The City of SAN DIEGO

2025 Annual Climate Action Plan Report

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Message from the City Planning Department Director

Each year, the City of San Diego reports on progress we are making to reduce climate pollution and build healthier, more sustainable communities. This report shows that we are making meaningful progress in several important areas, while also making clear that more work remains.

Overall, climate pollution in 2024 was 23 percent lower than the baseline year in 2019 and 3 percent lower than 2023. More homes and businesses are using clean electricity and saving energy. Electricity from rooftops and other on-site solar systems doubled between 2019 and 2024 and the amount of clean electricity on the power grid in 2024 was nearly twice what it was in 2019. Nearly two-thirds of the electricity used in the city in 2024 came from emissions-free sources.

San Diegans are also finding cleaner ways to get around the city. Compared to the previous year, the number of electric vehicles and public charging stations increased by about 25 percent. Public transit use continued to recover from the COVID-19 pandemic, with transit boardings increasing 10 percent in 2024.

The City is also making it easier for people to live in Climate Smart Village Areas – neighborhoods closer to jobs, schools, parks, stores, transit and other everyday needs as addressed in the General Plan. In 2025, 7,259 new homes, including 2,050 new affordable homes, were permitted in these areas, representing 95 percent of new homes and 99 percent of new affordable homes. Also in 2025, the City completed community plan updates in the College Area and Clairemont communities that add space for tens of thousands of additional homes in walkable, transit-connected neighborhoods.

Other examples of progress include planting more than 5,000 new trees and building over 24 miles of new bikeways in 2025 and redirecting more than 24 million pounds of surplus food in 2024 to organizations serving people in need.

At the same time, this report shows that progress is uneven, and some important goals remain out of reach. Driving in the city remains below 2019 levels but has steadily increased in recent years. Transit ridership also remains below pre-pandemic levels. And while overall climate pollution continues to trend downward, emissions in 2024 were still about 6 percent above the average pace needed to meet the Climate Action Plan's 2030 target.

These results help show where current efforts are working and where faster progress is needed. The City remains committed to doing its part, but climate change cannot be addressed by cities alone. Lasting progress will require coordinated action across all levels of government, across businesses and institutions, and throughout everyday economic and community life – in San Diego, across California, throughout the United States and around the world.

Today, that broader coordination faces real challenges. Governments are dealing with difficult budget decisions, people and families are facing rising costs of living and national priorities are focused elsewhere. Even so, the City remains committed to advancing practical climate solutions that also improve daily life for San Diegans.

Our focus continues to be climate action that helps make neighborhoods healthier, safer, more affordable, and more connected. That means cleaner air and lower energy costs, better transportation choices, more housing near everyday needs, and stronger, more resilient communities for all San Diegans.

Heidi Vonblum, Director
City Planning Department

Climate Action Plan Reporting

The 2025 Annual Climate Action Plan Report summarizes the best available information on the City of San Diego's progress toward the goals of the Climate Action Plan. The report includes a comprehensive, citywide inventory of climate pollution in 2024[1] and tracks key indicators[2] that help us understand why and how emissions are changing over time. For many indicators, the latest available data is from 2024. Where 2025 indicator data is available, it is also provided.

The report also presents the latest emissions estimates for 2019-2023. When improved data became available while preparing the 2024 inventory (e.g., more accurate data on natural gas consumption), emissions estimates were also updated for past years to show relevant comparisons.

This approach follows international and State guidance and helps ensure that emissions trends are accurate and consistent. As a result, emissions estimates for some years will show variations from what was shown in past annual reports.

Because it measures emissions across the whole community, a citywide inventory reflects the combined impact of decisions and activities by residents, businesses, institutions, utilities and all levels of government. This is different from simply estimating the emissions reductions expected from individual City programs or projects. Those estimates can help show the potential benefits of specific actions taken by City government, but they do not capture the full picture of how emissions are actually changing across the city over time. A citywide inventory helps track real-world outcomes and overall progress toward climate goals.

[1] 2024 is the latest year for which complete data are available to complete an annual greenhouse gas emissions inventory for the city. Key data inputs needed to complete the annual greenhouse gas emissions inventory for 2025, including data related to energy consumption, electricity emissions, and vehicle miles traveled, are provided by agencies and entities external to the City (e.g., California Energy Commission, California Department of Transportation) and are not anticipated to be available to the City until late 2026 or early 2027.

[2] Performance indicators, such as number of trees planted, miles of new bikeways constructed and number of electric vehicle charging stations installed, help measure how effectively the City is carrying out the actions of the Climate Action Plan. These indicators provide valuable data on implementation progress but are not a replacement for annual greenhouse gas emissions inventories. Inventories use the best available data to estimate emissions from all sources and activities across the city, not only those directly influenced by City-led actions.

The City Planning Department retained the Energy Policy Initiatives Center of the University of San Diego School of Law to prepare the inventory and help analyze the data for key indicators. Several City departments collected and shared data needed to prepare the inventory and evaluate key indicators.

The data sources, reporting protocols, methods, assumptions and limitations involved in tracking and reporting the key indicators and preparing the citywide emissions inventory are provided in Appendices A and B, respectively.

The citywide emissions inventory is an estimate of the climate pollution (greenhouse gas emissions) produced by everyday activities across the city, including transportation, building energy use, electricity generation, waste disposal and other sources. The inventory is based as much as possible on real-world information, such as metered energy consumption, energy sources used to make electricity, traffic data, transit ridership and waste volumes. Where direct data for activities and sources in the city are not available, the inventory uses standard methods, modeling, and reasonable assumptions to estimate citywide emissions as accurately as possible.

The emissions data and key indicators included in this report, along with information on the status of actions implementing the Climate Action Plan, are available on the City's Climate Action Plan dashboard **climatedashboard.sandiego.gov.**

Annual Greenhouse Gas Emissions Levels in 2024

Annual GHG emissions levels were estimated to be 8.16 million metric tons of carbon dioxide equivalent (MMT CO_2e) in 2024.

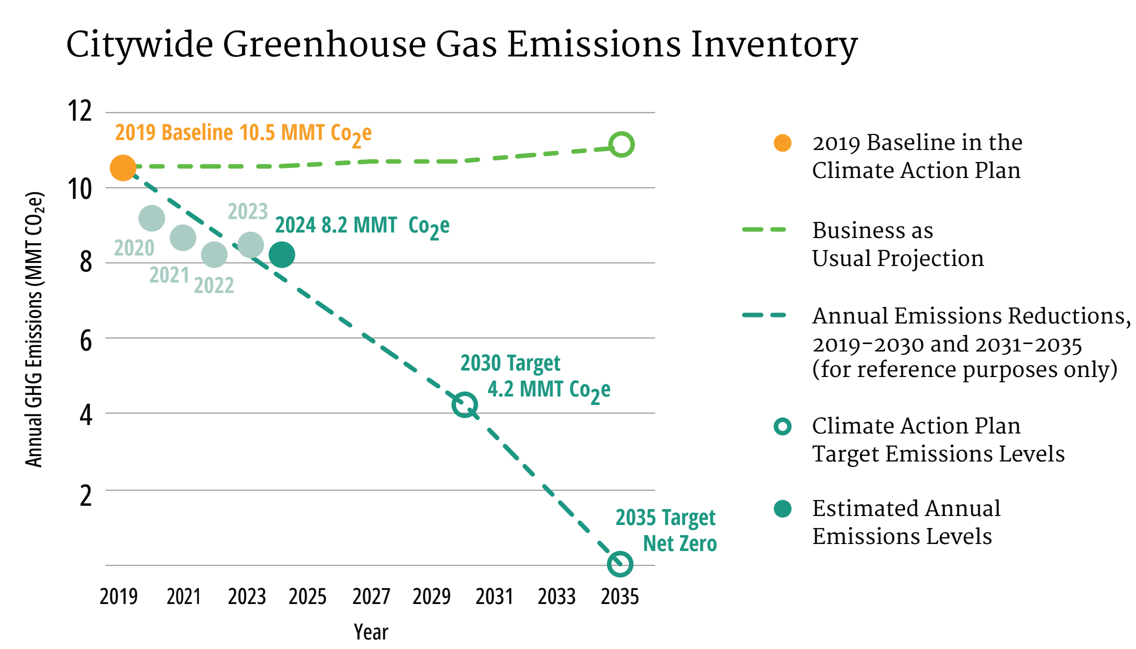
Citywide emissions in 2024 were down 23 percent from 2019, the reference point for measuring future changes in emissions in the Climate Action Plan. Citywide emissions in 2024 were also down 3 percent from the prior year, when emissions levels were down 20 percent from 2019.

Figure 1. Citywide Greenhouse Gas Emissions and Reduction Targets

Estimated citywide greenhouse gas emissions from 2019-2024 are shown alongside two trajectories through 2035: a Business-as-Usual scenario assuming no Climate Action Plan implementation and a linear trajectory of average emissions reductions each year from 2019 to the Climate Action Plan's 2030 and 2035 targets.

Source: adapted from Table 3, Appendix B and "City of San Diego Greenhouse Gas Emission Projections and Reductions" (p.18), City of San Diego Climate Action Plan (2022).

Notes: MMT CO_2e = million metric tons of carbon dioxide equivalent



Progress Toward Climate Action Plan Targets

To track progress toward the Climate Action Plan's 2030 emissions reduction target, the City developed a linear trajectory of average emissions reductions needed each year from 2019 to 2030. The Climate Action Plan does not include this linear trajectory, and it does not call for specific levels of emissions reductions each year; the linear trajectory is provided only for reference purposes to help understand progress toward long-term Climate Action Plan targets.

