UCLA Energy Atlas Technical Summary

The California Center for Sustainable Communities at the Institute of the Environment and Sustainability, UCLA, has developed an interactive web based Energy Atlas for Los Angeles County and Southern California providing essential information for municipal and regional energy efficiency, climate change planning and implementation of state regulations. The Atlas is available at www.energyatlas.ucla.edu.

The Atlas develops insights about energy use patterns, such as the relationship between building age, size and energy intensity across geographies and allows local governments, planners and other interested parties to understand building energy use in Southern California from region-wide to neighborhood scales

The Energy Atlas consists of two separate data products. On the **back-end** is a privately networked, spatially enabled, PostgreSQL instance which contains a historical time series of monthly energy and water billing data for millions of utility accounts. This consumption data has been related to parcel building data and U.S. Census Bureau socio-demographic data – as well as others – to facilitate enhanced energy system and policy analysis. On the **front-end** is the publicly facing energy atlas website which is built upon a set of aggregated consumption statistics that have been precomputed for a set of cities and counties using the account level information stored in the backend system.

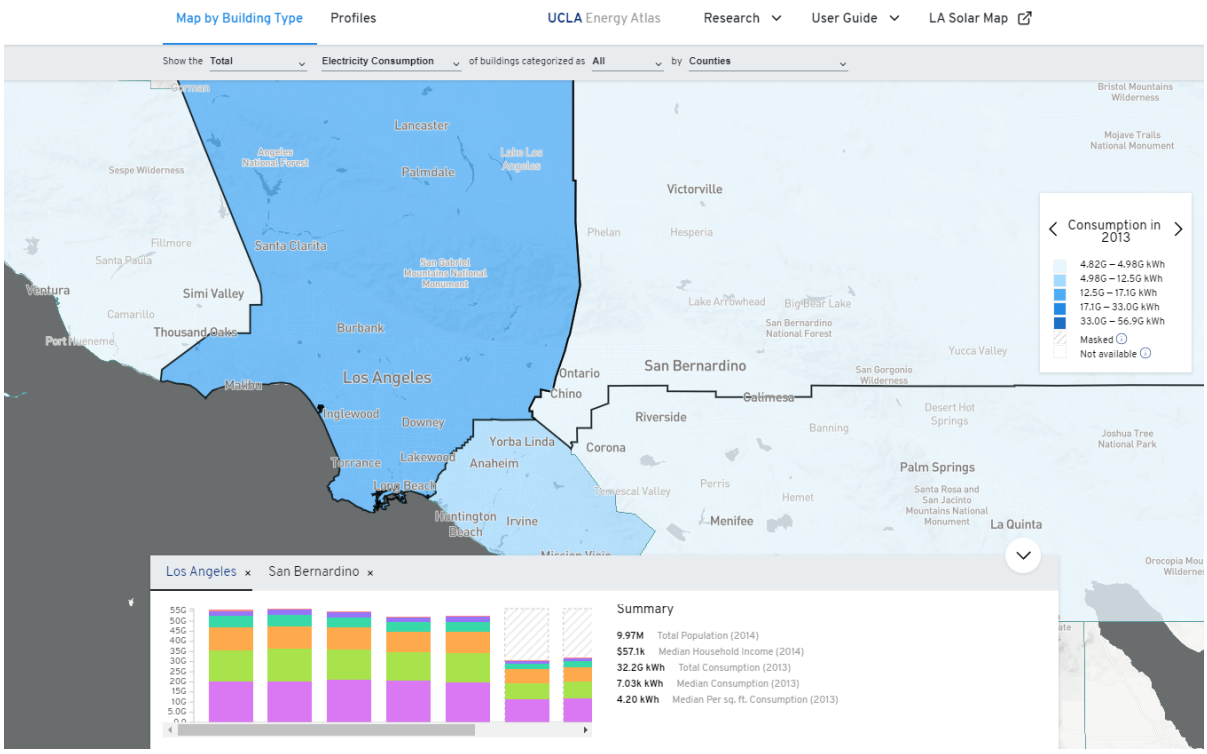
Back-end Database: Private

- Database size: 1.8 TB, with a total of 752 tables
- 37.9 million energy/water accounts, over 2 billion unique energy/water consumption records
- Back-end Database Server Software
    - PostgreSQL 9.5.7 on x86_64-pc-linux-gnu, compiled by gcc (GCC) 4.8.5 20150623 (Red Hat 4.8.5-11), 64-bit with PostGIS extension
    - Python
    - Citrix Share Drive Environment for secure data storage and processing. 8 CPU and 48 GB RAM and 1.96 TB data.
- Hardware
    - CentOS Linux release 7.3.1611 (Core)
    - PowerEdge R730 Server,256 GB Memory, 21.6 TB Drive Capacity

Energy Atlas Database Process

Front-end Website: Public

An interactive map forms the basis for the public facing Atlas tool. Data displayed maintains State-mandated data confidentiality, while providing neighborhood-, city-, county-, and COG-specific energy consumption. Pull down tabs enable comparisons among different geographies, building types, sociodemographic characteristics and energy use. The Atlas can generate downloadable tables and charts showing, for example, building energy by size of building to establish energy disclosure thresholds for the commercial sector. In compliance with PUC privacy regulations, some geographies will be masked under various data queries.



Front-end Software:

- Atlas 2.0: AWS S3 Hosting, React JS, D3, Mapbox
- Atlas 1.0: Digital Ocean Server, React JS, MapServer, MapBox

Importance

The level of granular data contained in the Energy Atlas is critical to facilitating a rapid and equitable energy system transition. The Atlas is unique in California, as well as nationally/internationally as far as we know.

Future Plans

We update the Atlas backend with new data layers (such as weather) on an ongoing basis. We are applying for funding to pilot the management and analysis of higher temporal resolution (15-minute) data. The Local Government Sustainable Energy Coalition is seeking support to expand the Atlas statewide.

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