

2019 Energy Benchmarking Report

San Francisco Municipal Buildings

May 2021



San Francisco
Water
Power
Sewer

Services of the San Francisco
Public Utilities Commission

Hetch Hetchy
POWER

In 2011, the [San Francisco Existing Commercial Buildings Energy Performance Ordinance](#) was passed by the Board of Supervisors and signed by Mayor Edwin M. Lee requiring owners of non-residential buildings over 10,000 square feet to annually benchmark and disclose building energy performance. Leading by example, the City and County of San Francisco soon began to benchmark its municipal building energy use, becoming the first city on the west coast to annually measure and publish building performance data.

Starting in reporting year 2019 (this year), SFPUC began publishing building performance data in an interactive dashboard - and this document is a static copy. For the best experience, visit www.sfpuc.org to interact with charts and tables in this report. In the online version, the buttons below and the arrow above-right are navigation tools.

Trends



Portfolio Summary



Building Level Data



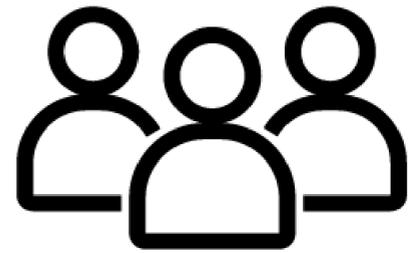
Data Sources and Assumptions



Energy Programs and Projects



Acknowledgements



On behalf of City agencies, the San Francisco Public Utilities Commission (SFPUC) continues to benchmark approximately 500 municipal buildings annually. In collaboration with San Francisco's Department of the Environment, SFPUC releases this dashboard to provide San Francisco's agencies and the general public a better understanding of how municipal facilities perform and to identify buildings that would benefit from cost-effective energy efficiency investments.

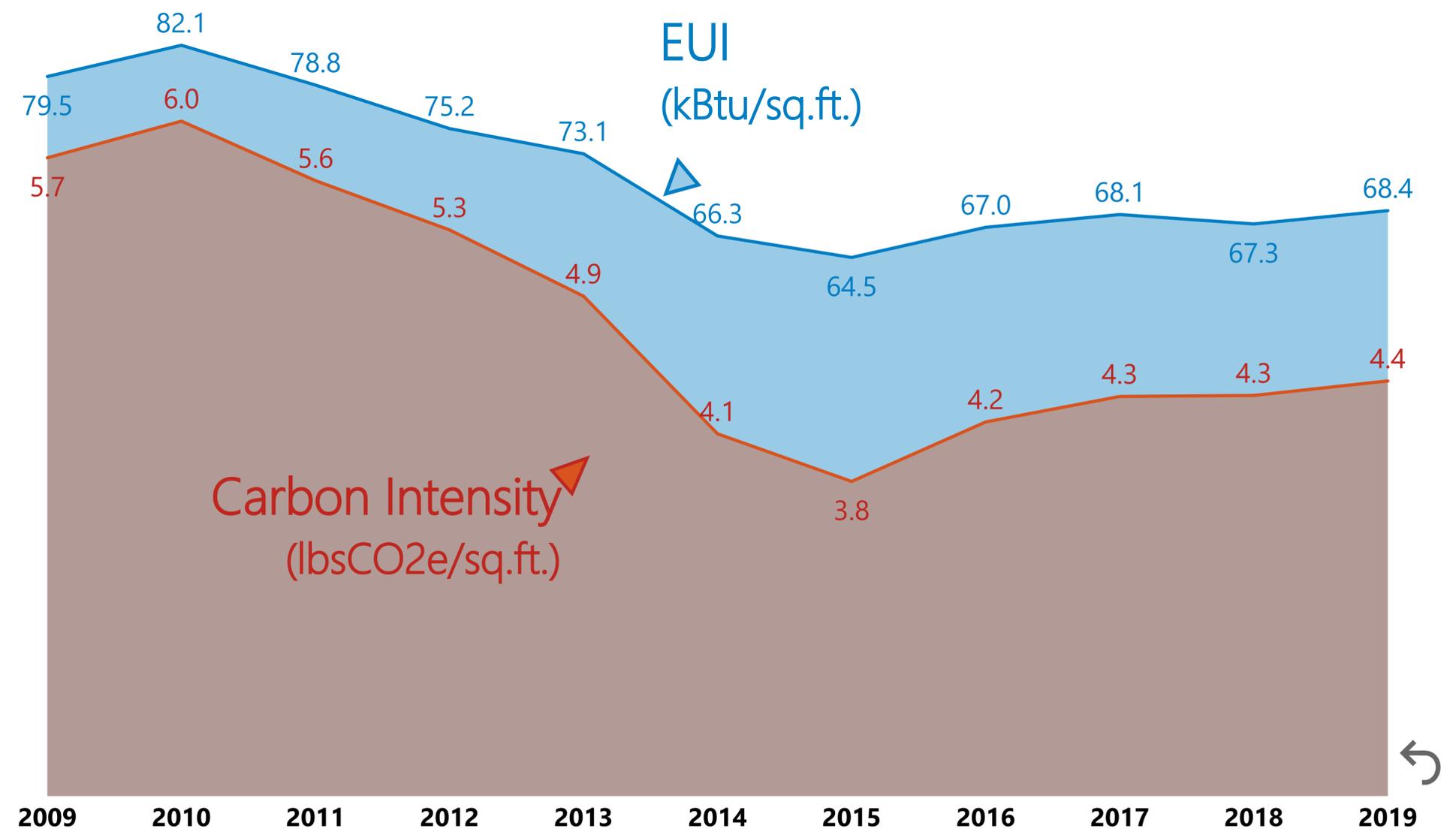
This dashboard does not include energy usage information for non-municipal buildings, nor does it include data on the nearly 400,000 customers enrolled with the SFPUC's [CleanPowerSF program](#).