When measured on this linear trajectory, citywide emissions would need to decrease by 0.58 MMT CO_2e on average each year to achieve the Climate Action Plan's 2030 target (Table 1). On this linear trajectory, annual emissions levels in 2024 would be 7.67 MMT CO_2e.

The estimated annual emissions levels of 8.16 MMT CO_2e for 2024 were approximately 6 percent *(0.49 MMT CO_2e)* higher than the levels that align with a linear trajectory toward the 2030 target.

Table 1. Progress Toward 2030 Emissions Reduction Target

Progress toward the Climate Action Plan's 2030 emissions reduction target using a linear trajectory from 2019 to 2030.

2019 baseline emissions	10.54 MMT CO_2e
2030 emissions reduction target	4.22 MMT CO_2e
Average annual reduction to achieve the 2030 target using a linear trajectory from 2019 to 2030	0.58 MMT CO_2e
Annual emissions levels in 2024 to align with linear trajectory	7.67 MMT CO_2e
Annual emissions levels estimated for 2024	8.16 MMT CO_2e
Difference between estimated emissions levels and the 2024 reference point on a linear trajectory	0.49 MMT CO_2e (+6%)

Source: adapted from Table 3, Appendix B and "City of San Diego Greenhouse Gas Emission Projections and Reductions" (p.18), City of San Diego Climate Action Plan (2022).

Notes: MMT CO_2e = million metric tons of carbon dioxide equivalent

GHG emissions are rounded to the nearest ten thousand.

Sums may not add up to totals due to rounding.

Sources of Greenhouse Gas Emissions in 2024

The vast majority (96%) of citywide emissions in 2024 were the result of fuels used in vehicles that move people and goods around the city (*on-road transportation*) and energy used to power homes and other buildings (*electricity and natural gas*) (Figure 2).

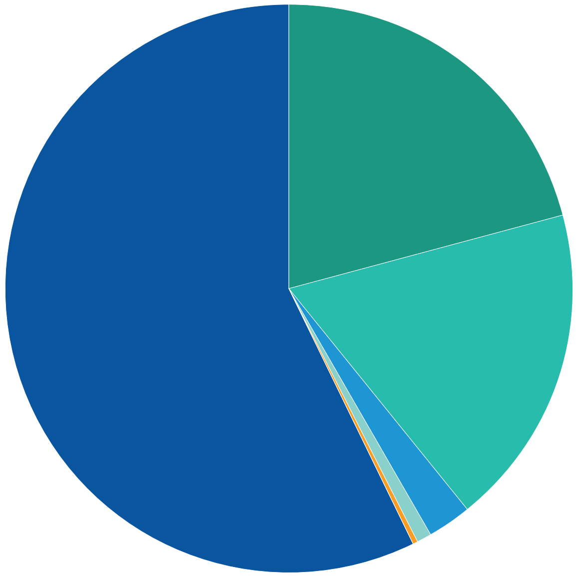
The largest source was gasoline- and diesel-powered cars and trucks, representing more than half (57%, 4.64 MMT CO_2e) of annual emissions in the city. Following that was natural gas and electricity used in homes and other buildings, accounting for 39 percent (3.19 MMT CO_2e) of 2024 emissions.

Natural gas end uses – such as water and space heating, cooking, and clothes drying – represented 21 percent of 2024 emissions (1.71 MMT CO_2e). Electricity from the grid, which is used for air conditioning, lighting, refrigeration, appliances, cooking, electric vehicle charging and more, represented 18 percent of 2024 emissions (1.48 MMT CO_2e).

The following sources and activities were responsible for the remaining 4 percent (0.34 MMT CO_2e) of emissions in 2024:

- Throwing away organic solid waste like food and yard trimmings (solid waste, 3 percent, 0.22 MMT CO_2e)
- Using equipment and vehicles for construction projects (construction equipment, less than 1 percent, 0.06 MMT CO_2e)
- Providing the City with safe drinking water and recycled water (water supply, <1%, 0.05 MMT CO_2e)
- Making wastewater safe to release or reuse (wastewater treatment, <1%, 0.01 MMT CO_2e)

Figure 2. Citywide Emissions by Emissions Sector



57%	4,637,000 - Vehicles and Driving *(On-Road Transportation)*
21%	1,710,000 - Homes and Buildings *(Natural Gas)*
18%	1,475,000 - Homes and Buildings *(Electricity)*
3%	216,000 - Organic Waste in Landfills
1%	57,000 - Construction Equipment *(Off-Road Transportation)*
<1%	51,000 - Water Supply
<1%	12,000 - Wastewater Treatment

Source: adapted from Table 3, Appendix B.

Annual Greenhouse Gas Emissions Levels by Emissions Sector, 2019-2024

Lower emissions from vehicles and driving (down 21 percent from 2019 to 2014) and from electricity and natural gas used in homes and other buildings (down 37 percent and 11 percent, respectively, from 2019 to 2024) are the main reasons for the 23 percent decrease in citywide emissions from 2019 to 2024 (Table 2; Figure 3).

Table 2. Annual Greenhouse Gas Emissions Levels by Sector, 2019-2024

Emissions Sector	Annual Emissions Levels[1] (MMT CO_2e)							
	2019	2020	2021	2022	2023	2024	Percent Change 2019-24	Percent Change 2023-24
Vehicles and Driving *(On-Road Transportation)*	5.85	4.65	4.68	4.63	4.67	4.64	-21%	< -1%
Homes and Buildings *(Electricity)*	2.34	2.29	1.71	1.56	1.59	1.48	-37%	-7%
Homes and Buildings *(Natural Gas)*	1.91	1.83	1.92	1.73	1.80	1.71	-11%	-5%
Organic Waste to Landfill *(Solid Waste)*	0.28	0.27	0.22	0.21	0.21	0.22	-22%	1%
Construction Equipment *(Off-Road Transportation)*	0.07	0.06	0.06	0.06	0.06	0.06	-17%	0%
Water	0.06	0.07	0.07	0.07	0.06	0.05	-16%	-11%
Wastewater	0.03	0.02	0.02	0.01	0.01	0.01	-54%	-8%
TOTAL	**10.54**	**9.19**	**8.68**	**8.26**	**8.41**	**8.16**	**-23%**	**-3%**

Source: adapted from Tables 3 and 4, Appendix B.

Notes:

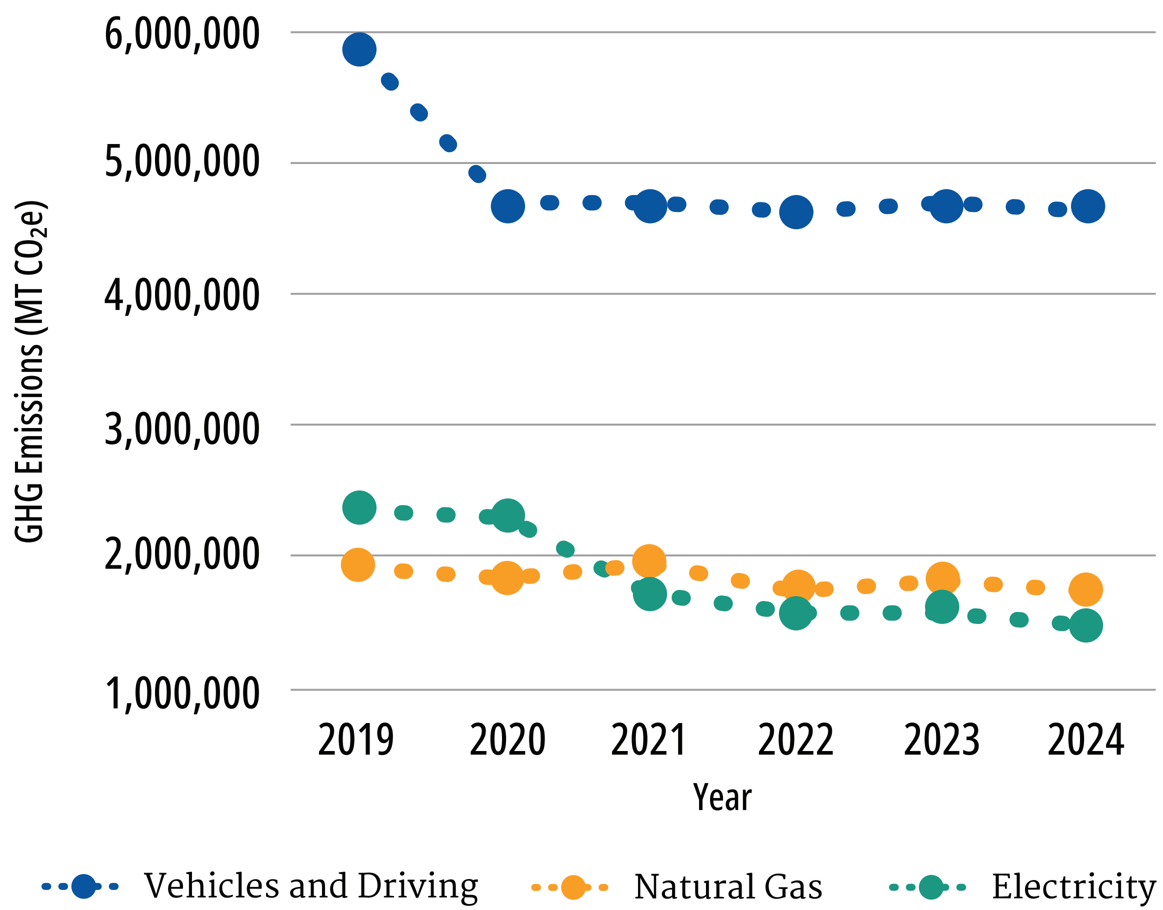
[1] GHG emissions for each sector and annual totals are rounded to the nearest ten thousand.

