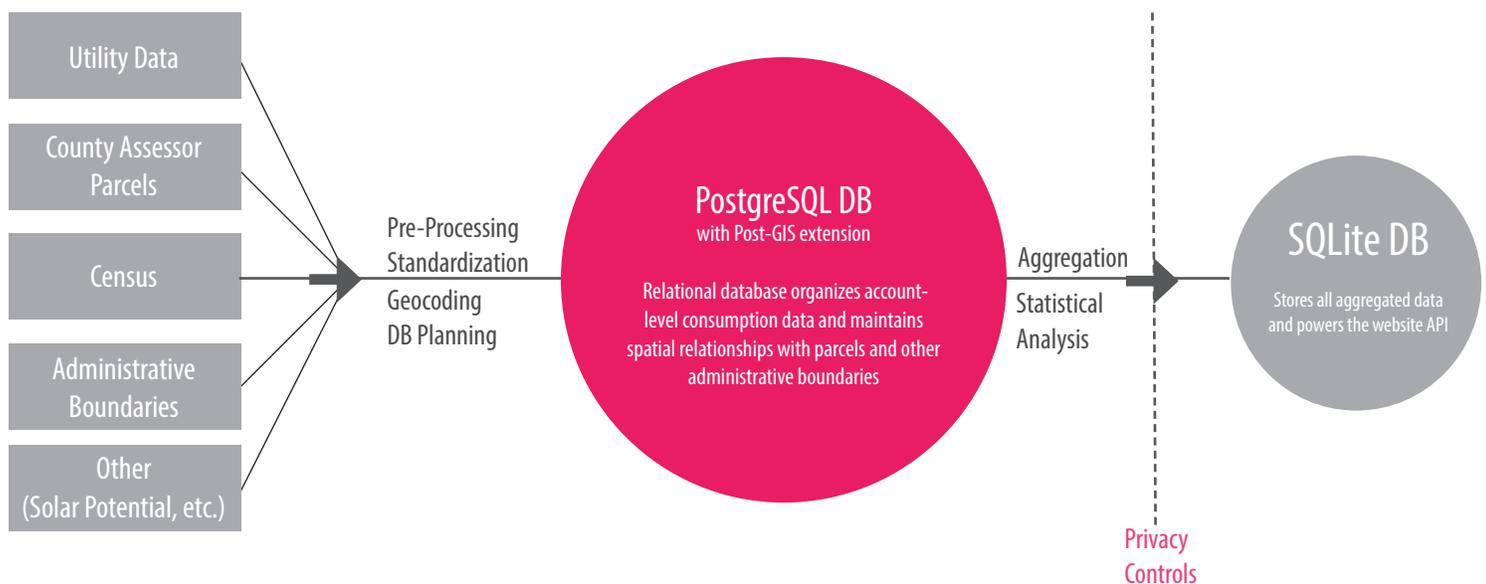
Parcel data for these counties was obtained and standardized to link accounts to building characteristics like built square footage, year built, and use type. For San Diego County, additional attribute data for parcels was unable to be obtained, so these characteristics are not available for this area.

## Database Server Improvements

In order to process and store such large sets of data, a new CCSC-dedicated database server was built to host **over one billion** energy records for customers in Southern California. This new database also hosts contextual information including county assessor parcel data, Census and American Community Survey data, climate zones, administrative boundary data, and energy efficiency program participation.

Together, these rich datasets can be spatially queried and aggregated to produce privacy-protected datasets used to power the next-generation Atlas and further research.

View the database process and flow in the diagram below.



Relational Database Process

# Energy Atlas 2.0

The next-generation Energy Atlas will contain a brand new updated user interface, additional analysis, easier access to download data, and a fully functional API for developers.

