LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

Welcome!

LGSEC.org

New Department of Energy Tools to Plan for Stimulus Projects

Thursday, May 28 | 12- 1PM

LGSEC Board Member:
Marc Costa (**MCosta@energycoalition.org**)

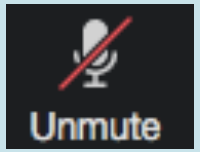
Project Associate:
Sarina Soor (**SSoor@lgc.org**)

LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

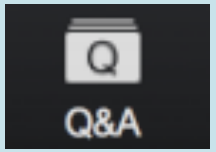
Send in your questions!

LGSEC.org

Keep yourself muted so that we can hear our speakers clearly



Use Q&A function to send questions throughout webinar



LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

Our Network of Leaders

LGSEC.org

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Marc Costa (**MCosta@energycoalition.org**)

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Sarina Soor (**SSoor@lgc.org**)

LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

Our Speakers

LGSEC.org

Harry Bergmann
Oak Ridge Institute for Science and Education (ORISE) Fellow
Department of Energy's Building Technologies Office (BTO)

Megan Day, AICP
Senior Energy Planner
National Renewable Energy Lab

U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

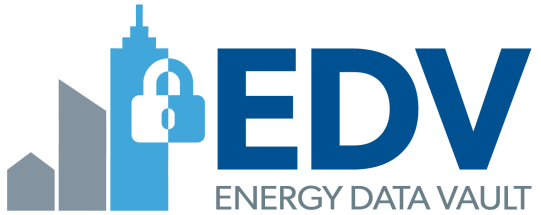
Software & Data Tools from the Building Technologies Office

May 28, 2020

Harry Bergmann
Harry.Bergmann@ee.doe.gov

Questions you may be asking:

- How do I prioritize buildings to retrofit?
- What questions should I ask my utility partner about technology incentives?
- How do I keep track of assets and performance in my building stock?
- How can I compare buildings and measures to each other?



Mission & Goals of the BED Sub-Program

Vision

- Data serves as the starting point for working toward a more efficient, equitable, affordable, and resilient built environment.

Mission

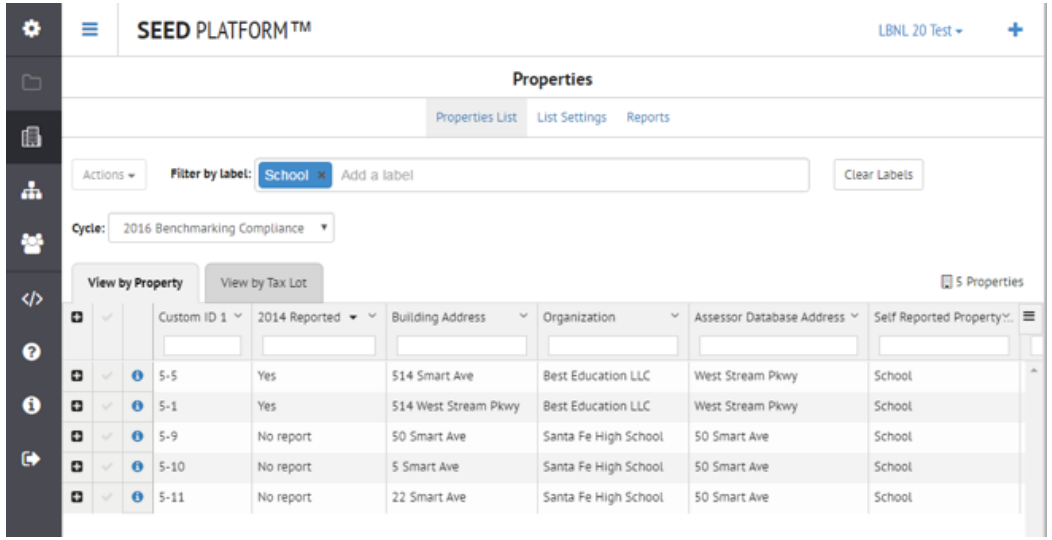
- To provide a freely available network of tools and resources, built upon standards, that enable the fluid exchange of building energy and attribute data in order to better achieve energy efficiency savings in the built environment.

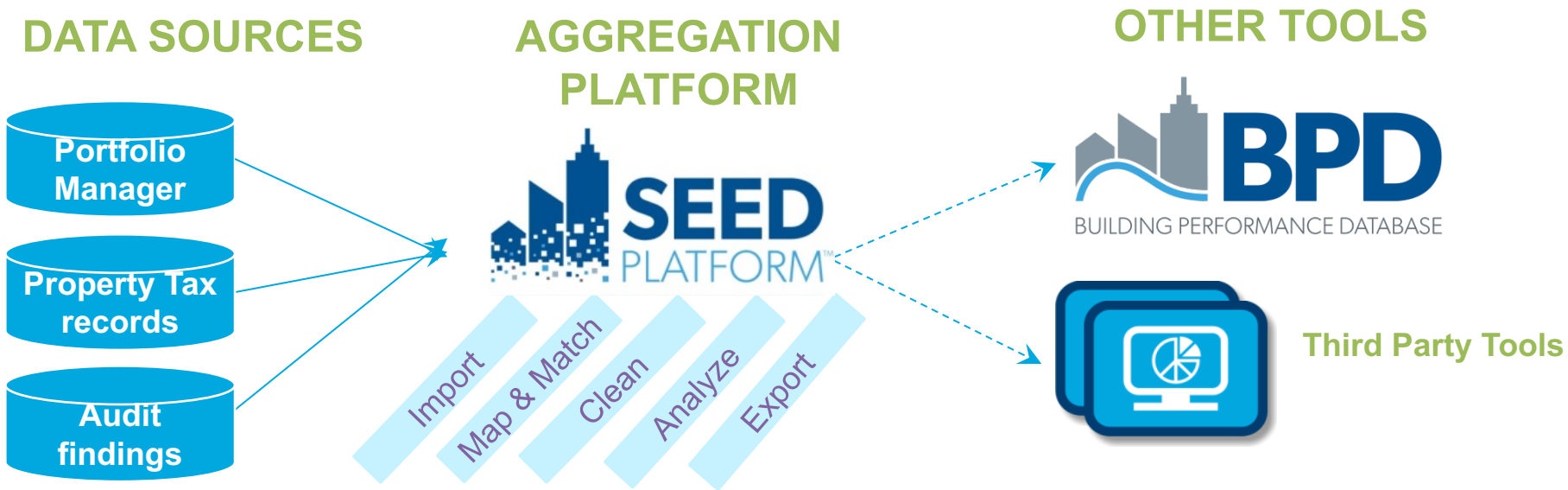
Goals

- Develop a network of interoperable tools on which the private sector can build specialized services.
- Collaborate with stakeholders to produce easily-adopted standards and exchange specifications to promote interoperability.
- Deliver products which enable planners, owners/investors, utilities, regulators, and others to make better informed strategic decisions.

SEED Platform

- Open source database for building energy & attribute data
- Data management back-end hub for BTO tools portfolio

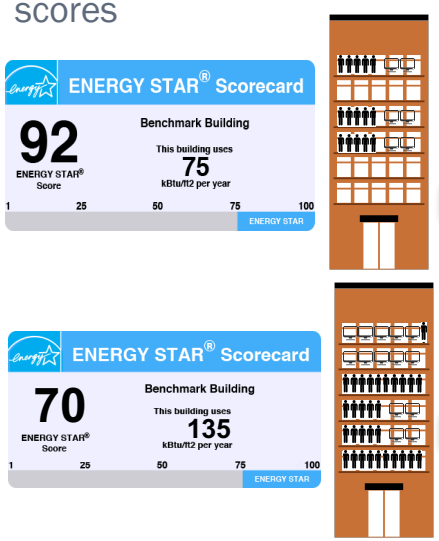




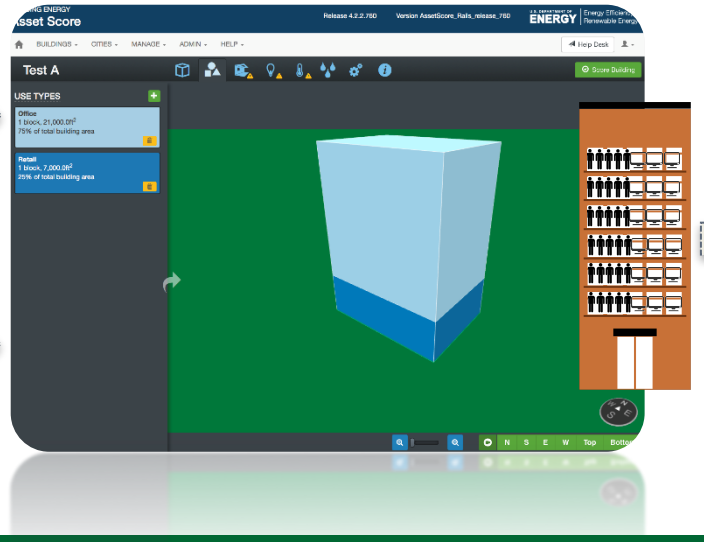
Asset Score

- A free asset rating tool built on top of the EnergyPlus & OpenStudio
- Provides a standardized report to disaggregate building energy information and identify energy improvement opportunities.