Sums may not add up to totals due to rounding.

MMT CO_2e = million metric tons of carbon dioxide equivalent

Figure 3. Annual Greenhouse Gas Emissions by Source, 2019–2024

Annual greenhouse gas emissions from vehicles and driving and natural gas and electricity used in homes and buildings, 2019–2024.



Source: adapted from Table 3, Appendix B.
MT CO_2e = metric tons of carbon dioxide equivalent

Taken together, 2024 emissions from electricity and natural gas used in homes and other buildings were down 25 percent since 2019 and were 6 percent lower than the prior year. Similarly, the 3 percent drop in citywide 2024 emissions from the prior year is mostly because of lower emissions from electricity and natural gas used in homes and other buildings (down 7 percent and 5 percent respectively, from 2023 to 2024).

Vehicles and Driving

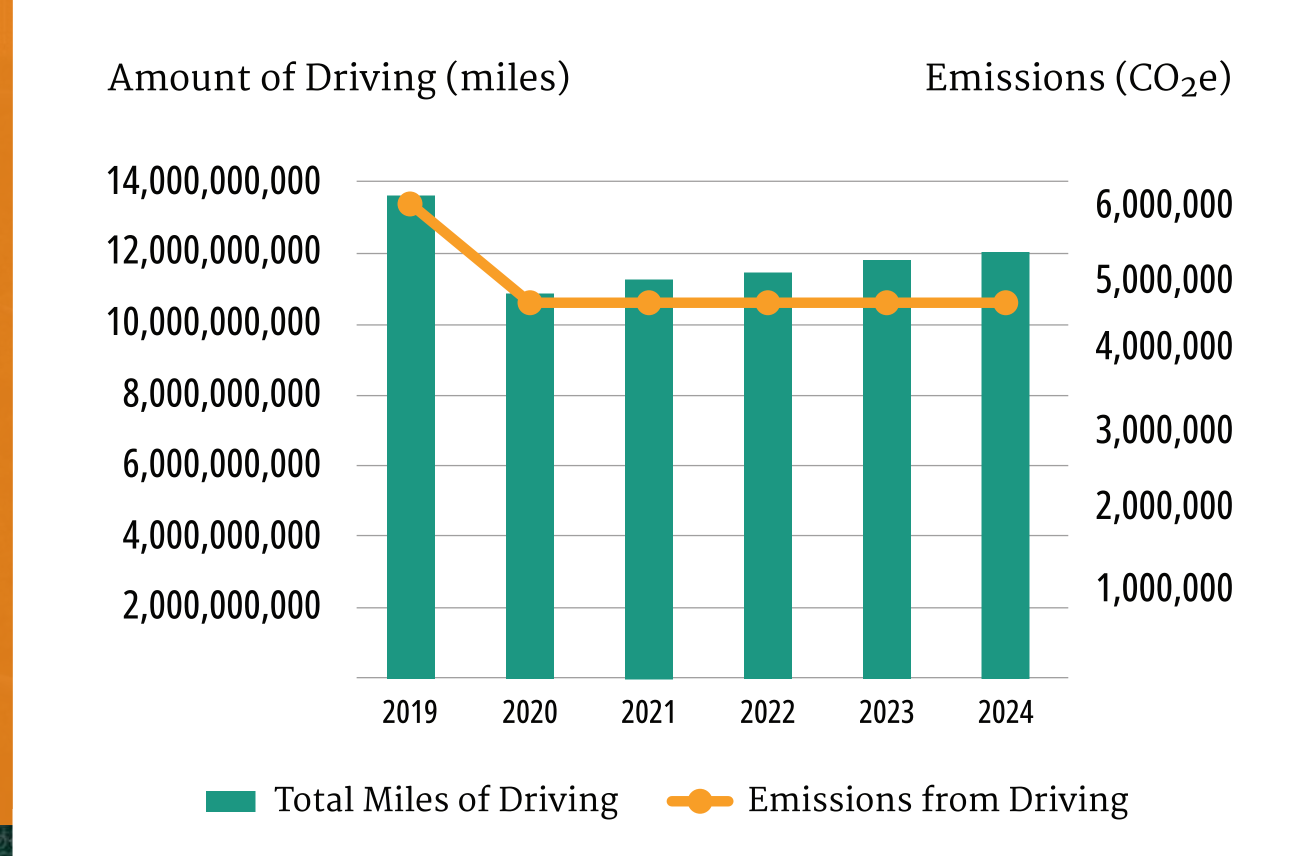
How much people drive and what kinds of vehicles they use are the biggest contributors to emissions from cars and trucks.

Compared to 2019, the amount of driving in the city was lower *(12% fewer miles driven)* and the types of vehicles being used were cleaner *(10% less pollution released per mile)* in 2024 (Figure 4; Table 3). The cars and trucks used in 2024 were also cleaner than the previous year *(3% less pollution released per mile, see Table 3)*. For example, the number of electric vehicles *(25% increase in 2024 compared to 2023)* and electric vehicle chargers *(26% increase in public Level 2 chargers, 26% increase in public fast chargers in 2024 compared to 2023)* continues to grow. Electric vehicle charging increased even more in 2025, with 29 percent more public Level 2 chargers and 38 percent more public fast chargers compared to the prior year.

However, the amount of driving in 2024 was higher *(2% more miles driven)* than in 2023. In fact, after decreasing 20 percent from 2019 to 2020 at the start of the COVID-19 pandemic, the amount of driving in the city has increased 2-3 percent per year from 2021-2024, which corresponds with schools and businesses reopening and more people returning to in-person work.

Figure 4. Vehicle Miles Traveled and Driving Emissions, 2019–2024

Total miles of driving per year compared to total greenhouse gas emissions from driving, 2019-2024.



Source: adapted from Table 11, Appendix A.

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

Table 3. Pollution from Vehicles in the San Diego Region, 2019-2024								
Vehicle Pollution	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Percent Change**	
							2019-24	**2023-24**
Pollution per mile driven (g CO_2e/mile)	428	427	415	405	396	386	-10%	-3%

Source: adapted from Table 11, Appendix A.

Notes: A statewide mobile source emissions model developed by the California Air Resources Board was used to calculate the regional average annual vehicle emission rate; city-specific data on pollution from vehicles is not available.

g CO_2e = grams of carbon dioxide equivalent

Bringing Public Electric Vehicle Charging to San Diego Neighborhoods

The City is making it easier to charge electric vehicles by adding public chargers at City sites at no cost to taxpayers. A private company pays to install and maintain the chargers in City parking lots in exchange for a percentage of the revenue generated from use of the chargers. In 2025, the first full year of the program, 58 old or broken chargers were replaced with new, working ones at 12 sites, including recreation centers, pools and libraries, bringing EV charging to more neighborhoods across the city. Visit the Public Electric Vehicle Charging Program website to learn more: **sandiego.gov/general-services/energy/zev/evcharging.**

SD City Planning

Table 4. Public Transit Use in the San Diego Region (Passenger Boardings and Miles Traveled), 2019-2024

Public Transit Use	2019	2020	2021	2022	2023	2024	Percent Change	
							2019-24	2023-24
Average weekday regional transit boardings	315	159	163	243	270	298	-6%	10%
Average weekday regional transit passenger miles	1,734	680	836	1,406	1,528	1,522	-12%	<-1%

Source: adapted from Figure 17, Appendix A.
Notes: Data includes bus and rail transit services operated by Metropolitan Transit System and North County Transit District; city-specific data on public transit use is not available.

More people in the San Diego region[3] used public transit in 2024 than the year before (as measured by passenger boardings) and the distance traveled stayed about the same (as measured by miles traveled by passengers). In fact, more people have been using public transit each year since the height of the COVID-19 pandemic in 2020, although 2024 boardings and miles traveled in the region were 6 percent and 12 percent , respectively, below pre-pandemic (2019) levels (Table 4). Trends are similar for the Metropolitan Transit System (MTS): the amount of people getting on the bus and Trolley has increased each year since the low point in 2020, including a 10 percent increase from 2023 to 2024, but were still 9 percent below pre-pandemic (2019) levels in 2024 (Appendix A, Figure 18). In 2025, MTS passenger boardings climbed 2 percent from the prior year and were 7 percent below 2019.

The City is helping make transit more accessible, allowing people to drive less, by providing more opportunities for new homes to be built in Climate Smart Village Areas – neighborhoods close to transit and other everyday needs. Over the past several years (2021–2025), 32,954 new homes were permitted in these areas, representing about 90 percent of all new permitted homes. During the same period, 6,849 new affordable homes were permitted, with about 95 percent located in Climate Smart Village Areas. In 2025, an even larger share of new homes was permitted in these areas: 95 percent of the 7,630 new homes and 99 percent of the 2,050 new affordable homes.

[3] City-specific data on public transit use is not available.