For information about how municipal buildings' greenhouse gas emissions compare to emission from other sectors in San Francisco, check out [San Francisco's Climate Storyboard](#).

Starting in reporting year 2019, the SFPUC began publishing building performance data in this interactive dashboard, and this 2019 document is a static copy. Data from 2011 to 2019 can be found in static reports: [2019](#), [2018](#), [2017](#), [2016](#), [2015](#), [2014](#), [2013](#), [2012](#), [2011](#).

Carbon and Energy Use Intensity Over Time

For each municipal facility, the SFPUC measures and compares on-site annual energy use and greenhouse gas (GHG) emissions over time, on a square foot basis. (Expressed as energy use intensity (EUI) and carbon intensity, respectively). For 2020, San Francisco provides complete results for 465 City Facilities, including partial information for 26 facilities.

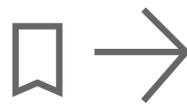


As shown above, average EUI and carbon intensity for municipal buildings, excluding San Francisco International Airport (SFO), have fallen 14% and 23%, respectively, since 2009. Over this time, City facilities have reduced their steam, electricity, and natural gas usage through energy efficiency and conservation.

From 2018 to 2019, municipal buildings faced slightly higher energy demands and thus had a slightly higher joint EUI and carbon intensity. EUI rose 2.0% and carbon intensity climbed 1.6%, due to a large increase in steam usage, as well as small increases in natural gas and electricity use. Since municipal facilities use 100% GHG-free electricity, the increase in electricity usage contributed to the growth in EUI but not in carbon intensity.