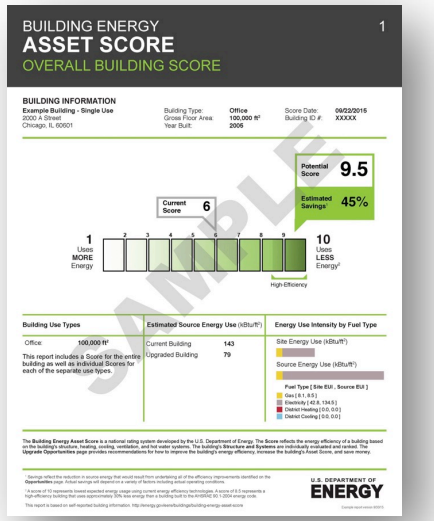
Two similar buildings with different operational choices may have different ENERYG STAR scores



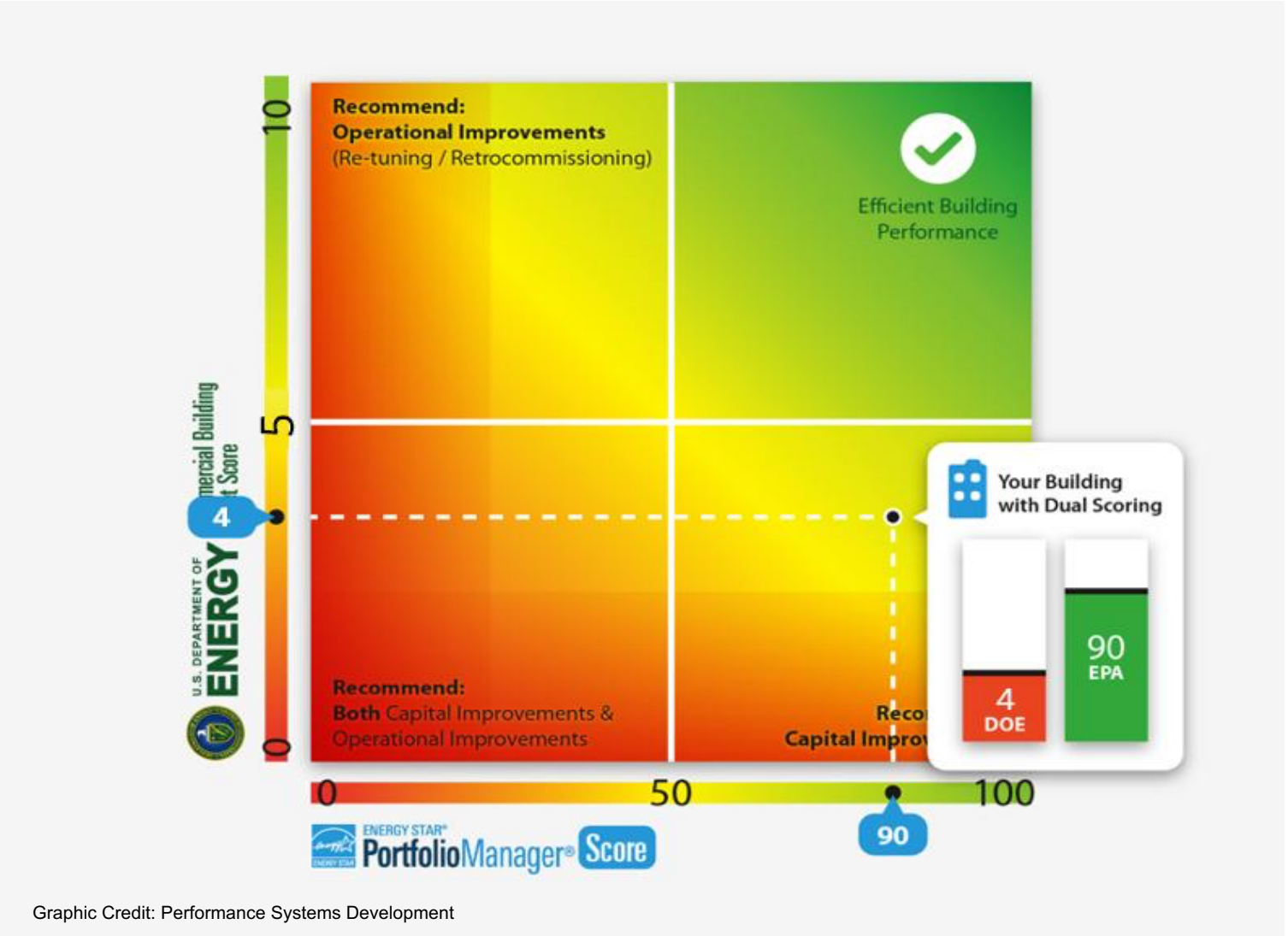
Asset Score tool normalizes for building operations, occupancy, tenant behavior and climate location. Users enter <20 required (up to 100 optional) building characteristics. Inference engine fills in the blanks. Creating an energy model has never been easier.



Asset Score report provides a score, energy use by end use and fuel type, system level rating, identified upgrade opportunities, and potential score after upgrade.



Asset Score



Graphic Credit: Performance Systems Development

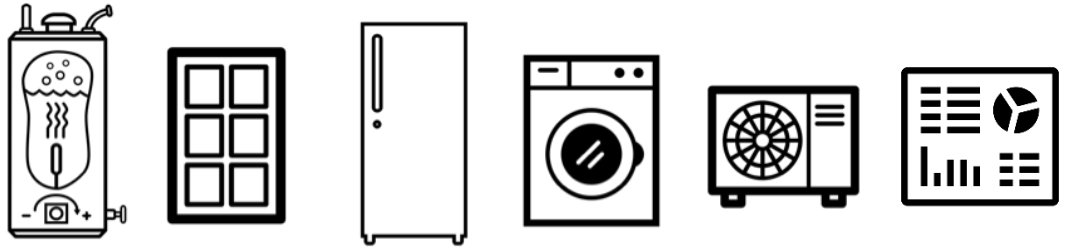
Setting the broader context for efficiency impact assessment

Scout helps answer the following questions:

1. What are the biggest opportunities for U.S. building energy use and cost reductions – now, in 10 years, in 20 years?

2. How might an efficiency measure (or measures) impact "business-as-usual" building energy use in the U.S.?

3. Does a measure (or measures) compare favorably to and/or complement other efficiency measures?



The U.S. Department of Energy's

DATA SOLUTIONS FOR CITIES

Prioritize Upgrades for Public Building Portfolios

Collect, manage, and analyze your building data to more strategically identify cost-effective energy efficiency improvement opportunities across your building portfolio.

Data Fields	Tools	Reports
Building Features *e.g., size, address, HVAC equipment, wall type*	Building Asset Score *Rates efficiency of commercial buildings based on its features*	Building Asset Score Report *Shows how efficient a building is built (1-10 scale) and recommends cost-effective upgrades*
Energy Bills *Monthly usage data*	ENERGY STAR Portfolio Manager *Measures & tracks actual energy consumption and emissions*	ENERGY STAR Score *Shows how efficiently a building is performing compared to similar buildings (1-100 scale)*
	Database: SEED Platform *Combines and matches data sets to enable data cleansing, organization, and analysis*	

Next Steps to Consider

Prioritize buildings for further analysis, evaluation of incentive programs, and share data with the Building Performance Database for benchmarking and peer comparisons.