Planning for More Homes and Jobs in Climate Smart Village Areas

The General Plan was updated in 2024 to strengthen its alignment with the Climate Action Plan.[4] Central to the update is the Village Climate Goal Propensity Map, which establishes a data-driven framework to guide future opportunities for jobs and housing near transit, services, shops, schools, workplaces and parks and public spaces. This strategy was designed to reduce the need for driving, optimize public transit investments, and foster sustainable, equitable and connected communities. Areas designated as Climate Smart Village Areas are identified as having the highest potential to shift commuter behavior away from driving and making it easier for people to walk, roll, bike and ride transit. Planning for more homes and jobs located near transit in these areas is intended to help reduce climate pollution primarily attributable to driving.

While the Climate Smart Village Areas serve as a citywide guide for locating future employment and housing mixed-use villages, final designations are tailored to the community contexts and determined at the neighborhood level through the Community Plan Update process. The most recent community plan updates adopted by City Council – College Area and Clairemont – added opportunities for 32,000 new homes in Climate Smart Village Areas. Updates are also underway for Mid-City Communities, Rancho Bernardo and Otay Mesa-Nestor.

[4] Making Progress Towards Mode Share Goals – General Plan Update (Blueprint SD) overview: **www.sandiego.gov/sites/default/files/2024-05/blueprint-sd-memo031424.pdf**

Using Cleaner Vehicles in City Operations

As of 2025, about 8 percent of the City's 5,037 municipal vehicles were zero or near-zero-emission, including 230 fully electric vehicles and 126 plug-in hybrids. The City also has 382 regular hybrids. In 2025, the City replaced 21 gasoline or diesel-powered vehicles with electric vehicles – including one electric fire truck - with 17 being fully electric pickup trucks.

The Climate Action Plan aimed to switch most of its vehicles to zero-emission models by 2030 (75% of all cars and 50% of all light-, medium-, and heavy-duty vehicles). As of 2025, approximately 11 percent of cars, 5 percent of light duty-trucks, 4 percent of medium-duty trucks and less than 1 percent of heavy-duty trucks were zero and near-zero emission models (Table 5).

Table 5. Transitioning City Vehicles to Zero- and Near-Zero Models, Status as of 2025

Vehicle Type	Car[1]	Light-Duty[2]	Medium-Duty[3]	Heavy-Duty[4]
Plug-in Hybrid	101	0	25	0
Electric Vehicles	32	79	0	1
Percent Zero and Near-Zero Emissions	**11%**	**5%**	**4%**	**<1%**

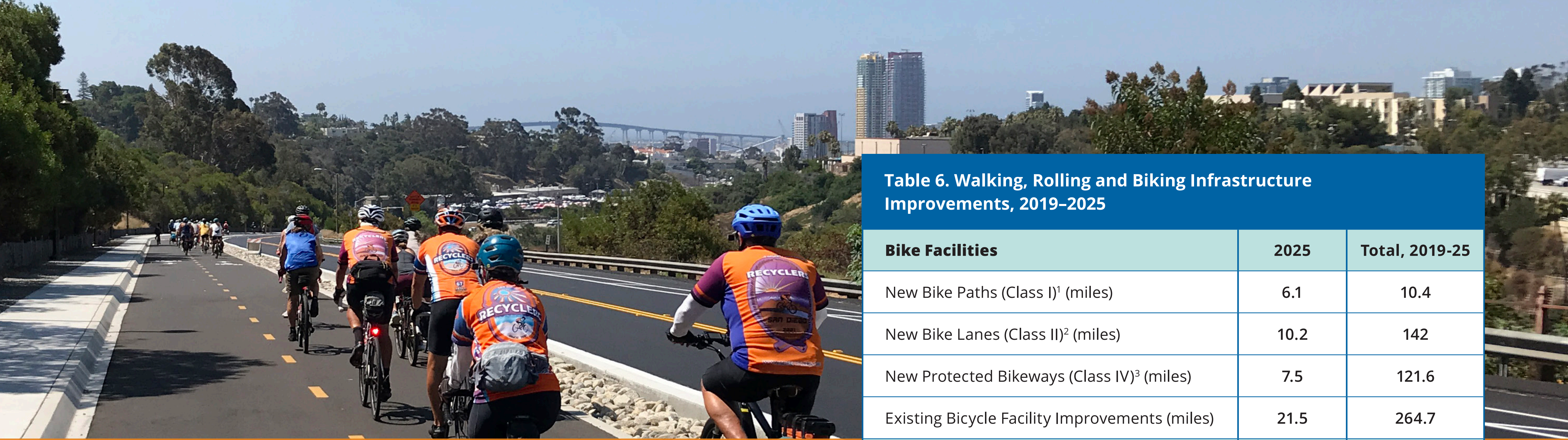
Source: adapted from Figure 11, Appendix A.

Notes: This table excludes carts, motorcycles, trailers and other off-road equipment.

1. Examples of cars include sedans and small sport utility vehicles.
2. Examples of light-duty vehicles include vans and pickup trucks (e.g., F150 and F250).
3. Examples of medium-duty vehicles include flatbed trucks and larger pickup trucks (e.g., F350 and F450).
4. Examples of heavy-duty vehicles include dump trucks, fire engines, garbage trucks, street sweepers, backhoes and vactors (sewer cleaning trucks).

Progress is moving forward but limited because there are not yet many suitable larger vehicles on the market and additional charging infrastructure is needed. The City continues to review available vehicle options to identify compatible replacements.

To support more electric vehicles, the City is focusing on adding additional charging stations at its fleet locations. A first review of charging needs has been completed, and the City has released a Request for Proposals for charging services and is looking for a partner to install new chargers in fleet parking lots.



The City continues to create more places to safely walk, roll and bike (Table 6). Since 2019, the City has installed over 270 miles of new bike facilities and improved over 260 miles of existing bike facilities. Since 2022, the City has constructed 1.5 miles of new sidewalks and repaired or replaced over 67 miles of existing sidewalks.

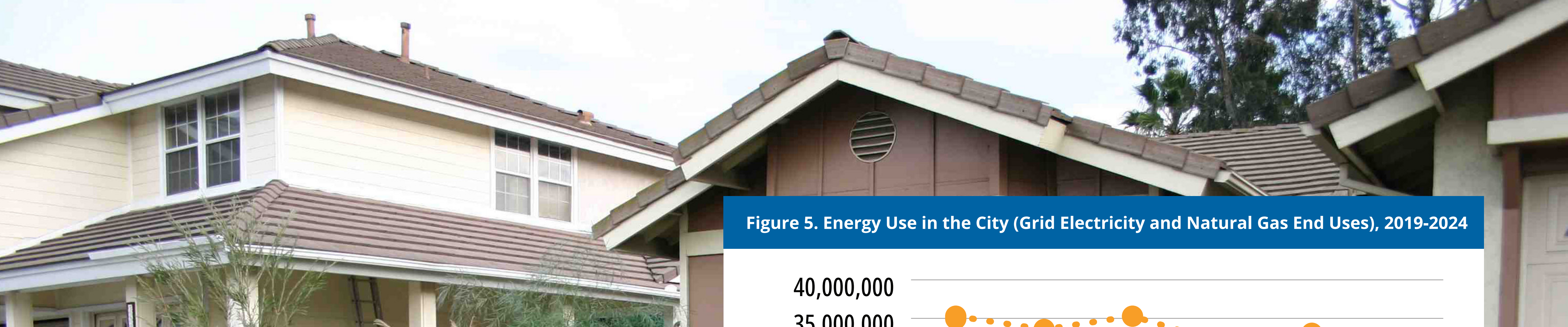
Table 6. Walking, Rolling and Biking Infrastructure Improvements, 2019–2025

Bike Facilities	2025	Total, 2019-25
New Bike Paths (Class I)[1] (miles)	6.1	10.4
New Bike Lanes (Class II)[2] (miles)	10.2	142
New Protected Bikeways (Class IV)[3] (miles)	7.5	121.6
Existing Bicycle Facility Improvements (miles)	21.5	264.7
Sidewalks[4]	**2025**	**Total, 2022-25**
New sidewalk constructed (miles)	0.2	1.5
Sidewalk repaired/replaced (miles)	21.8	67.4

Source: adapted from Tables 12 and 13, Appendix A.

Notes:

1. Class I Bike Paths: paved right-of-way for exclusive use by bicyclists, pedestrians, and those using non-motorized modes of travel. They are physically separated from vehicular traffic and can be constructed in street right-of-way or exclusive right-of-way. Bike paths provide critical connections in the city where streets are absent.
2. Class II Bike Lanes: one-way facilities on either side of a street for exclusive or preferential bicycle travel. Bike lanes are defined by pavement striping and signage.
3. Class IV Protected Bikeway: includes separation between the bikeway and through vehicle traffic. For exclusive use by bicycles.
4. Sidewalk data was not collected prior to 2022.

