

Building Energy Use in San Mateo County

Existing Buildings

At least 50% of single-family homes and nearly 60% of California's apartment complexes (about 14 million total residences) were built before the state's first energy standards. Updating older buildings is critical to achieving the state's climate and clean energy goals.

When averaged across the county, more than 90% of San Mateo County's total building square footage is found in the residential sector (roughly 60% single-family housing and 30% multi-family housing). While commercial buildings make up only 3% of building square footage across San Mateo County, the commercial sector accounts for a third of the natural gas use in buildings in the county and the residential sector accounts for roughly half.

International Role Model

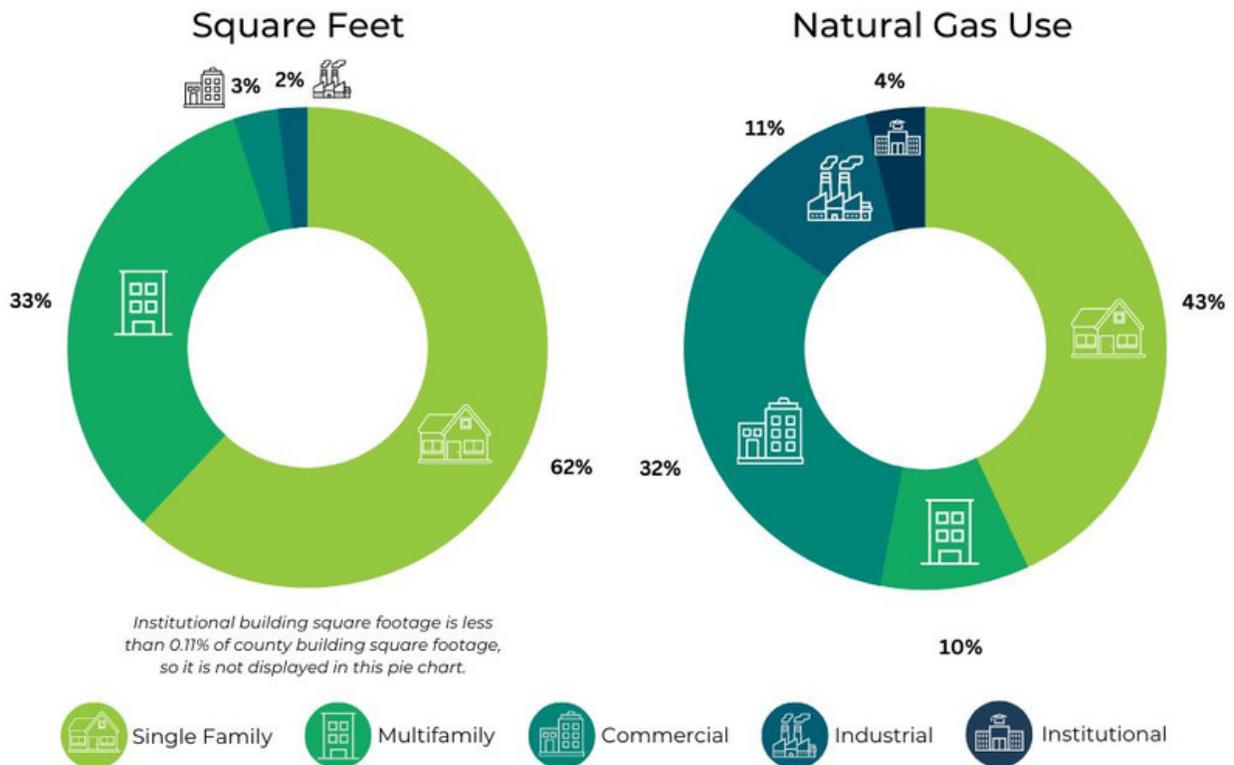
City of Amsterdam Phasing Out Natural Gas



Photograph by Massimo Catarinella, distributed under a CC BY-SA 3.0 license

In September 2020, the City of Amsterdam adopted the Heat Transition Vision, which sets out the main steps in the transition to a natural gas-free city by 2040. The plan identifies the best way for Amsterdam to become natural gas free and the best heat solution for each neighborhood. Newly developed regions of the city are no longer being connected to the gas grid, and new neighborhoods are being designed without gas pipelines. For existing buildings connected to natural gas, the municipality is looking at each neighborhood to see how it can become gas free as quickly as possible.