Prioritize Upgrades

- ✓ See both asset and performance data on buildings in your portfolio
- ✓ Identify highest potential investment opportunities
- ✓ Compile list of cost-effective improvements to consider for each building
- ✓ Help prioritize buildings on which to perform more in-depth audits

Contact to Learn More: Harry.Bergmann@ee.doe.gov | Visit Our Website: https://www.energy.gov/eere/buildings/analysis-tools

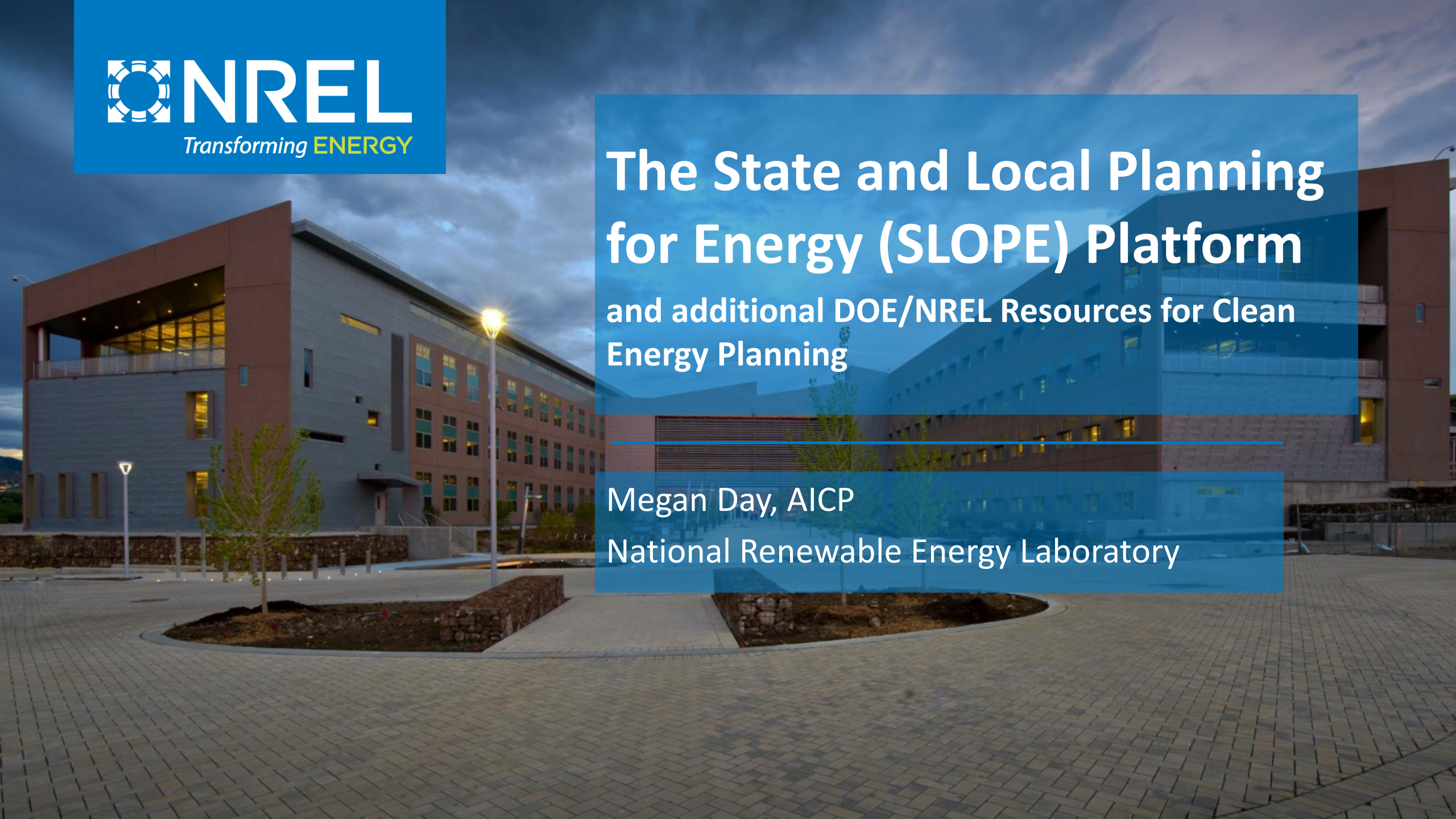
Better Buildings® U.S. DEPARTMENT OF ENERGY

Learn More

https://www.energy.gov/eere/buildings/building-energy-data

Harry Bergmann

Harry.Bergmann@ee.doe.gov



The State and Local Planning for Energy (SLOPE) Platform

and additional DOE/NREL Resources for Clean Energy Planning

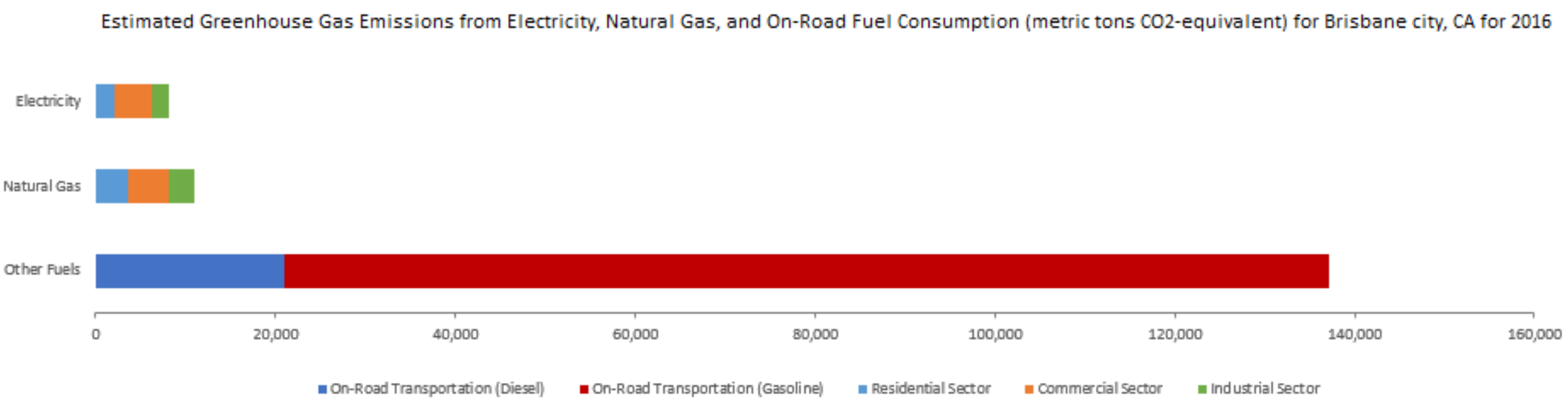
Megan Day, AICP
National Renewable Energy Laboratory

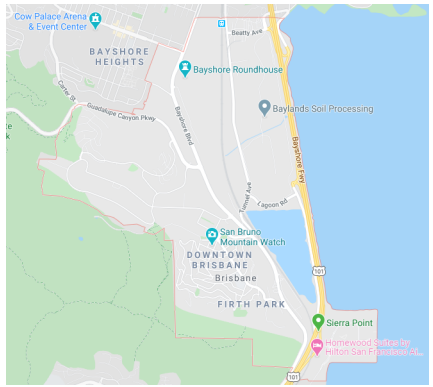
Brisbane, CA Example

San Mateo County

Estimated Greenhouse Gas Emissions

Brisbane, CA (2016)





https://openei.org/doe-opendata/dataset/city-county-energy-profiles

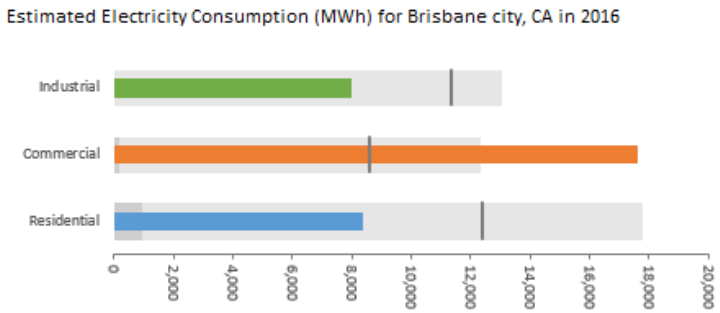
State and Local Energy Profiles

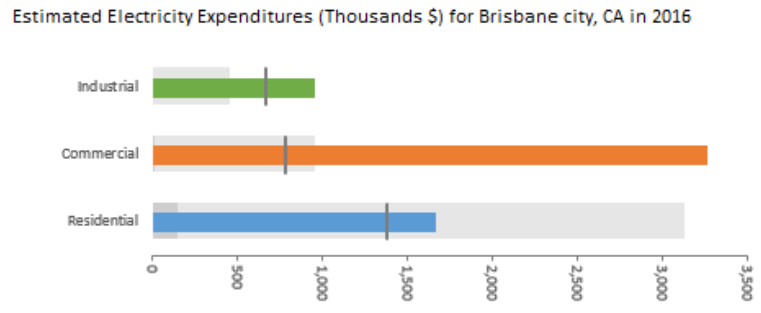
Modeled Energy Consumption Brisbane, CA

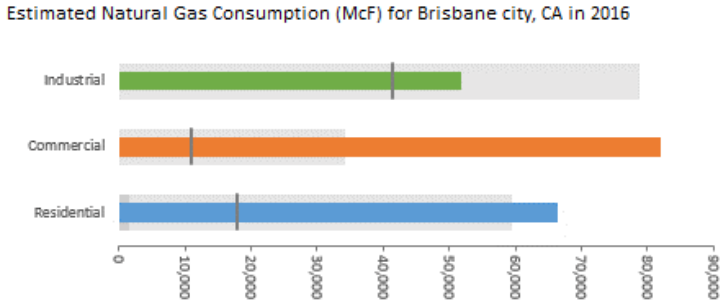
https://openei.org/doe-opendata/dataset/city-county-energy-profiles