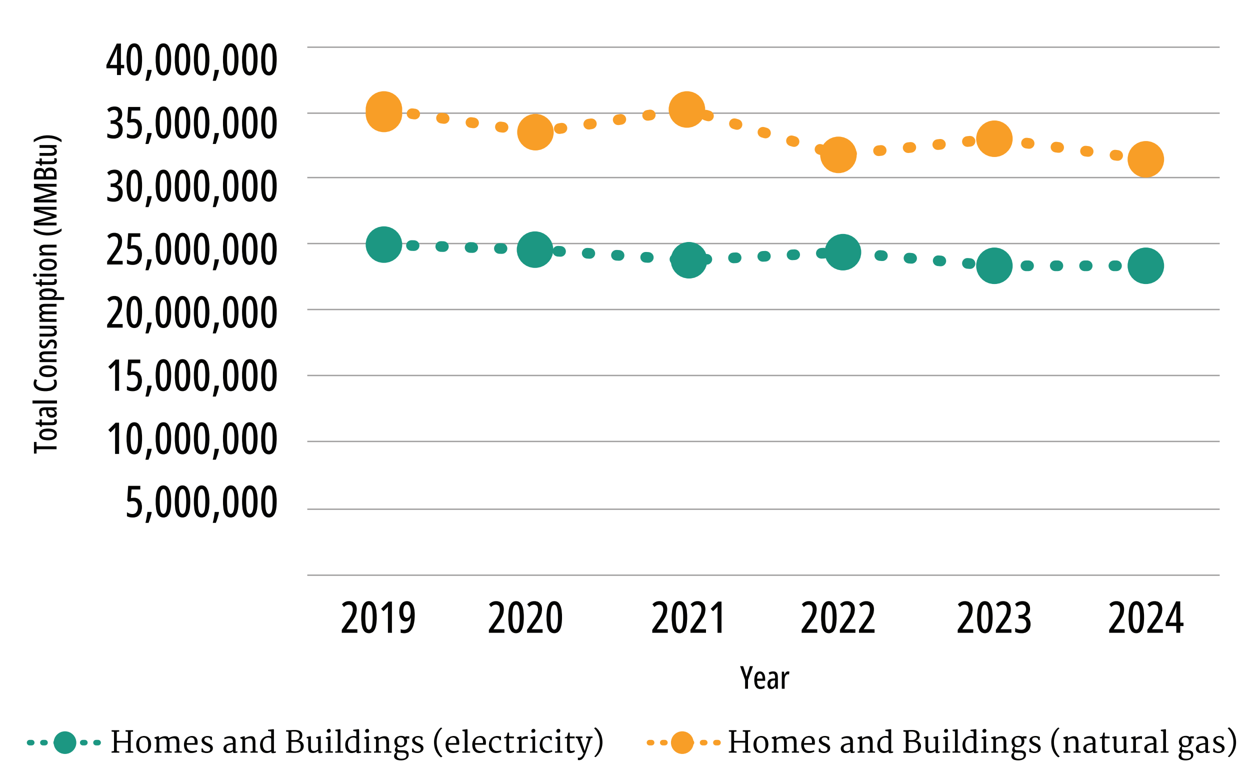


Energy Use in Homes and Other Buildings

How much energy people use and the sources of that energy are the biggest contributors to emissions from homes and other buildings. Natural gas is generally used for space heating, water heating, cooking and other gas appliances like clothes dryers. In 2024, businesses (commercial and industrial accounts) in the city used 62 percent of natural gas, while homes (residential accounts) used 38 percent. Electricity, which is delivered from the power grid and produced with on-site solar, provides power for air conditioning, lighting, refrigeration, appliances, cooking, electric vehicle charging and more. In 2024, businesses used 71 percent of the electricity from the grid and homes used 29 percent.

Natural gas use in the city in 2024 was 11 percent lower than in 2019 and 5 percent lower than the prior year (Figure 5). Use of electricity from the grid was also down 6 percent from 2019 but about the same as the year before.

Figure 5. Energy Use in the City (Grid Electricity and Natural Gas End Uses), 2019-2024



Source: adapted from Table 3, Appendix A.

Notes: Natural gas units (therms) and electricity units (kWh) have been converted to MMBtu to allow comparison on a single axis.

kWh = kilowatt hour

MMBtu = million British thermal units

One reason for the lower use of electricity from the grid is the large increase in people making and using their own electricity with on-site solar power (also referred to as “behind-the-meter” solar because the solar energy is made and used on the customer’s side of the meter and does not pass through the utility’s meter).

Compared to 2019, the amount of electricity from on-site solar in 2025 was significantly larger: homes (residential) used 124 percent more on-site solar energy in 2025, while businesses (commercial, industrial) used 122 percent more (Table 7). Electricity produced by on-site solar in 2025 was also more than the prior year: a 5 percent increase for homes and 13 percent increase for businesses.

Of all the electricity used in the city in 2024, about 16 percent was from on-site solar.[5] That’s up from 8 percent of all electricity in 2019, and 14 percent the prior year.

Table 7. Electricity Generated by On-Site Solar Systems, 2019-2025

Customer Type	Electricity Generation (GWh)							Percent Change	
	2019	2020	2021	2022	2023	2024	2025	2019-25	2024-25
Residential	450	523	610	734	889	956	1,006	124%	5%
Commercial, Industrial	169	190	230	250	280	332	375	122%	13%

Source: adapted from Figure 9, Appendix A.
Notes: GWh = gigawatt-hour

[5] 2024 is the latest year for which data is available for both on-site solar systems and electricity supplied through the power grid.

Additionally, electricity from the power grid was much cleaner in 2024, with emissions 37 percent lower than 2019 and 7 percent lower than the prior year. These lower emissions are mostly because more solar and other clean energy sources are being used to power the electric grid.

Overall, the amount of electricity from emissions-free sources in 2024 was nearly double the 30 percent emissions-free sources in 2019 and is about 3 percent higher than the prior year. On average in 2024, about 56 percent of grid electricity delivered to city customers was from emissions-free sources (Table 8).

Under San Diego Community Power's "PowerOn" plan, which supplied about 69 percent of grid electricity in 2024, 55 percent of the electricity was from emissions-free sources. For "direct access" providers,[6] which supplied about 24 percent of grid electricity in 2024, 59 percent of the electricity was from emissions-free sources. About 4 percent of grid electricity was supplied by SDG&E and 3 percent by Community Power's "Power100" plan. Less than 1 percent was supplied under Community Power's "PowerBase" plan.

When accounting for grid-electricity and on-site solar, about 64 percent of electricity used in the city in 2024 was from emissions-free sources.

Table 8. Electricity Supplied with Emissions-Free Sources, 2019-2024

Electricity Supplier	Percentage from Emissions-Free Sources[1]					
	2019	2020	2021	2022	2023	2024
San Diego Gas & Electric	31	33	47	45	42	41
San Diego Community Power (Power 100)	-	-	100	100	100	100
San Diego Community Power (PowerOn)[2]	-	-	67	67	55	55
San Diego Community Power (PowerBase)	-	-	-	-	-	45
Direct Access	25	29	34	35	43	59
Total, All Suppliers[3]	**30**	**32**	**50**	**57**	**53**	**56**

Source: adapted from Table 6 and Figure 10, Appendix A.

Notes:

1. Emissions-free = renewable sources (biomass and biogas, geothermal, eligible hydroelectric, solar, wind) plus large hydroelectric and nuclear.
2. Large hydroelectric provided about 12% and 13% of electricity under PowerOn in 2021 and 2022; for 2023 and 2024, large hydroelectric decreased to 4% and 2%.
3. Total for all suppliers is based on average percentage from emissions-free sources for each supplier, weighted based on how much electricity each supplier delivered.

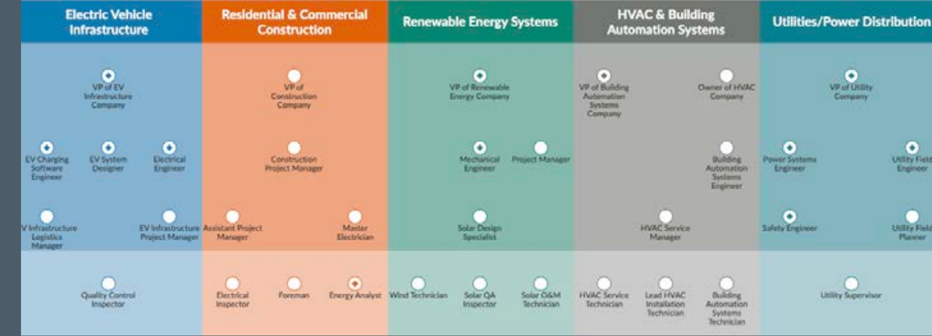
[6] Direct access electricity customers are non-residential (commercial/industrial) users that purchase electricity from non-utility suppliers known as energy service providers. Energy service providers deliver their electricity to customers through the power grid.

Reducing Emissions from City Operations

City operations produce emissions from electricity and natural gas used to power buildings and facilities and fuels like gasoline, diesel and natural gas used in City vehicles.

Energy use in City buildings was 7 percent higher in 2024 than in 2019, though it declined 8 percent compared to 2023. Over the five-year period, electricity consumption rose 22 percent while natural gas use fell 11 percent, resulting in a net increase in energy use. This is due to the opening of new City facilities, more employees working in City facilities and the City's transition to electric equipment and appliances under the Zero Emissions Municipal Buildings and Operations Policy.

Despite rising energy use, emissions from City operations have fallen sharply and are down 70 percent since 2019 and 12 percent since 2023. This progress is primarily due to the City's enrollment in San Diego Community Power's Power100 rate tier, which supplies electricity from zero-emission sources, combined with reduced natural gas consumption.