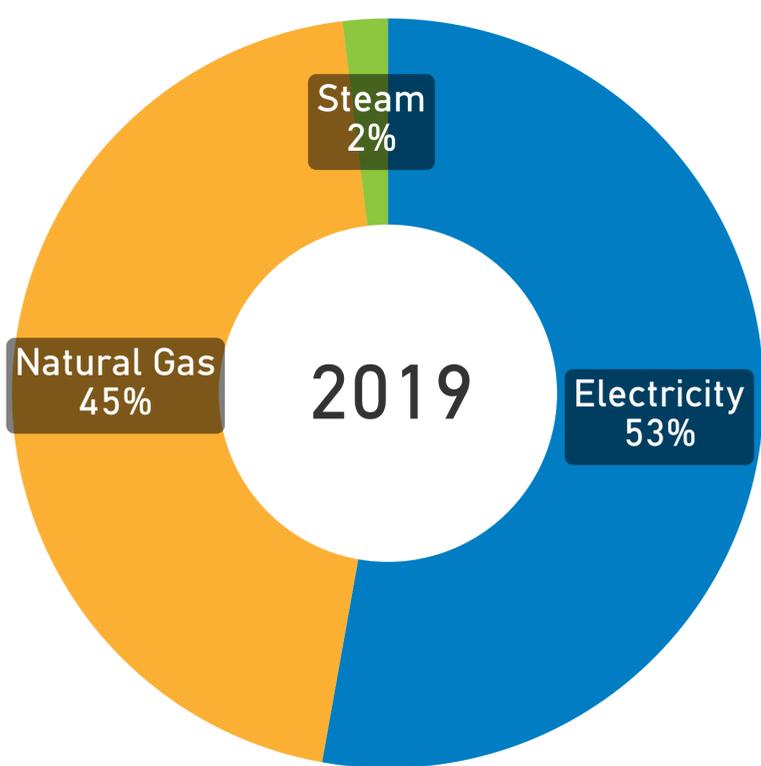
SFO is such a large part of the municipal portfolio that including it in the trend line above would mask the change in EUI and carbon intensity in all other municipal facilities. From 2018 to 2019, the airport increased its EUI 1.6% and its carbon intensity, 2.6%.

These year-over-year trends in energy demand can be influenced by factors such as weather and variations in building operations or demands. The City remains committed to reducing the energy intensity and carbon impact of its buildings. For more information on efforts to reduce the energy and carbon intensity of municipal facilities, visit the Energy Programs and Projects page.



Energy Use by Fuel Type

Three sources of energy are used to power municipal buildings: Electricity, Natural Gas, and District Steam. Every year there are certain buildings not fully benchmarked due to insufficient information. Energy usage from these buildings is not included in the overall figures, trends, and summary charts below, but is visible on the [Building Level Data page](#).