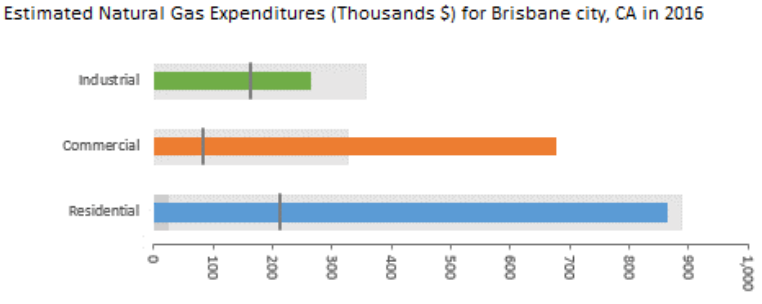
The City and County Energy Profiles lookup table provides modeled electricity and natural gas consumption and expenditures, on-road vehicle fuel consumption, vehicle miles traveled, and associated emissions for each U.S. city and county. Please note this data is modeled and more precise data may be available from regional, state, or other sources. The modeling approach for electricity and natural gas is described in Sector-Specific Methodologies for Subnational Energy Modeling: https://www.nrel.gov/docs/fy19osti/72748.pdf.

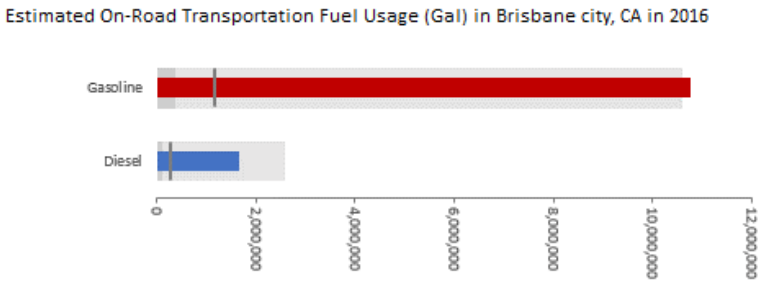
This data is part of a suite of data: https://openei.org/wiki/StateAndLocalEnergyProfiles and builds on Cities-LEAP energy modeling: https://www.energy.gov/eere/cities-leading-through-energy-analysis-and-planning Examples of how to use the data to inform energy planning are here: https://www.energy.gov/eere/analysis/downloads/city-energy-data-decisions

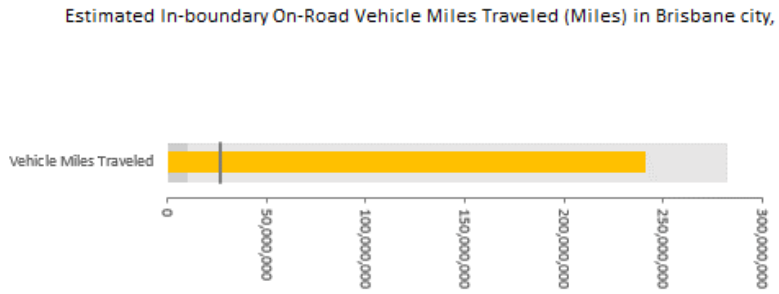








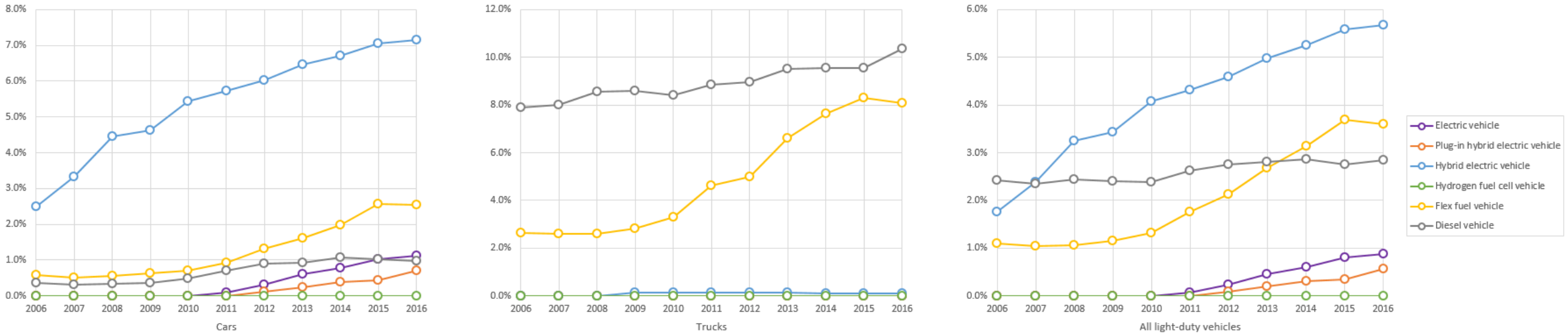




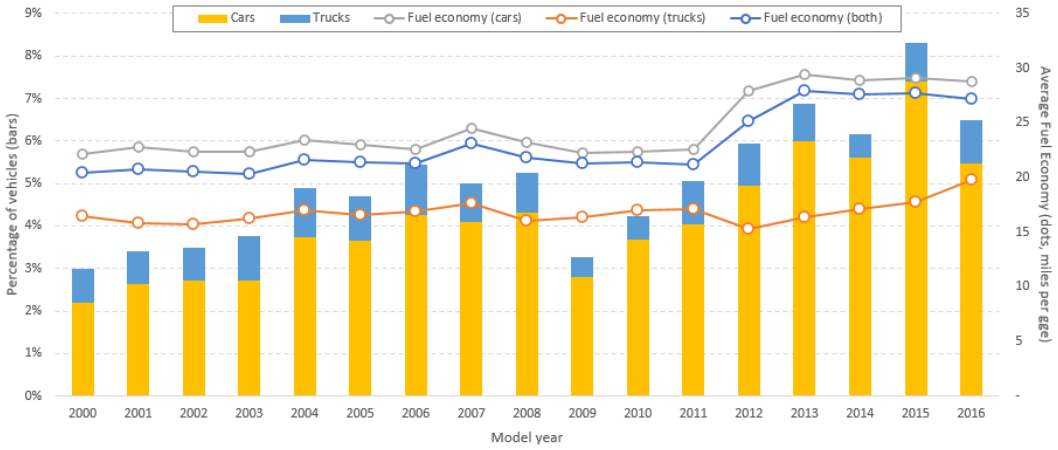
Estimated Greenhouse Gas Emissions from Electricity, Natural Gas, and On-Road Fuel Consumption (metric tons CO2-equivalent) for Brisbane city, CA for 2016

Light Duty Vehicle Inventory, 2016 Brisbane, CA

Percentage of alternative fuel light-duty vehicles by type and cumulatively for a model year and all earlier model years registered in 2016 in Brisbane city, CA



Average fuel economy of light-duty vehicles by model year and type registered in 2016 in Brisbane city, CA