City Building Electric Energy Upgrades At No Upfront Cost to the City

The City has contracted with Willdan Energy Services to increase energy efficiency and transition from natural gas to electricity use at municipal facilities with no upfront cost. Under the agreement, Willdan will retrofit 40 City-owned buildings, primarily libraries and recreation centers, with efficient HVAC systems, lighting, water heaters, and transformers. Select buildings will also receive new solar panels and batteries for onsite energy generation and storage. Additionally, approximately 39,000 streetlights will be upgraded to energy-efficient LEDs. The cost of these improvements will be repaid through the energy savings they generate, while also reducing GHG emissions from City operations.

Supporting Clean Energy Careers for San Diegans

In spring 2025 the City released the San Diego Clean Energy Career Map (sdcleanenergy.careerpathplatform.com/map/) an easy-to-use, interactive tool intended to help people start or grow their careers in the clean energy industry. It highlights a range of jobs across five main sectors including opportunities for different skill levels. The map also shows how people can move from one job to another, making it easier to identify next steps and plan a long-term career path.

How You Can Save Energy

At home

- ☑ Replace old lightbulbs with LED bulbs.
- ☑ Choose appliances that use less energy (look for the Energy Star label).
- ☑ Install a smart thermostat so your heating or cooling automatically adjusts when you are asleep or away.
- ☑ Do a home energy checkup (you can hire a professional or do it yourself) and fix things like drafty windows and doors, low attic insulation or leaky ducts.
- ☑ When your gas water heater wears out, replace it with a more energy efficient heat pump water heater.
- ☑ When your gas furnace or central air conditioning needs to be replaced, switch to a more efficient heat pump system.

At work

- ☑ Turn off office equipment when you're not using it, or set it to power down automatically. Smart power strips can help by shutting things off when no one is around.
- ☑ Create a company policy to buy only Energy Star-certified equipment, like computers, monitors, and printers.
- ☑ Use efficient lighting and make sure lights are off when spaces are empty. Motion sensors help and may cut lighting costs by up to 40 percent.
- ☑ Install programmable thermostats. In warm months, set them to 74 degrees or higher when the building is in use. After hours, set them to 85 degrees or turn them off.
- ☑ Add shading or window film to reduce heat from the sun and use roof coatings that help block heat.
- ☑ Keep heating and cooling systems well-maintained so they run more efficiently.

Other Emissions Sources and Activities

Other sources and activities produced about 4 percent of citywide emissions in 2024, including sending organic waste to the landfill, producing water for drinking and reuse, making wastewater safe to release or reuse and using construction equipment. Other activities, like planting and caring for trees and protecting natural areas, help lower emissions in the atmosphere by storing them in plants and soil.

Managing Organic Waste (Solid Waste)

Solid waste emissions are produced when organic materials such as food scraps and landscape trimmings are put into the trash and sent to the landfill. When organic materials break down in a landfill, a powerful greenhouse gas called methane is released into the atmosphere.

Since 2024, the City has used green bins to collect organic waste and keep it out of the landfill. Nearly 195,000 tons of organic waste were collected and sent to the Miramar Greenery or similar facilities in 2025, an increase of 2 percent from the prior year (Table 9). This represents about 10 percent of total solid waste generated in the city.

The amount of extra food received by food recovery organizations has increased significantly in recent years.

Table 9. Organic Waste Diverted from Landfill (All Waste Haulers), 2024-2025

Organic Waste Diversion	2024	2025
Organic waste diverted from landfill to Miramar Greenery or other composting facility (tons)	190,795	194,723

Source: City of San Diego Environmental Services Department, 2026.

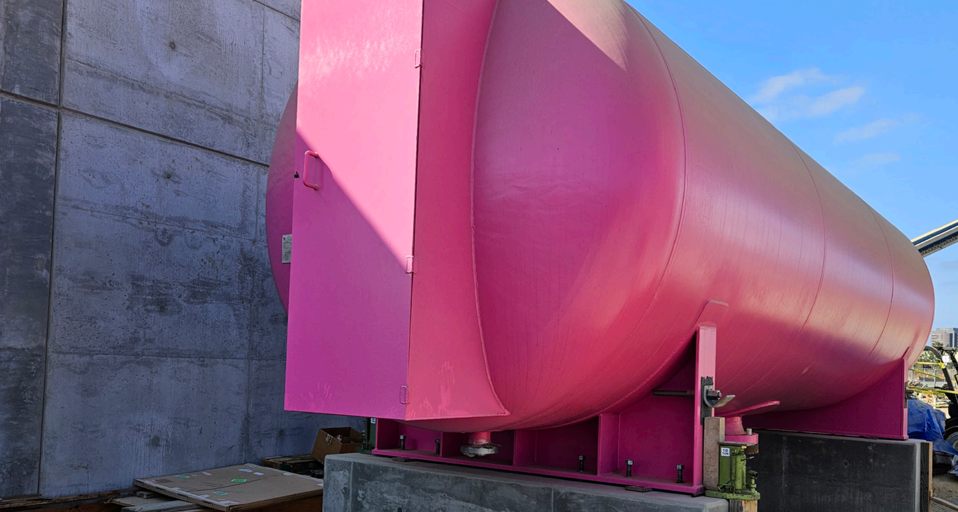
These organizations redistribute extra food to people in need, which reduces the amount of food sent to the landfill. In 2024, over 24 million pounds of food were received by recovery organizations, a 190 percent increase from the over 8 million pounds in 2022, the first year of the program (Table 10). The amount of food recovered in 2024 was also 21 percent higher than the prior year. This means not only lower climate pollution, but also more people fed and less food wasted.

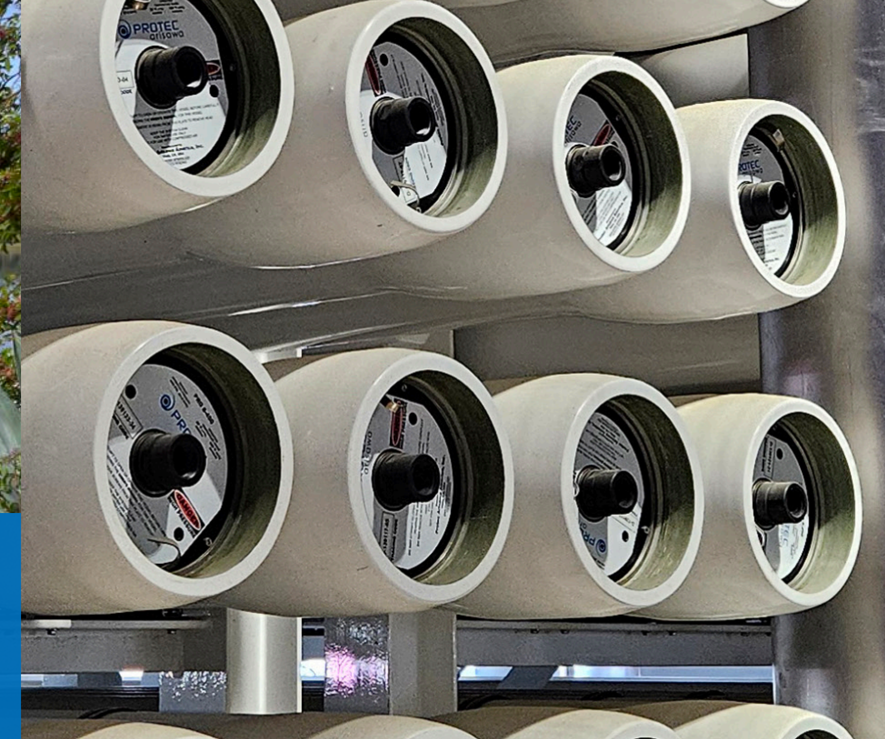
Table 10. Food Collected or Sent to Food Collection Services, 2022-2024

Food Recovery and Collection	2022	2023	2024
Total food received by Recovery Organizations or collected by Recovery Services (million pounds)	8.3	20.2	24.4

Source: Adapted from Table 17, Appendix A.

Notes: Data collection began in 2022.





Providing Drinking and Recycled Water (Water Treatment)

Emissions from drinking water and recycled water mainly come from the energy used to bring the water to the city, clean it and deliver it to homes and businesses. When the energy used in the equipment comes from fossil fuels, emissions are produced.

Different water sources require different amounts of energy. In general, water imported to San Diego from outside the region requires more energy use than water recycling and getting water from local sources. As a result, emissions can go up and down from year to year depending on where the city gets its water from.

Water emissions fluctuate from year to year depending on annual rainfall and other factors, and were 51,000 MT CO_2e in 2024, which is a 16 percent decrease since 2019 and a 11 percent decrease since the previous year.

As shown in Table 11, two-thirds of the City's drinking water is imported from other places. The share of imported water in the total supply has declined, however, falling 10 percent from 2023 to 2024 and 22 percent since 2019. Over that same period, the share of local water has grown substantially: up nearly 50 percent from 2023 to 2024 and more than 130 percent since 2019. Recycled water, which is wastewater treated to a level suitable for irrigation, manufacturing, and other non-drinking purposes, has held steady at approximately 5 percent of the total water supply since 2019.

Table 11. Sources of Water Supply in the City of San Diego, 2019-2024

Water Source	2019	2020	2021	2022	2023	2024
Imported (drinkable)[1]	83%	81%	87%	87%	72%	65%
Local (drinkable)[2]	13%	13%	7%	8%	22%	31%
Recycled (not drinkable)[3]	5%	5%	5%	6%	5%	5%

Source: adapted from Table 15, Appendix B.