San Mateo County Building Stock (2017)



Note: These building stock and gas usage percentages were calculated using data provided by [BayREN](#) and the [California Center for Sustainable Communities at UCLA](#) as part of the [Bay Area Energy Atlas](#). According to those sources, building use type and square footage values were derived from multiple county parcel datasets provided and standardized by the [Metropolitan Transportation Commission \(MTC\)](#). There are limitations to the data stemming from parcel data errors and gaps, so these numbers should be viewed as approximations rather than exact calculations.

The county-wide building stock average percentages hold when drilling down to the city level for 16 of the county’s 20 cities, as well as the unincorporated areas. Across three cities—Brisbane, Colma, and South San Francisco—over 30% of the building square footage is commercial and industrial. The City of San Mateo stands out as unique in the county, with multi-family residences comprising 80% of building square footage in the city.



Electricity Supply and Demand

Peninsula Clean Energy is the default provider of electric generation for customers in San Mateo County (20 cities and the unincorporated areas), although customers can choose to opt out and remain with PG&E for their electric generation. PG&E provides all gas service in the county, as well as electric delivery, billing services, and power line maintenance.



The electricity provided to San Mateo County residences and businesses is already largely renewable and carbon-free. Peninsula Clean Energy’s default offering provides electricity that is at least 50% renewable and 100% carbon-free at rates 5% below PG&E’s generation rates. Customers can “opt up” to purchase electricity that is 100% renewable and 100% carbon-free for \$0.01 per kWh more. Peninsula Clean Energy has set a goal to deliver 100% renewable energy to match demand on an hour-by-hour basis by 2025.

Peninsula Clean Energy currently generates electricity for close to 300,000 customer accounts in San Mateo County and the City of Los Banos, including 267,000 residential accounts representing approximately 765,000 residents and 28,000 commercial and industrial accounts. As of September 2020, the customer participation rate for Peninsula Clean Energy was about 97% (i.e., about 3% opted out and chose to remain with PG&E for electric generation).

Peninsula Clean Energy Breakdown by Customer Type (CY 2019)

	Total Peninsula Clean Energy	Residential	Commercial, Industrial
Number of Customer Accounts	295,956	267,348 90.3%	28,608 9.7%
Total Retail Sales (MWh)	3,564,214	1,394,703 39.1%	2,169,511 60.9%

Source: Peninsula Clean Energy

As part of their emission reduction targets and sustainability goals, 15 cities and the County of San Mateo have opted to purchase 100% renewable and carbon-free electricity from Peninsula Clean Energy for their municipal and county accounts. In Portola Valley, all customers are automatically “opted up” to 100% renewable and carbon-free electricity, making Portola Valley one of the first towns in California to be entirely 100% renewable.



Natural Gas Supply and Demand

PG&E provides all gas service in San Mateo County. California imports nearly 90% of its gas supply using six large gas lines, mostly from the American Southwest, the Rocky Mountain states, and Canada.

The tables below show residential and commercial natural gas use in San Mateo County by ZIP code.

Residential Gas Use in San Mateo County by ZIP Code (2021)
(Sorted by Therms per Customer)

Zip	City	Number of Customers	Total Therms	Therms per Customer
94027	Atherton	2,396	4,065,408	1,697
94028	Portola Valley	2,262	2,235,958	989
94062	Woodside, Emerald Hills	8,576	6,595,801	769
94010	Burlingame and Hillsborough	14,228	10,565,216	743
94038	Moss Beach	614	386,526	629
94402	San Mateo - Hayward Park	8,577	5,292,760	617
94025	Menlo Park	14,287	8,456,494	592
94019	Half Moon Bay	4,101	2,285,382	557
94037	Montara	788	429,516	545
94070	San Carlos	11,138	5,830,345	523
94030	Millbrae	7,218	3,657,194	507
94002	Belmont	9,360	4,740,363	506
94404	Foster City	9,803	4,941,189	504
94303	East Palo Alto	5,640	2,835,929	503
94044	Pacifica	12,572	6,291,505	500
94066	San Bruno	11,401	5,593,758	491
94403	San Mateo - Hillsdale, Laurel	13,155	6,374,587	485
94018	El Granada	1,664	800,570	481
94015	Daly City - West	14,728	7,060,279	479
94401	San Mateo - Northeast	8,701	4,037,709	464
94080	South San Francisco	17,612	8,005,230	455
94061	Redwood City - West	12,102	5,469,319	452
94063	Redwood City - East	6,877	2,895,635	421
94014	Daly City and Colma	12,046	5,059,496	420
94065	Redwood Shores	4,197	1,741,749	415
94005	Brisbane	1,737	708,166	408
TOTAL		219,773	116,051,788	528

* Data is made available by PG&E by ZIP code. The ZIP code for East Palo Alto, 94303, includes areas of the city in both San Mateo and Santa Clara counties.