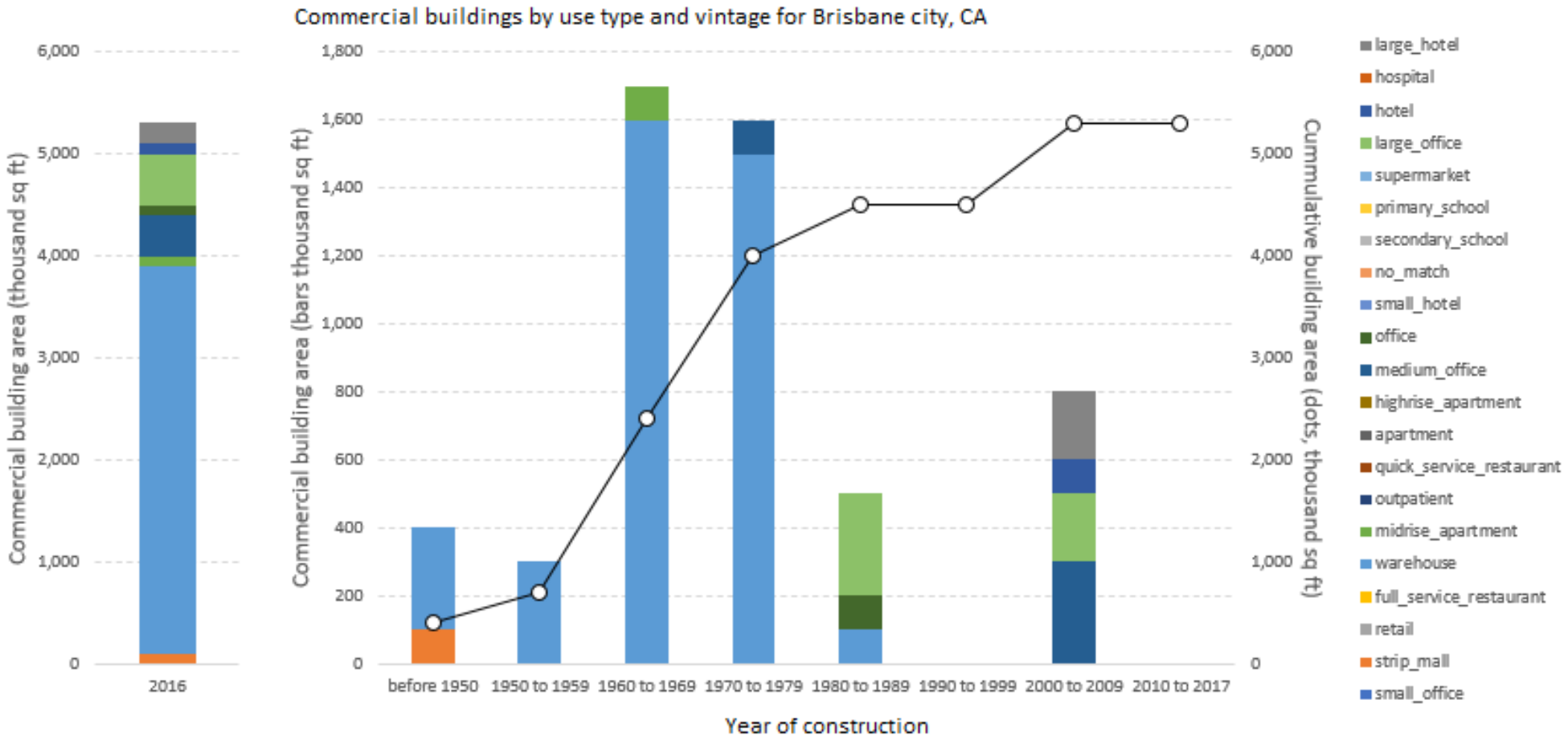
https://openei.org/doe-opendata/dataset/city-and-county-vehicle-inventories

This light-duty vehicle inventory dataset provides information on 2016 registered by vehicle type (car vs. truck), fuel type, and model year showing the changes in fuel economy and fuel type.

Commercial Building Inventory Brisbane, CA

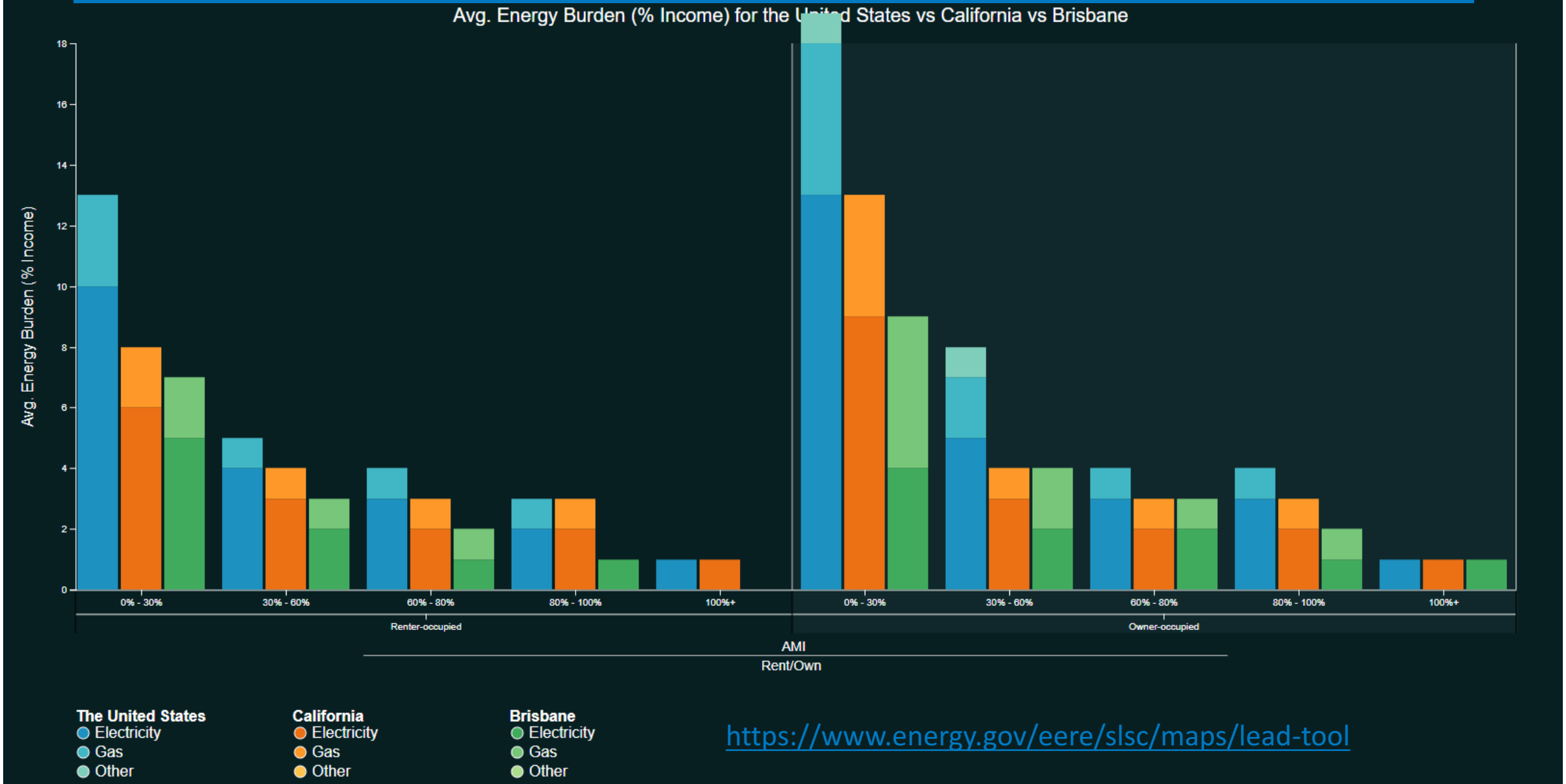
https://openei.org/doe-opendata/dataset/city-and-county-commercial-building-inventories

Commercial Building Inventories provide modeled data on commercial building type, vintage, and area for each U.S. city, county, and state. Please note this data is modeled and more precise data may be available through county assessors or other sources. Commercial building stock data is estimated using CoStar Realty Information, Inc. and FEMA Hazus building stock data through a process described in Sector-Specific Methodologies for Subnational Energy Modeling: https://www.nrel.gov/docs/fy19osti/72748.pdf.