Notes:

1. Includes treated and untreated water imported from the San Diego County Water Authority.
2. Includes water from local surface reservoirs and local groundwater basins.
3. Includes non-potable water produced at the City's North City and South Bay Water Reclamation Plants.

Totals may not add up to 100 percent due to rounding.

Making Wastewater Safe to Release or Reuse (Wastewater)

Emissions from wastewater mainly come from organic materials like food waste and human waste, which release powerful greenhouse gases like methane when they are broken down during the treatment process, and from energy used by equipment at treatment plants. When the energy comes from fossil fuels, emissions are produced.

Most wastewater in the city is sent directly to the Point Loma Wastewater Treatment Plant (88%), which uses equipment called digesters to capture the methane gas produced in the treatment process and then uses that gas to make electricity that powers the equipment that runs the plant. Wastewater is also processed at the North City (8%) and South Bay (4%) water reclamation plants, where it is turned into recycled (non-drinking) water. Solids collected at the reclamation plants are transferred to the Point Loma plant for treatment and processed through the digesters. The City captures nearly all of the methane gas (99.9% capture rate) produced during treatment of the city's wastewater and uses it to generate electricity to power the Point Loma plant.

Emissions from wastewater treatment in 2024 were 12,000 MT CO_2e, which is 54 percent lower than 2019 and 8 percent lower than the previous year. The lower emissions are the result of replacing landfill gas with cleaner energy sources to help power operations and equipment.


Using Construction Equipment (Off-Road Transportation)

Operating the equipment and vehicles needed to build homes, other buildings, roads and other infrastructure uses energy. When the energy comes from fossil fuels, emissions are produced. Compared to 2019, construction emissions were about 17 percent lower in 2024 because cleaner and more efficient equipment and vehicles are being used. Construction emissions in 2024 were about the same as the prior year.

Table 12. Tree Planting and Maintenance by the City, 2020-2025						
City Tree Activities	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Number of trees planted	1,863	1,707	1,649	1,586	1,978	5,381
Number of trees pruned	33.254	35,206	61,655	48,754	55,829	27,832
Number of trees removed[1]	1,824	2,151	2,004	2,827	1,169	1,853

Source: adapted from Table 20, Appendix A.

Notes:

1. Tree removal includes dead trees, diseased trees, trees that are immediate safety hazards and, where necessary, trees removed to prevent damage to infrastructure or to allow infrastructure to be repaired.

Planting and Caring for Trees and Protecting Natural Areas

Planting and caring for trees and protecting natural areas like habitat and open space benefits people, wildlife and the environment in many ways. Trees and natural areas are homes for native plants and animals, help clean the air and water, provide shade, cooling and lower energy costs, reduce flooding and erosion, provide places to spend time outdoors and support the economy. Trees and natural areas also reduce climate pollution because healthy plants, wetlands and soils absorb emissions from the atmosphere. Protecting habitats, open space and trees from being damaged or destroyed prevents the carbon stored in the plants and soils from being released back into the air. The portion of the city shaded by trees has increased over the last decade, from about 13 percent in 2014 to about 15 percent in 2024. The Climate Action Plan includes a goal of 28 percent urban tree canopy cover by 2030. From 2020 through 2025, the City planted over 14,000 new trees (Table 12). In 2025 alone, the City planted over 5,000 new trees.

Trees for Communities

The Trees for Communities project has completed its planting phase, which provided about 2,900 trees in vacant areas and installed more than 160 new tree wells in previously paved parkways along City streets within Communities of Concern. The program also includes three years of tree watering, which will conclude by December 2028. The program was created to support the City's goal of expanding the urban tree canopy and improving quality of life.

Ready, Set, Grow San Diego

The tree planting phase of the Ready, Set, Grow San Diego initiative ended on Arbor Day in 2026. Since the initiative began in 2024, more than 5,000 trees have been planted in neighborhoods such as Bay Terraces, City Heights, Linda Vista, Oak Park, Otay Mesa-Nestor, Paradise Hills and Encanto. The initiative also includes a three-year tree watering period to help young trees establish and thrive. The next phase of the program will focus on protecting existing trees and redesigning sidewalks to promote long-term tree health and longevity.

The City continues to expand conserved natural areas to support biodiversity, protect sensitive habitat and animals, and enhance quality of life. As part of the BiodiverseSD program, the City conserves a network of habitat and open space areas that includes core biological resources; this network is call the Multi-Habitat Planning Area. The City has a goal of 52,727 acres conserved by 2047. The City adds land to the Multi-Habitat Planning Area through land acquisitions or by placing long-term protections on land. As of 2024, combining land already conserved with land committed for future conservation, the City has achieved over 99 percent of its overall goal (Table 13). The City also strives to protect natural habitat outside the Multi-Habitat Planning Area and has conserved an additional 2,440 acres that does not count toward the 2047 goal.

Table 13. Progress Toward Land Conservation Goals, 2019–2024

Progress toward the City's land conservation goal within the Multi-Habitat Planning Area, 2019-2024

	Habitat Land Conserved (acres, cumulative[1])					
	2019	**2020**	**2021**	**2022**	**2023**	**2024**
Land conserved in MHPA (existing)[2]	36,002	36,259	36,403	36,544	36,608	37,519
Land obligated for conservation in MHPA (future)[3]	14,932	14,932	14,932	14,932	14,932	14,932
Total, land conserved in MHPA	**50,934**	**51,191**	**51,336**	**51,476**	**51,540**	**52,451**
% of goal (52,727 acres)	96.6%	97.1%	97.4%	97.6%	97.7%	99.5%

Source: adapted from Table 19, Appendix A.

Notes:

1. Cumulative = running total of conserved land in given year plus previous years.
2. Land already protected and managed for conservation purposes.
3. Land required to be conserved by a formal commitment (e.g., permit condition, mitigation requirement, legal instrument).

Building Stronger Communities Through Climate Action

The 2025 Annual Climate Action Plan Report shows that San Diego continues to make steady progress reducing climate pollution and building healthier, more sustainable communities. Overall emissions continue to go down as more homes and businesses use their own solar power, the power grid gets cleaner, more people drive electric vehicles and more charging stations become available. Transit use also continues to recover and the City is continuing to focus new home development in neighborhoods close to transit, jobs, shops and other everyday needs, which results in people spending less of their time driving, more time with family and friends and reduced emissions. Progress in these and other areas, including planting trees, building new facilities for people to safely walk, roll and bike, and redirecting surplus food to our communities, shows how climate action can make everyday life better for San Diegans.

At the same time, this report shows that more progress is needed in some areas to meet climate goals. Looking ahead, the City will begin updating the Climate Action Plan in 2026, with the process expected to conclude in 2028. During development of the updated plan, the City will continue annual reporting on the current Climate Action Plan to track progress, learn what's working, identify areas for improvement and help guide future actions. The updated plan will continue to support State goals for reducing emissions while focusing on actions that also improve daily life for San Diegans, including better health, lower costs, more homes near everyday needs and stronger, more resilient communities.

Appendices

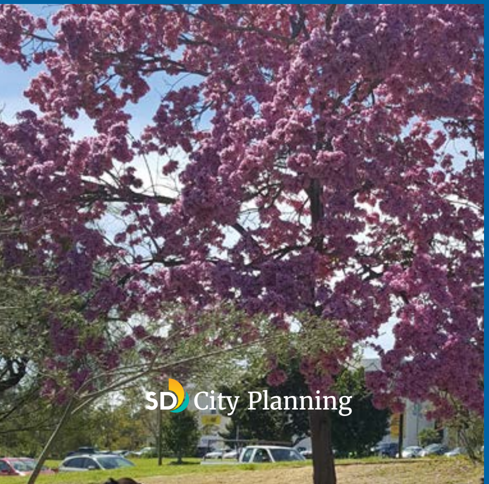
Appendices are provided as separate PDF files. Click a title below to open the file.

Appendix A

Tracking Progress Towards Climate Action Plan Performance Targets

Appendix B

City of San Diego Greenhouse Gas Emissions Inventory Methodology and Updates



APPENDIX A: TRACKING PROGRESS TOWARDS CLIMATE ACTION PLAN PERFORMANCE TARGETS

Supplement to 2025 Annual Climate Action Plan Report

June 2026

Prepared for the City of San Diego

Prepared by the Energy Policy Initiatives Center

About EPIC

The Energy Policy Initiatives Center (EPIC) is a non-profit research center of the University of San Diego School of Law that studies energy policy issues affecting California and the San Diego region. EPIC's mission is to increase awareness and understanding of energy- and climate-related policy issues by conducting research and analysis to inform decision makers and educate law students.

For more information, please visit the EPIC website at **www.sandiego.edu/epic**.

Disclaimer

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INTRODUCTION

The City of San Diego (City) adopted an updated Climate Action Plan (CAP) in 2022 with new targets, strategies, measures, and actions.[1] The CAP identifies performance targets for emissions reduction measures. This report tracks progress toward the performance targets outlined in the 2022 Climate Action Plan. The performance data provided in this report is also available on the City of San Diego's CAP Dashboard**.** In this document, the government agency of City of San Diego will be referred to as 'the City', and the physical boundaries and activities that occur within them will be referred to as 'the city'.