Commercial Gas Use in San Mateo County by ZIP Code (2021)
(Sorted by Therms per Customer)

Zip	City	Number of Customers	Total Therms	Therms per Customer
94080	South San Francisco	1,420	14,845,717	10,455
94015	Daly City - West	297	2,650,082	8,920
94030	Millbrae	276	1,681,281	6,092
94063	Redwood City - East	1,500	8,722,196	5,815
94025	Menlo Park	1,029	5,327,458	5,177
94010	Burlingame and Hillsborough	955	4,678,526	4,899
94062	Woodside, Emerald Hills	210	917,440	4,369
94070	San Carlos	2,192	8,273,526	3,774
94066	San Bruno	416	1,513,332	3,638
94044	Pacifica	312	1,021,098	3,276
94014	Daly City and Colma	554	1,611,018	2,908
94401, 94402, 94403	San Mateo	4,802	6,754,769	1,407
94019	Half Moon Bay	227	227,701	1,003
TOTAL		14,190	58,224,144	4,103

Customer gas usage data by ZIP code is made available by PG&E pursuant to CPUC regulations. Some data is not available by city due to CPUC rules for public aggregation of data, which require a minimum of 100 residential customers and a minimum of 15 non-residential customers, with no single non-residential customer accounting for more than 15% of the total consumption. If aggregation is not met, the consumption is combined with a neighboring ZIP code until the aggregation requirements are met. Therefore, not all ZIP codes or cities are represented in these tables.



Electric Homes Aren't New
Electricity has been the primary energy source in other parts of the U.S. and in other countries for many years. Pictured is a photo from a Westinghouse ad in the 1950s promoting the "Total Electric Home." Today, nearly 60% of new homes nationwide are being built all-electric, and 40% have heat pumps. In California, just five percent of new single-family homes have heat pumps.

End Uses of Natural Gas

Space heating, water heating, and cooking are the most common uses of natural gas in both residential and nonresidential buildings in California. Among San Mateo County homes, almost 70% are estimated to use natural gas for space heating and up to 90% still use natural gas for water heating.

Gas Appliance Use in San Mateo County Homes

In San Mateo County there are

270,000 households



90% use gas water heaters



65% use gas furnaces



Over 50% use gas stoves

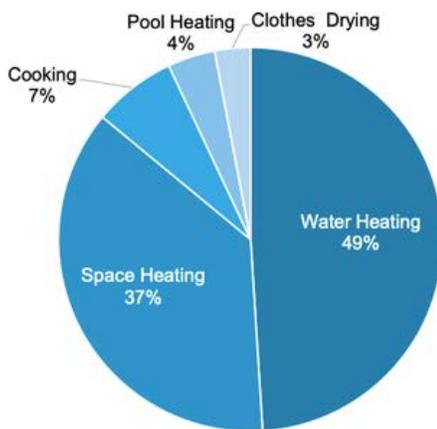


25% use gas clothes dryers

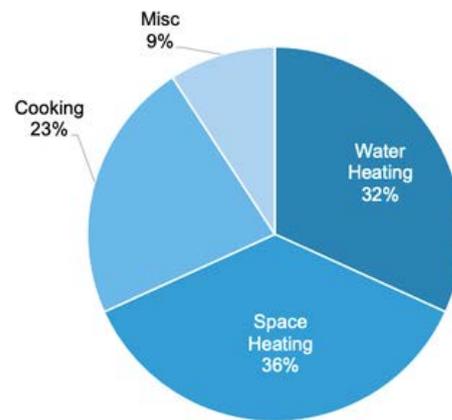
Fewer than 5% of homes have gas-powered pool heaters, spa heaters, BBQs, and/or fireplaces (for secondary heat)

Source: [U.S. American Community Survey \(ACS\)](#) and [California Residential Appliance Saturation Survey \(RASS\)](#); data provided by [Peninsula Clean Energy](#). See data table in [Appendix C](#) for more details.