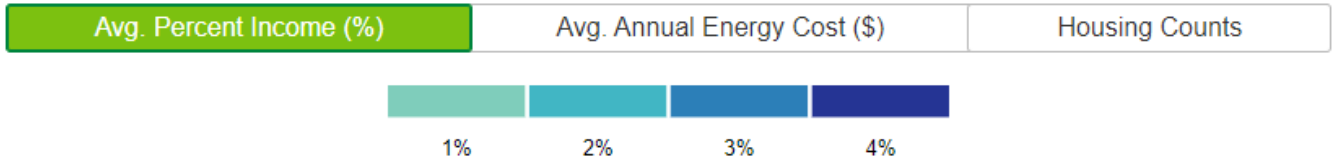
Low-Income Energy Affordability

Brisbane, CA

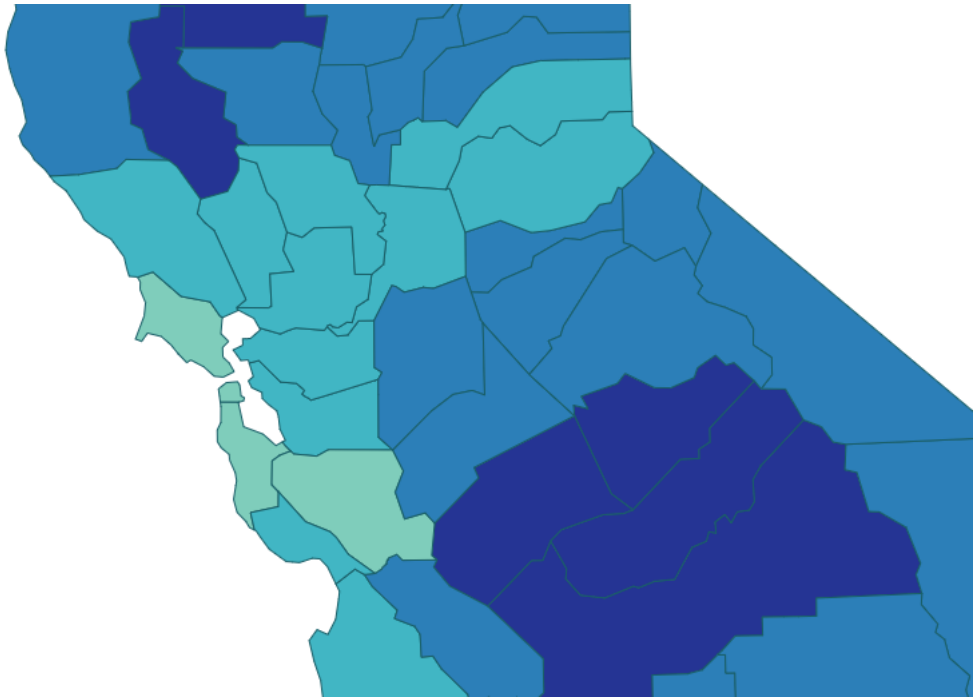


https://www.energy.gov/eere/slsc/maps/lead-tool

Energy Affordability
San Mateo County



Energy Burden: the percentage of household income spent on energy costs. Households spending more than 6% of gross annual income are typically considered energy burdened.



San Mateo County households, on average, spend 1% of gross annual income on energy costs. The average annual energy cost is $1,650.

https://www.energy.gov/eere/slsc/maps/lead-tool

What is the State and Local Planning for Energy (SLOPE) Platform?

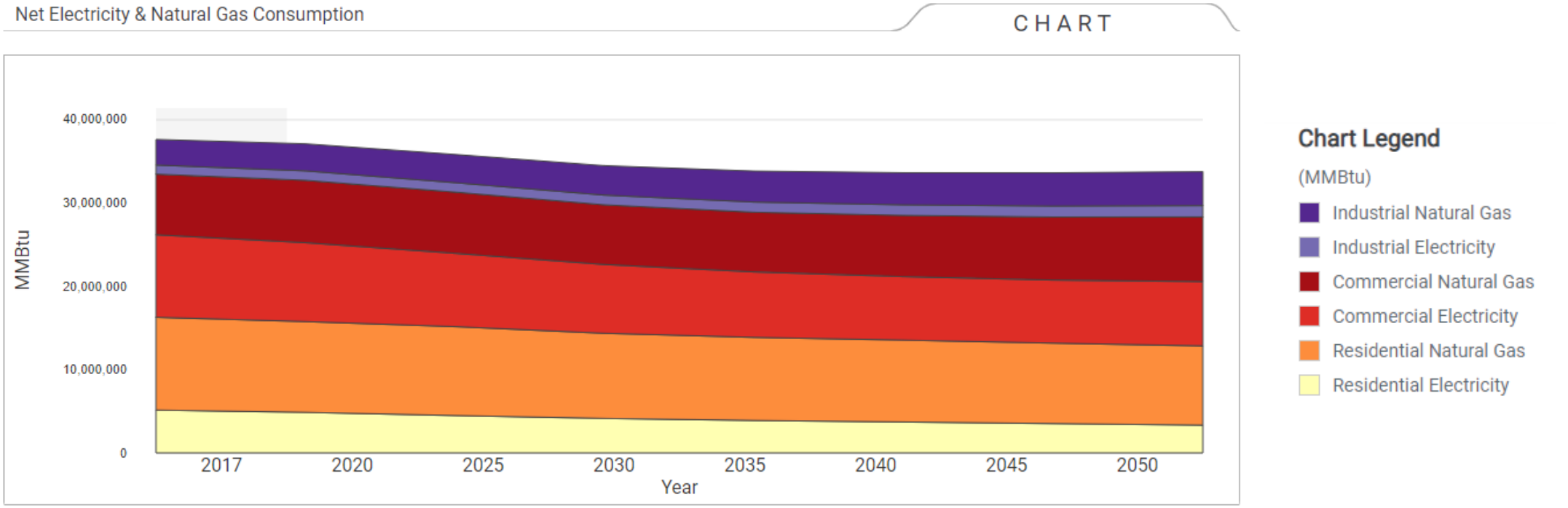
- A collaboration between **eight** Department of Energy (DOE) **technology offices** and the National Renewable Energy Laboratory
- A tool to enable more **data-driven state and local energy planning** by integrating dozens of distinct sources of energy efficiency, renewable energy, and (coming in 2020) sustainable transportation data and analyses
- An easy-to-access, online platform that illustrates **clean energy opportunities and potential** at the state and local levels

SLOPE Beta Datasets

SLOPE Beta includes the following datasets:

Energy Efficiency Potential	• State-wide residential, commercial, and industrial sector and single-family home energy efficiency potential
Electricity and Natural Gas Consumption	• Projected business-as-usual consumption and expenditures from modeled baseline data for the residential, commercial, and industrial sectors
Renewable Energy Generation Potential	• Technical generation potential for utility-scale, rooftop, and floating solar photovoltaic (PV), concentrated solar power (CSP), onshore and offshore wind, biopower, geothermal, and hydropower
Levelized Cost of Energy (LCOE)	• Projected LCOE by renewable and fossil fuel generation technologies
Population	• Current and projected population from Oak Ridge National Laboratory (ORNL) LandCast model
Commercial Building Stock	• Current and projected commercial building stock counts and area

Net Electricity & Natural Gas Consumption San Mateo County, CA



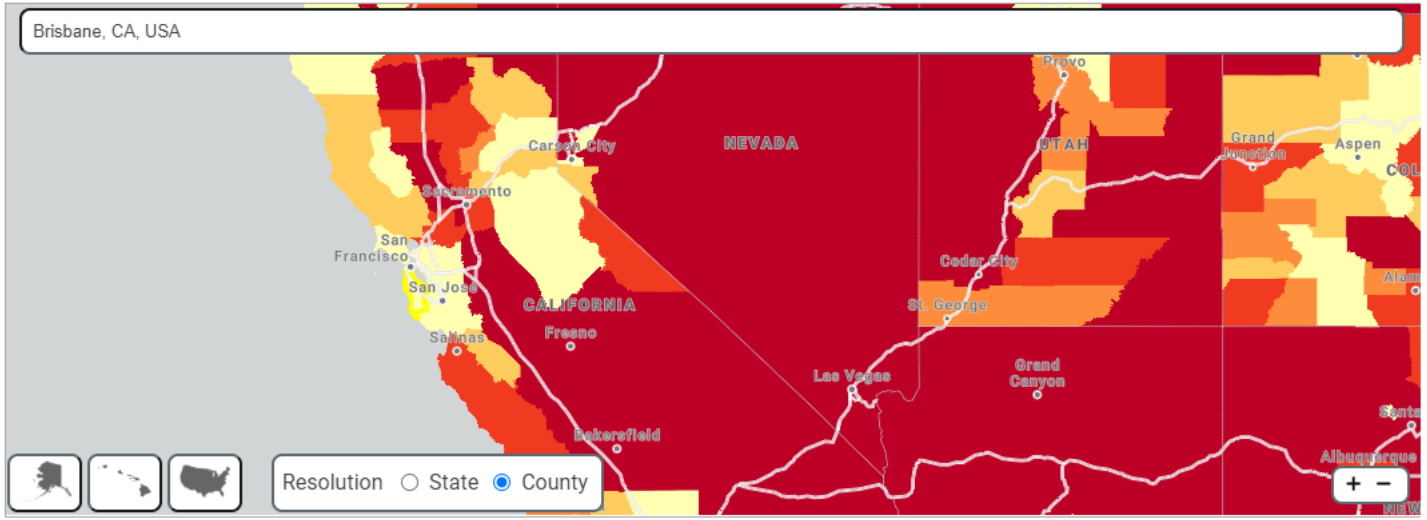
Here we can see modeled electricity and natural gas consumption in San Mateo County by sector.