## 1. Expanded Territories

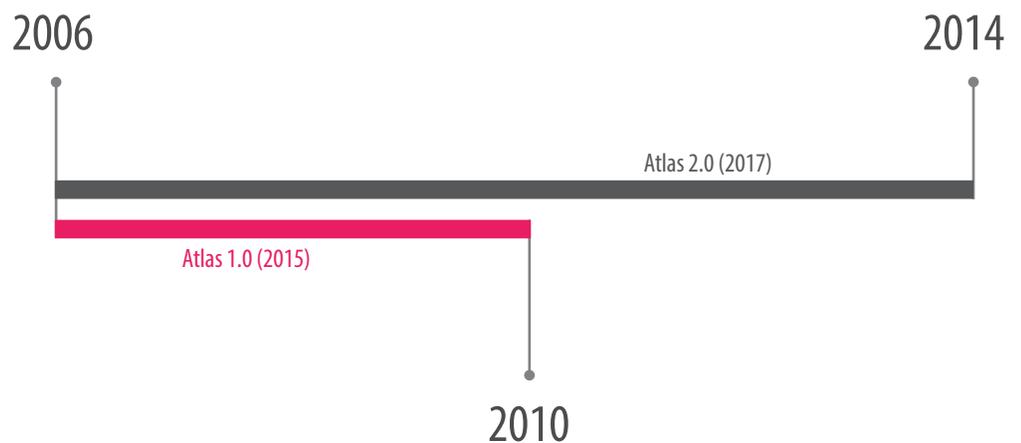
The updated Atlas will include:

- Southern California Edison (SCE)
- Southern California Gas (SCG)
- San Diego Gas and Electric (SDG&E) territories.
- \*LADWP to be determined.



## 2. Updated Years

Consumption data from 2006-2014 for LA County and 2011-2014 for Southern California IOU territory.



## 3. Energy Efficiency Participation Data

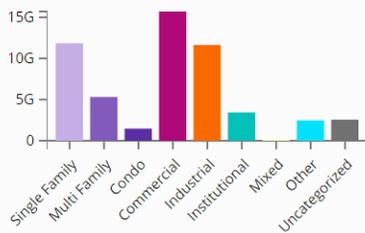
Energy Efficiency (EE) program participation data from SCE, SCG, and SDG&E territory from 2010-2012.



**4.28 kWh** Electricity Consumption Per Square Foot

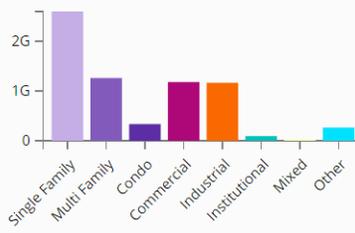
**-0.0100%** Below LA County Average

Total Consumption in 2010



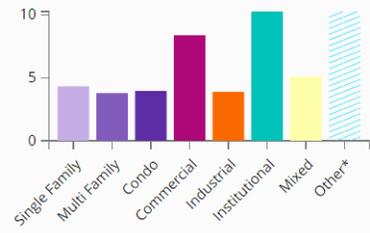
This graph shows the total amount of electricity consumption in 2010 by each building use type.

Built Space (Square Feet)



This graph shows the total amount of built space (in square feet) of each building use type.

Median Consumption Per Square Foot All Building Types



This statistic shows the median consumption of all building use types per total built space (in square feet).

LA County Electricity Profile Statistics from Atlas 1.0

## Research Contributions

Energy Atlas data contributes to research efforts spanning utility grid vulnerabilities, questions of energy efficiency, and advanced energy communities within LA County. The unprecedented access to highly disaggregated energy data makes the Energy Atlas a first-of-its-kind resource for exploring energy questions within the region.

### Grid Vulnerability and a Changing Climate

A CEC project investigating vulnerabilities to the grid due to high heat events. Data from the Energy Atlas is used to:

- Screen for communities that are vulnerable to the effects of urban heat island using geographically specific future temperature predictions, monthly energy consumption, and building vintage data.
- Determine regression models for monthly and annual energy consumption for geographically specific areas within LA County based on temperature and building characteristic data.

### Residential Energy Efficiency Program Participation

CCSC researchers are exploring the effectiveness of energy efficiency program participation in residential buildings with one of the largest datasets available. Program participants are linked with their historical consumption data and building characteristics for a deep dive into performance of specific energy efficiency programs.

### Advanced Energy Communities

A CEC project focusing on developing advanced energy communities in CalEnviroScreen designated disadvantaged neighborhoods in East Los Angeles County. This project partners with local policy makers, organizers, and local businesses and residents to achieve greater building energy efficiency and net zero energy capacity for the community.

### Energy Consumption in K-12 Public Schools

CCSC researchers analyzed monthly building energy consumption over time in LA County public schools based on size, geography, and school type. Published findings discuss policy implications, particularly relevant to policies promoting energy efficiency through programs such as California's Proposition 39.

### Sustainable LA Grand Challenge

Energy Atlas data is incorporated into the upcoming 2017 Sustainable LA Environmental Report Card for Los Angeles County produced by UCLA Institute of the Environment and Sustainability researchers.