End Uses of Natural Gas in California Buildings



Residential



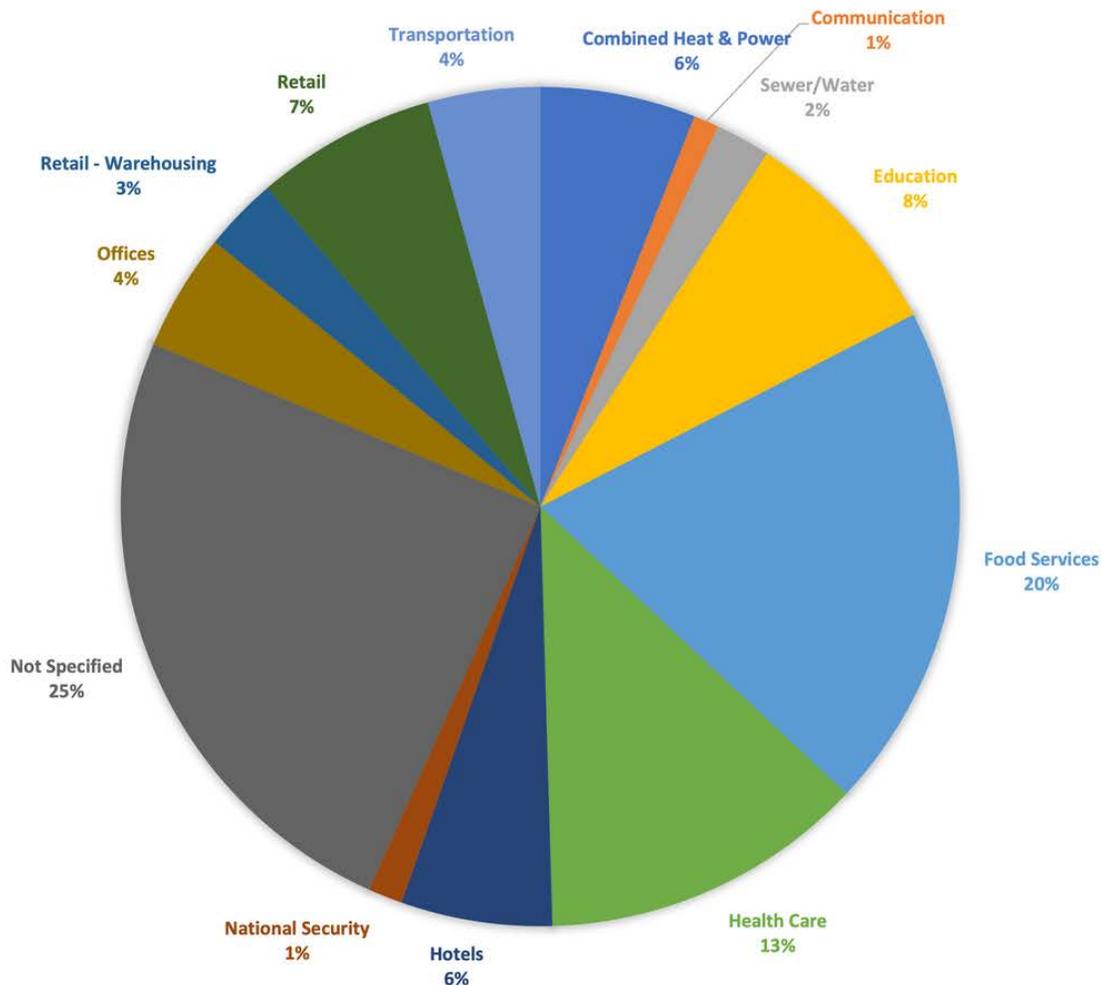
Non-Residential

Source: 2009 California Residential Appliance Saturation Survey, 2006 California Commercial End Use Survey. *Graphic:* Bay Area Reach Codes



While current disaggregated data on commercial natural gas usage in San Mateo County is not available, the [California Air Resources Board \(CARB\)](#) collects and [inventories California GHG emissions data](#) on an annual basis. Statewide emissions data illustrate the types of commercial building use that are emitting the most GHGs from natural gas combustion, and therefore where electrification efforts can have the largest emission reduction impact, including in health care, food services, and education. (Note, however that 25% of commercial emissions are from sources that are not specified.)