NOTE: Estimates are modeled and have a high degree of uncertainty. Projected, business-as-usual electricity and natural gas consumption and expenditures are modeled for the residential, commercial, and industrial sectors using baseline 2016 estimates developed through the Cities Leading Energy Analysis and Planning (Cities-LEAP) methodology. A similar, sector-specific methodology is applied to project annual natural gas and electricity use and expenditures from 2017 to 2050 using historic per household and establishment energy estimates and Energy Information Administration Annual Energy Outlook 2019 projections. A description of the methodology is here.

https://gds.nrel.gov/slope

Renewable Energy Generation Potential

Utility Scale Solar (San Mateo County, CA)



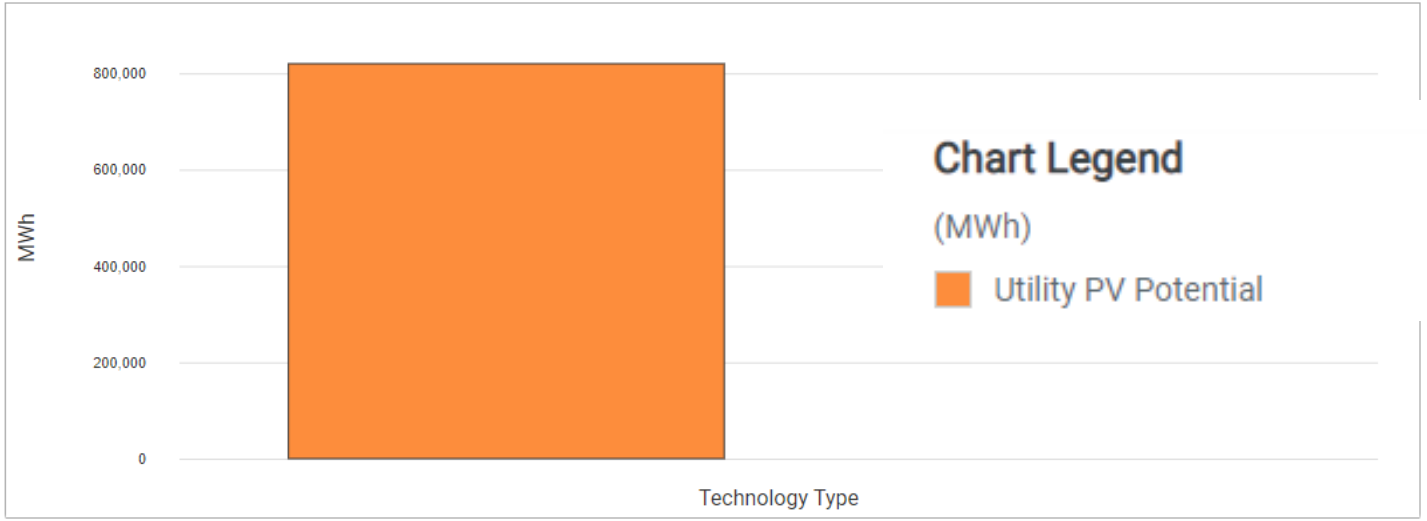
Map Legend

(MWh)

- 93,298,000 +
- 55,107,000 - 93,298,000
- 33,606,000 - 55,107,000
- 12,365,000 - 33,606,000
- 0 - 12,365,000

Utility PV

CHART



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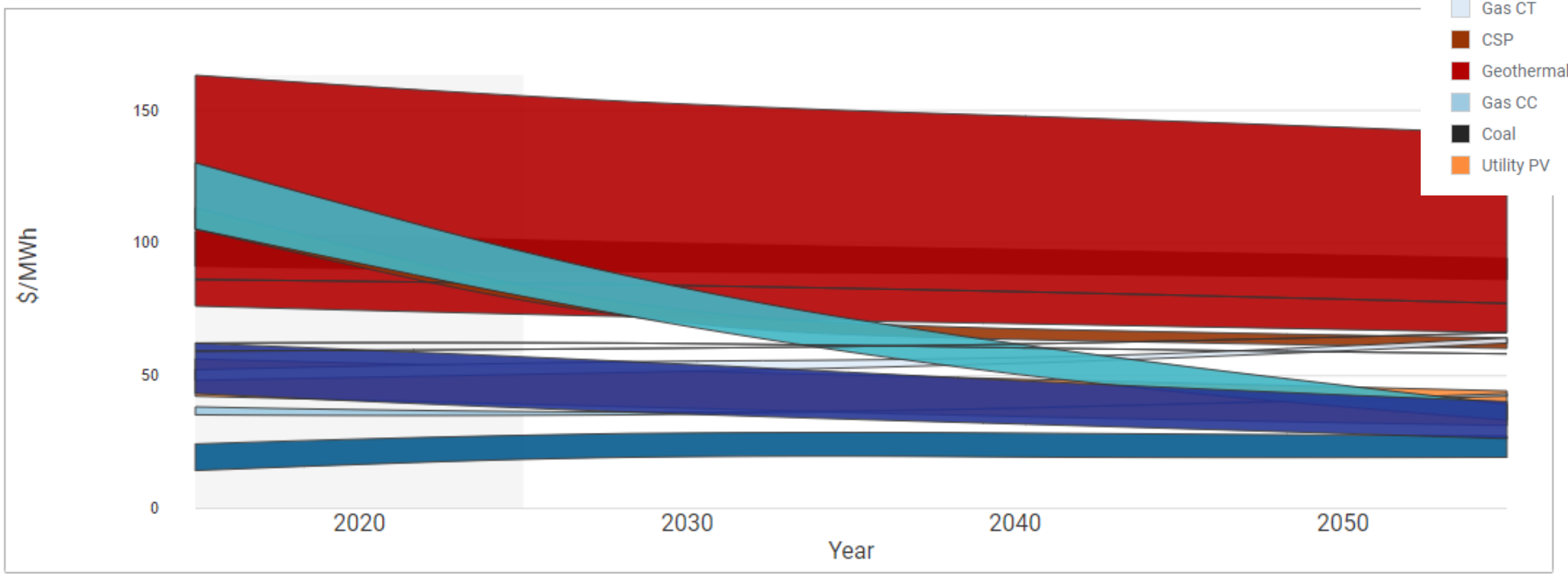
Levelized Cost of Energy (LCOE)

San Mateo County, CA



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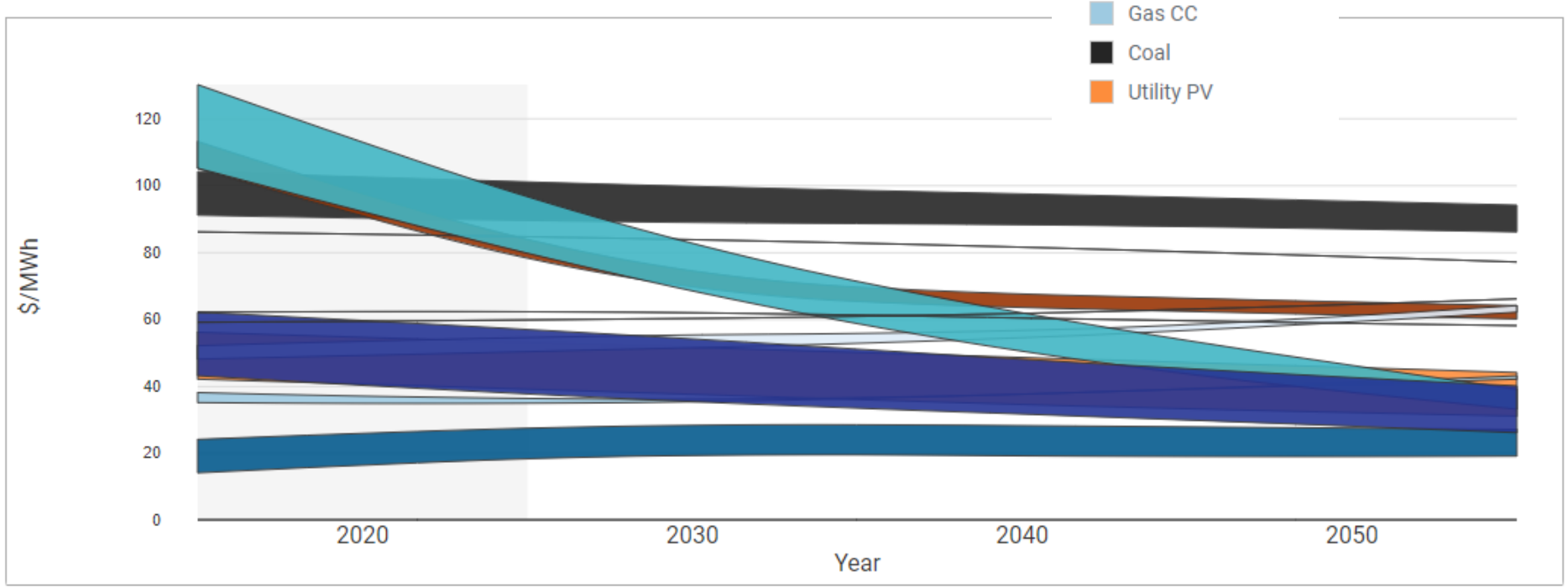
LCOE
San Mateo County, CA



Modeled costs for newly constructed electricity generation. (Geothermal LCOE is clicked off in the legend here.)