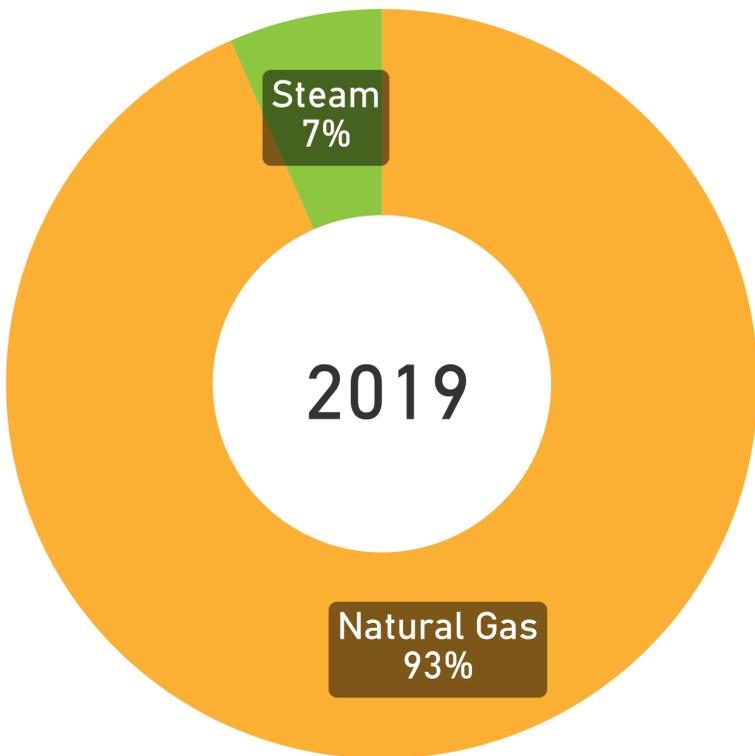
- 2018
- 2019



4.37bn
kBtu

Emissions by Fuel Type

All facilities receive 100% greenhouse gas (GHG)-free electricity from SFPUC through the Hetch Hetchy Water and Power System. As a result, electricity is entirely emissions-free while natural gas use continues to drive and represent the largest share of municipal building GHG emissions.