2019 CALIFORNIA COMMERCIAL SECTOR GREENHOUSE GAS EMISSIONS (CO2E) FROM NATURAL GAS COMBUSTION



Data was obtained using the [CARB Greenhouse Gas Emissions Inventory Query Tool](#).



The California Commercial End-Use Survey (CEUS) is a comprehensive study of commercial sector energy use. The CEC uses the survey to collect commercial sector energy consumption and end-use profiles. The 2018-2022 CEUS was completed in June 2022. The project was severely impacted by the pandemic, causing delays in all aspects of the project including the final quality control and posting of the survey data. The estimated time for availability of data is January 2023.

The History of California's Gas Supply

San Mateo County has some of the oldest oil fields in California, dating back to the 1880s. Initially, the natural gas produced from these oil fields was burned off and a small percentage of it was used for heating or lighting. But after the discovery of inexpensive ways to produce lighting, companies began to search for natural gas. Non-associated gas (gas produced without oil) reached the market as early as 1910, after the first gas zone in the state was found in the Buena Vista Oil Field in the San Joaquin Valley. In 1929, the San Francisco Bay Area region was supplied with gas through a pipeline laid from the Kettleman Hills Oil Field in Kings County. As demand for natural gas increased across the state, gas exploration in California increased significantly in the 1940s and 1950s.



The search for new gas fields continued into the 1970s, during which 44 gas fields were found. Before the 1940s, California had a surplus of natural gas, but due to growth in both population and industry, demand has outpaced supply ever since. Natural gas became a primary source of energy in San Mateo County throughout the 20th century because it was abundant and had a relatively low cost of production. Natural gas was also cleaner than many other sources of energy like coal. Furthermore, gas fueled many industrial processes and was an important component of paints and plastics.

Local Role Models

City of Menlo Park and Menlo Spark



The [City of Menlo Park](#) is a pioneering municipality in the Bay Area for its innovative and forward-thinking approaches to promoting building electrification. In July 2020, Menlo Park adopted a new climate action plan that included measures for phasing out fossil fuel throughout the city. The plan sets a goal for the city to reach carbon neutrality by 2030, the most ambitious goal of any city in San Mateo County.

[Menlo Spark](#) is a local nonprofit helping Menlo Park adopt a suite of building and transportation electrification measures by 2025 that are vital to reaching the city's 2030 goal. Its [Menlo Park Green Challenge](#) encourages homeowners to adopt sustainable habits in a competitive and fun way. In July 2021, Menlo Spark published "[Gassed Out – How Building Electrification Now Means a Healthy, Prosperous Menlo Park](#)", a roadmap for electrification in the city.

In June 2022, Menlo Park announced a public-private partnership with [BlocPower](#) to electrify 10,000 homes and buildings by 2030. The program will have an initial focus in Belle Haven, a DAC designated neighborhood and district along the bayfront most impacted by climate change. BlocPower will establish community advisory boards to center Menlo Park stakeholder needs in program design. An accompanying job training program through [JobTrain](#) will create local jobs while addressing the shortage of labor required to scale the program.

The challenge set forth before us is to follow the lowering cost curves of wind and solar, for heat pumps, electrical panels, and clean cooking equipment. We need to build systems and processes that center justice, so we address the least maintained in the most underserved communities. We need to do so in a way that builds trust with consumers so that they will welcome us into their homes. Our reward for doing so quickly will be more jobs at large, and more comfortable and healthier homes for all, and emissions reductions that meet the science of the climate challenge.

-- Roopak Kandasamy, Head of Sales Operations, BlocPower

This partnership is [funded](#), in part, by \$4.5 million from the California State budget secured for Menlo Park by State Senator Josh Becker. In partnership with Menlo Spark, BlocPower is seeking to raise at least \$35 million to finance low- and middle-income electrification and support programs.

To date, Menlo Park is also the only city in San Mateo County to have encouraged building electrification through [city planning and zoning updates](#). Menlo Park's 2016 General Plan Update for Belle Haven and the waterfront area of the city included policies that require new developments to use 100% renewable energy, for both electricity and natural gas, which will guide the transition to electric, fossil-fuel-free buildings.