NOTE: Estimates are modeled and have a high degree of uncertainty. Levelized cost of energy (LCOE) is a metric that combines technology cost and performance parameters, capital expenditures, operations and maintenance costs, and capacity factors. The map conveys the technology with the lowest modeled LCOE within each balancing area. The chart shows the minimum to median modeled cost range. Costs reflect local conditions such as labor markets and design requirements and spur line costs for connecting wind, PV, and CSP sites to the transmission system. LCOE projections are primarily derived from the Regional Energy Deployment System (ReEDS) and reflect Annual Technology Baseline representative technology assumptions. Fossil fuel technology costs are from the Energy Information Administration Annual Energy Outlook 2019 Reference case. The modeling approach is described here.

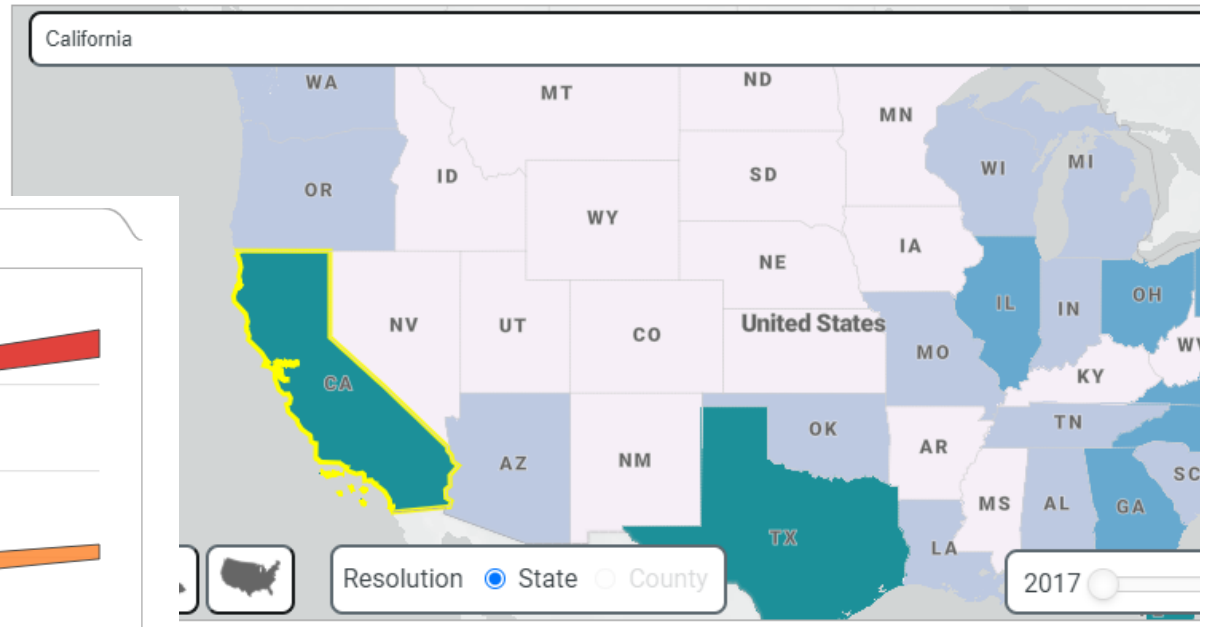
https://gds.nrel.gov/slope

Energy Efficiency – Potential by Sector

California

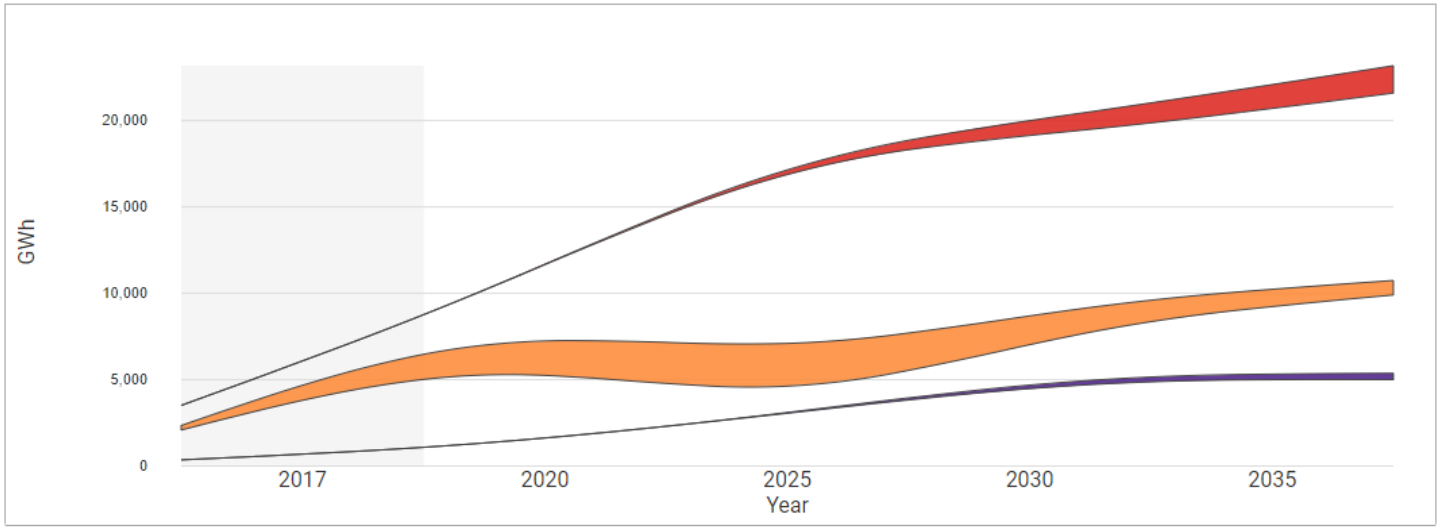
By 2035, California has an achievable electricity savings potential of 36,400 GWh with zero incentive and 39,200 with a $20/MWh incentive with the highest potential in the commercial sector.

Modeled Energy Efficiency: High Achievable Potential



High Achieveable Potential

CHART



Details

Title: High Achieveable Potential
Category: Energy Efficiency
State: California

Map Legend

(GWh)

- 4,700 +
- 2,400 - 4,700
- 1,100 - 2,400
- 483 - 1,100
- 0 - 483

Chart Legend

(GWh)

- Industrial High Achieveable Potential
- Commercial High Achieveable Potential
- Residential High Achieveable Potential

https://gds.nrel.gov/slope

*NOTE: Estimates are modeled and have a high degree of uncertainty. The Electric Power Research Institute State Level Electric Energy Efficiency Potential Estimates model electricity savings achievable through energy efficiency in the residential, commercial, and industrial sectors for a range of no incentive ($0, the lower end of the range shown for each sector) through $20 incentive (the high end of the range shown for each sector) per MWh. Results are shown for **Economic Potential**, resulting if all homes and businesses adopted the most energy efficient, cost-effective, commercially available measures and **High Achievable Potential**, a portion of the economic potential that considers market barriers and is more reflective of historic levels of achieved energy efficiency.*

Access SLOPE:
https://gds.nrel.gov/slope

Share Comments and Questions:
slope@nrel.gov

Q&A

Megan Day, AICP

www.nrel.gov

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NREL
Transforming ENERGY

LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

Thank you!

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