Read our peer-reviewed article on Energy Atlas findings in *Energy Policy*.

## Outreach

Outreach to critical stakeholders, policy makers, community groups, and local governments is a core mission of the Energy Atlas work. CCSC participates in efforts to advance transparency in energy data as a member of the Energy Data Access Committee, a quarterly meeting of representatives from the CPUC, investor-owned utilities, and local government officials working to improve energy data access.

Additionally, CCSC continues to present the Energy Atlas to relevant organizations such as Southern California Association of Governments (SCAG), Southern California Public Power Authority (SCPPA), California Energy Commission (CEC), Los Angeles Department of Water and Power (LADWP), and other municipally-owned utilities in the region. CCSC is actively forging connections with local government partners, and is a participant in the Local Government Commission (LGC) and the Local Government Sustainable Energy Coalition (LGSEC).

See Appendix A for a comprehensive list of outreach efforts.

## Website Analytics

Since the launch of the Atlas in Fall of 2015, over 8,200 users have accessed the site. Over half of these users visited the website in 2016, generating more than 53,000 page views. Roughly 60% of the users were first time visitors, while the remaining 40% are returning visitors. The most popular user view is the map page, followed by table tool, and finally the city/neighborhood profiles. A majority of users are based in Los Angeles or surrounding cities.

With the upcoming launch of Energy Atlas 2.0, including energy data for Southern California counties and improved API data access for developers and researchers, CCSC anticipates an increase in active users in 2017.

## Next Steps in 2017

The efforts and achievements of 2016 lay the groundwork for exciting updates in the coming year. In 2017, the Energy Atlas website will be re-launched with data for six new counties through 2014. CCSC researchers will continue to analyze this data, publish findings, and demonstrate the importance of transparent building energy consumption data.

- CCSC will officially launch the updated version of the Energy Atlas for Southern California with data through 2014.
- Obtain, clean, and analyze LADWP consumption data through 2014.
- Work with regional MOUs to incorporate additional utility data into the Atlas web-tool.
- Continue research in the public interest and outreach efforts.

## Acknowledgements

The California Center for Sustainable Communities would like to thank the Los Angeles County Office of Sustainability for their continued support of the Energy Atlas project.

For more information about the Energy Atlas, please visit [www.energyatlas.ucla.edu](http://www.energyatlas.ucla.edu).

## Appendix A. Outreach List

### **Usage Notes – people and organizations utilizing CCSC data**

LA County Regional Planning using the Atlas for long term planning and climate impacts  
DOE weatherization and Intergovernmental programs  
DOE Energy Efficiency  
DOE BPD  
City of Minnesota Energy Efficiency Team  
Gateway Cities COG  
City of Los Angeles City Council environmental staff  
LADWP rate payer's advocate  
So Cal Air Quality Management District  
California State Association of Counties  
International Energy Agency - Energy in Buildings and Communities Programme - Annex 70

### **CCSC Staff visits / interactions with:**

Congressmen:  
Adam Schiff  
Roybal-Allard  
Tony Cardenas  
Alan Lowenthal  
Xavier Becerra  
Ken Calvert  
Assemblyman Rendon  
Staff of Christina Garcia (In district and Sacramento)- May 4th

### **Policy Development - Policy Brief Review List**

Andrew McAllister- CEC  
Erik Stokes- CEC  
Sue Kateley- State Legislature  
Carmen Best- PUC  
Amy Reardon- PUC  
Craig Perkins- Energy Coalition  
Robert Hansen – CPUC  
Andrei Gribakov - Sen Pavley's office, environmental analyst  
Colin Murphy – Next Generation America  
Maria Stamas – NRDC  
Richard Bloom's LA staff  
Assemblyman Rendon's staff

### **Presentations & Press**

Coalition for Clean Air  
LAANE  
California Environmental Justice Alliance  
LARC  
SCAG Energy and Environment Committee  
American Association of Geographers (4/1) Annual Meeting - Presentation on Smart and Sustainable Cities  
GIS Day & Earth Day Presentation at UCLA  
National Public Radio (5/12)  
Greenwire Article (<http://bit.ly/1P2dC4Z>)  
LA Times Op-ed 5/30 (<http://www.latimes.com/opinion/livable-city/la-ol-aliso-canyon-blackout-distributed-energy-20160531-snap-story.html>)

Quarterly participation in the Energy Data Access Committee (EDAC) meetings and presentation on importance of Atlas and GHG emissions tracking.