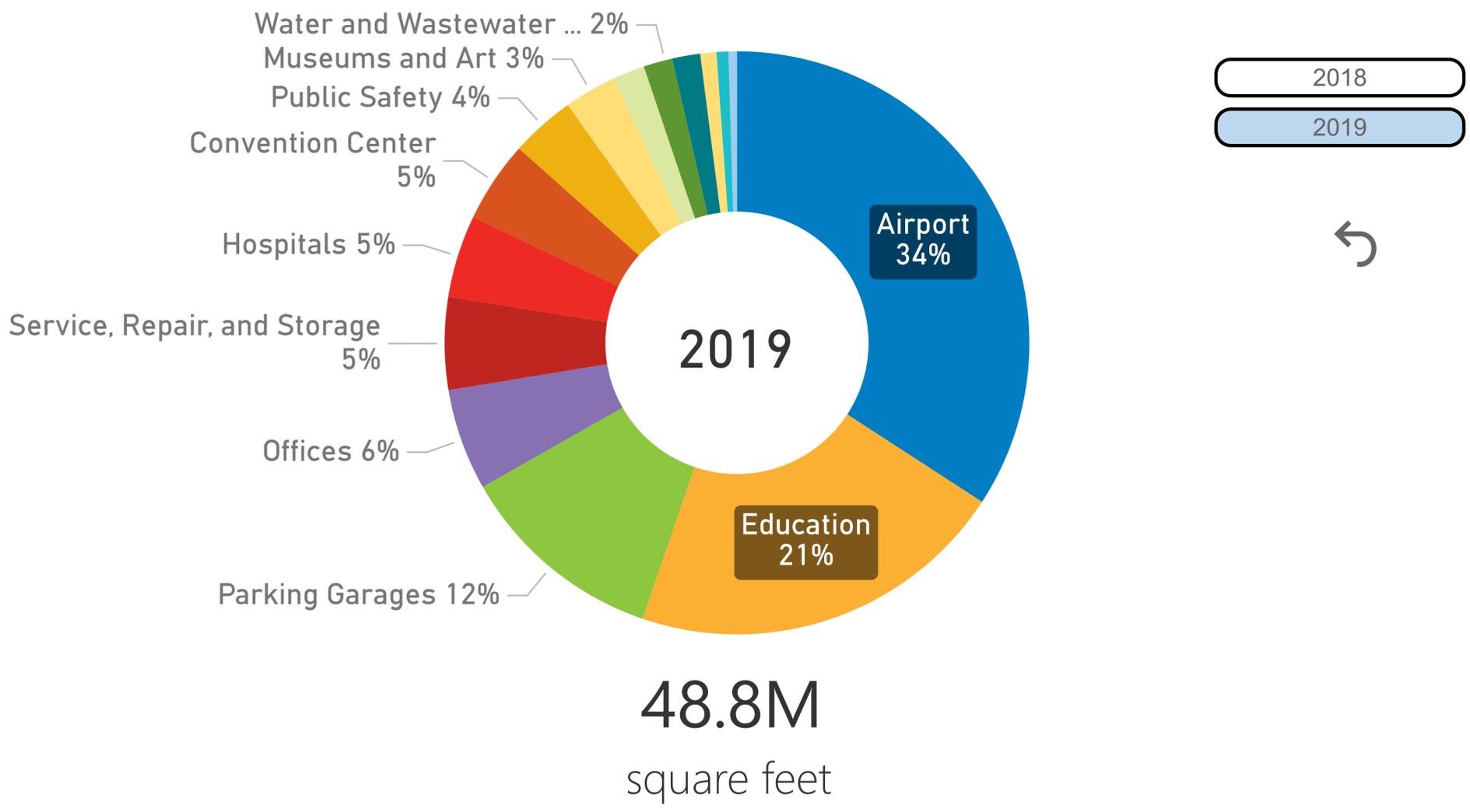
112,409
metric tons CO₂e





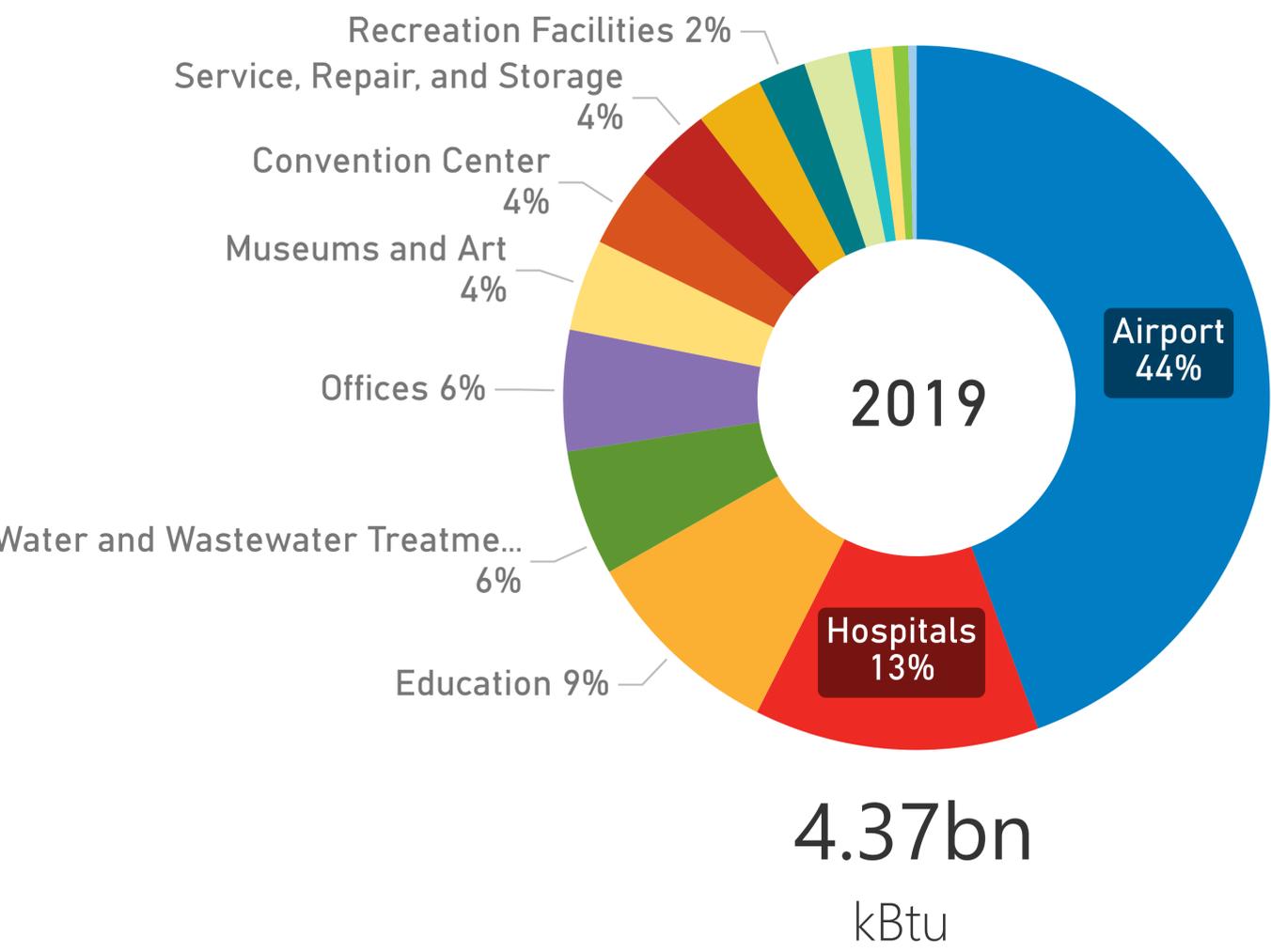
Floor Area by Building

The following depicts a summary of floor area by building category. Every year there are certain buildings not fully benchmarked due to insufficient information. Energy usage from these buildings is not included in the overall figures, trends, and summary charts below, but is visible on the [Building Level Data page](#).



Energy Use by Building

A building's size does not always dictate its energy use and some buildings consume energy out of proportion to their size due to their operating hours or energy use intensity. For example, hospitals represent a small percentage of benchmarked square footage, but consume a significant percentage of energy due to their continuous operating hours and high energy use intensity.





Data Sources and Assumptions



Data Sources

Energy use data: Electricity, natural gas, and steam usage data is stored in the SFPUC's energy accounting database, EnergyCAP, where billing is managed by the SFPUC. Where the site pays Pacific Gas and Electric (PG&E) or another vendor directly for natural gas, meter information was provided by the individual department to the SFPUC. Starting in 2019, data calendarization was used to extract annual data from monthly utility bills.

Building data: Square footage, year built, operating hours, and other facility data is used to reliably benchmark a building. As part of the initial report (2011), the SFPUC and other departments engaged in a thorough verification process to review available building and operations data and supply additional detail. Additional verification has occurred as new buildings have been added to the portfolio or buildings have changed. In some cases, a building comprises more than one space type. Where this would affect the Energy Star rating, multiple space types were created in EPA's Portfolio Manager for the facility.

Civic Center steam loop: Two historic Civic Center buildings, Bill Graham Civic Auditorium and the Department of Public Health Central Office, obtain steam through the Civic Center steam loop but do not have individual steam meters. The unmetered portion of Civic Center steam use is apportioned between these two buildings based on their square footage.

Greenhouse Gas Emission Factors: Below is a table of emission factor magnitude and data sources updated annually. Note that electricity is always emissions free because all municipal buildings receive 100% GHG-free electricity from the Hetch Hetchy Regional Water and Power System.

Year	Building Fuel Type	Emission Factors	Units	Source
2018	Steam	0.2016	lbs CO2e/lbs steam	Clearway Community Energy; obtained annually by request
2019	Steam	0.2024	lbs CO2e/lbs steam	Clearway Community Energy; obtained annually by request
2018	Natural Gas	11.7011	lbs CO2e/therm	ICLEI 2012 U.S. Community Protocol v1.0 Table B.1; ICLEI 2012 U.S. Community Protocol v1.0 Table B.3
2019	Natural Gas	11.7011	lbs CO2e/therm	ICLEI 2012 U.S. Community Protocol v1.0 Table B.1; ICLEI 2012 U.S. Community Protocol v1.0 Table B.3
2018	Electricity	0.0000	lbs CO2e/MWh	SFPUC Hetch Hetchy Power System Power Content Label at https://sfpuc.org/about-us/our-systems/hetch-hetchy-power-system
2019	Electricity	0.0000	lbs CO2e/MWh	SFPUC Hetch Hetchy Power System Power Content Label at https://sfpuc.org/about-us/our-systems/hetch-hetchy-power-system

Definitions

Energy Star Score: The Energy Star rating system gauges a building's energy performance as compared to similar buildings nationwide. Because the scale is geared to commercial buildings, only municipal facilities that fall in specific, eligible building categories can obtain a 1-100 score. A score of 50 represents the national median. To put this in perspective, a building with an score of 76 would indicate that it is performing better than 75% of other buildings in the same category.

Energy Use Intensity: The City's municipal buildings are benchmarked based on on-site Energy Use Intensity (EUI), a measure of annual energy use per square foot of building area. EUI does not consider the local climate or the type of energy used by a building and its associated GHG-emissions, so comparing EUIs across cities is not particularly useful. In this dashboard, water treatment and wastewater facilities EUI is calculated the same as for all other facilities (energy use per square foot) and not as energy use per volume of water processed. The area of exterior parking lots is not included in the EUI for the adjacent buildings, but buildings that function primarily as parking garages had their full square footages factored into their EUI calculation.

Data Uncertainties and Exceptions

While every effort has been made to ensure that the information contained in this dashboard is complete, accurate, and up-to-date, irreconcilable meter data and/or changes in a building's occupancy or primary use may skew their respective results.





Energy Efficiency

The San Francisco Public Utilities Commission (SFPUC) has offered energy efficiency services to its power customers for the past three decades. The SFPUC's General Fund Energy Efficiency Program utilizes these annual benchmarking efforts to identify municipal facilities most in need of energy improvements. The program evaluates prospective sites throughout the City based on total energy usage, energy use intensity, building age, and other relevant factors. Once candidate sites are identified, the Power Enterprise further develops projects by conducting energy audits, performing building retrocommissioning, and implementing energy efficiency retrofits.



As public facilities are built or undergo major renovations, they also must meet energy performance and LEED Gold standards. The SFPUC's energy efficiency work, combined with the efforts of individual departments, save the City millions of dollars per year in energy costs. .

Electrification

In response to natural gas being the primary contributor to greenhouse gas emissions from San Francisco buildings, the Board of Supervisors introduced an ordinance in September 2019, requiring new construction and major renovations of all municipal buildings to exclude natural gas sources and rely fully on electricity. As a complement to the ordinance, SFPUC Power's Distributed Energy Resources Projects team has been developing fuel switching demonstration retrofits to help support the transition from natural gas-reliant building systems to electricity. The SFPUC has been providing engineering design and contracting services to replace natural gas heating systems with all-electric heat pump and/or variable refrigerant flow (VRF) systems,. These new systems will be powered by GHG-free Hetch Hetchy hydroelectricity, further reducing San Francisco's emissions.

2019 Highlights

In 2019, SFPUC investments in energy efficiency measures totaled \$1.3 million. Notable projects include:



LED Lighting Upgrades at Asian Art Museum: SFPUC helped fund a series of major lighting retrofits that significantly reduced lighting energy usage in the gallery spaces while simultaneously providing better illumination for the artwork under display. Due to the longer lifetimes of the new lights, maintenance costs over time are also expected to be significantly reduced.

LED Lighting Upgrades at Mission Rec Center: SFPUC purchased new LED lamps and fixtures for the basketball court, racketball courts, and boxing area which reduce the lighting electricity usage by about 50% while improving the quality and uniformity of light in the spaces.



Building Energy Management System at SF Police Department Stations and Public Health Department Clinics: SFPUC upgraded the building controls systems to allow for more efficient operation of building HVAC systems while also improving the ability of the facilities engineers to maintain their sites.

In addition to these projects, the SFPUC continues to help with existing building LEED commissioning in the Civic Center District.





Gathering the information necessary to complete this benchmarking report involved the time and expertise of numerous people at a number of different departments and agencies. Many thanks to all those whose hard work and continued care went into ensuring that this report is as complete and accurate as possible.

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