This report is organized around the six strategies of the 2022 CAP: (1) decarbonization of the built environment; (2) access to clean and renewable energy; (3) mobility and land use; (4) circular economy and clean communities; (5) resilient infrastructure and healthy ecosystems; and (6) emerging climate action. For each strategy, the report provides: (1) emissions data and trends for 2019–2024 and (2) best available data to monitor progress toward the performance targets for each strategy. Refer to Appendix B for more information on the updated emissions data for 2019-2024, including inputs, assumptions and methods. In cases where progress can be tracked for specific actions directly, for example, tracking the number of trees planted by City departments and direct contractors, 2025 data is provided.

PROGRESS MONITORING TOWARDS CAP TARGETS

A.1 Strategy 1: Decarbonization of the Built Environment

A1.1 Activity and Emissions Trends Related to Building Energy Use within the City of San Diego:

Building energy-related emissions (fossil-fuel-based electricity and natural gas consumption) accounted for 39% of total citywide emissions in 2024. The sector had a 25% reduction from the 2019 baseline (37% reduction in emissions from electricity and 11% reduction from natural gas) and a 6% reduction from 2023. Electricity consumption and emissions from the commercial and industrial sectors are combined because some larger commercial electricity users' customer class designation may switch between commercial and industrial customer class based on their electric demand in a year. Combining commercial and industrial use shows a full picture of non-residential electric use without viewing misleading data noise due to customer class definitions.

Electricity Consumption & Emissions:

The 2019 - 2024 grid-supplied electricity is provided in Table 1. For electricity users with on-site electric generation (e.g., rooftop solar panels), only the net electricity from the grid has been included.

[1] City of San Diego: 2022 Climate Action Plan.

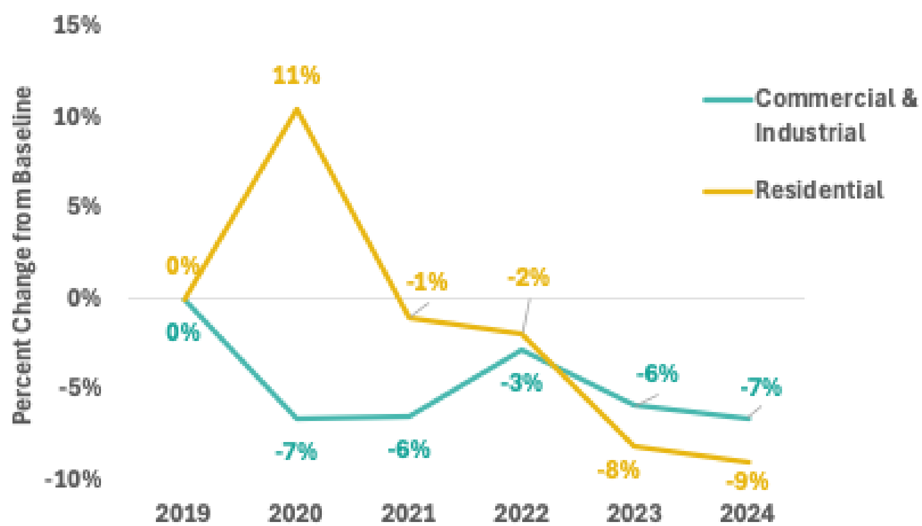
Table 1: Citywide Grid-Supplied Electricity Consumption and Emissions (2019 – 2024)

Year	Total Electricity Consumption Citywide (Including Water Sector) (MWh)	Emissions from Electricity Sector (Excluding Water Sector)[1] (MT CO_2e)
2019	7,312,722	2,336,000
2020	7,198,617	2,286,000
2021	6,957,213	1,714,000
2022	7,136,261	1,558,000
2023	6,903,306	1,594,000
2024	6,849,219	1,475,000
% Change 2023-2024	-1%	-7%
% Change 2019-2024	-6%	-37%

MWh = megawatt hour, MT CO_2e = metric tons of carbon dioxide equivalent
The MWhs do not include transmission and distribution losses, or self-serve behind-the-meter electricity generation (i.e., rooftop PV systems). The electricity consumption data does not include the electricity sales to San Diego County Regional Airport Authority, San Diego Unified Port District or military, but does include electricity consumption from water use.
The emissions calculation includes the electricity transmission and distribution losses and excludes emissions attributed to water consumption.
GHG emissions are rounded to the nearest thousand. The emissions from electricity were calculated based on the city's grid supply and power mix specifically, which may differ from other jurisdictions in San Diego region.
1. Emissions from energy used in the water sector is provided in Appendix B,
SDG&E 2026, Energy Policy Initiatives Center, University of San Diego 2026

The percent change of grid-supplied electricity consumption by sector compared to a 2019 baseline is shown in Figure 1.

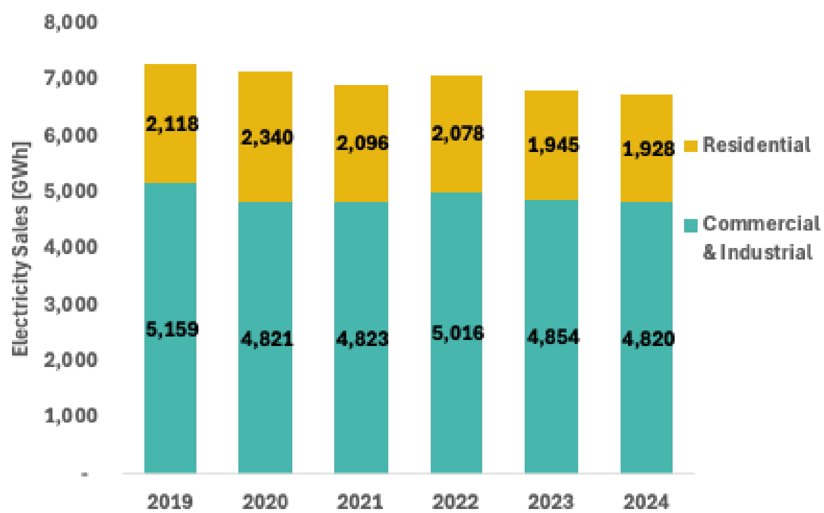
Figure 1: Percent Change in Grid-supplied Electricity Consumption by Sector from 2019 Baseline



SDG&E 2026, SDCP 2026

Total grid-supplied electricity consumption by customer class in 2019–2024 are shown in Figure 2.

Figure 2: Citywide Grid-supplied Electricity Consumption by Customer Class (2019 – 2024)



SDG&E's electricity sales within the city. Sales do not include transmission and distribution losses, and exclude sales to San Diego County Regional Airport Authority, San Diego Unified Port Authority and District Tenants, and the military.
Percentages may not sum up to totals due to rounding.
SDG&E 2026

Natural Gas Consumption & Emissions:

Table 2 provides natural gas consumption and emissions from 2019–2024. Citywide natural gas consumption in 2024 was 11% lower than the 2019 baseline and 5% lower than 2023. Natural gas consumption can fluctuate annually due to temperatures as natural gas is commonly used in the winter for space heating.

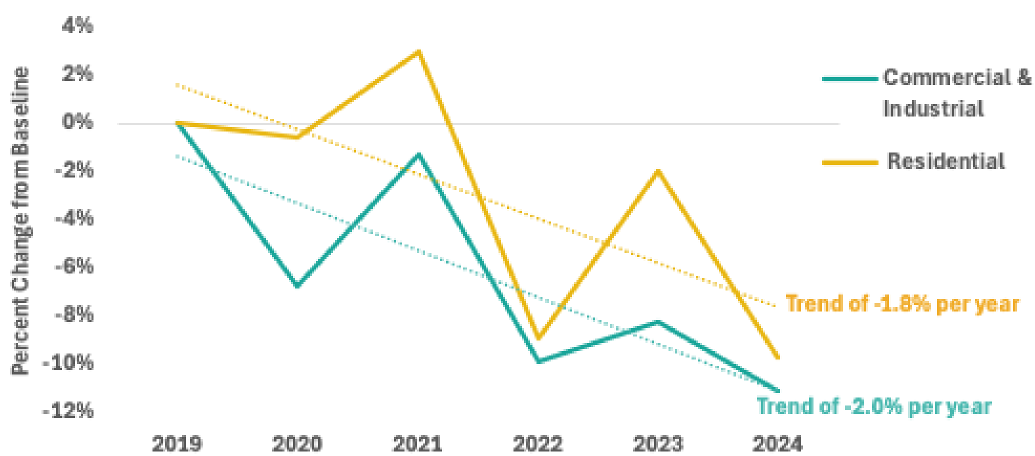
Table 2: Citywide Natural Gas Consumption and Emissions (2019 – 2024)

Year	Natural Gas Use (million Therms)	Emissions from Natural Gas (MT CO_2e)
2019	351	1,912,000
2020	335	1,827,000
2021	352	1,918,000
2022	317	1,730,000
2023	330	1,800,000
2024	314	1,710,000
% Change 2023 - 2024	-5%	-5%
% Change 2019 - 2024	-11%	-11%

Year	Natural Gas Use (million Therms)	Emissions from Natural Gas (MT CO_2e)
The natural gas consumption refers to retail sales by SDG&E. Sales data does not include the sales to San Diego County Regional Airport Authority, San Diego Unified Port Authority and District Tenants, and military. GHG emissions are rounded to the nearest thousand. SDG&E 2026, Energy Policy Initiatives Center, University of San Diego 2026		

Natural gas consumption changes compared to a 2019 baseline are shown in Figure 3. While natural gas use fluctuates from year to year typically due to weather fluctuations, both residential as well as commercial and industrial sectors have decreased on average 1.8 to 2% per year.

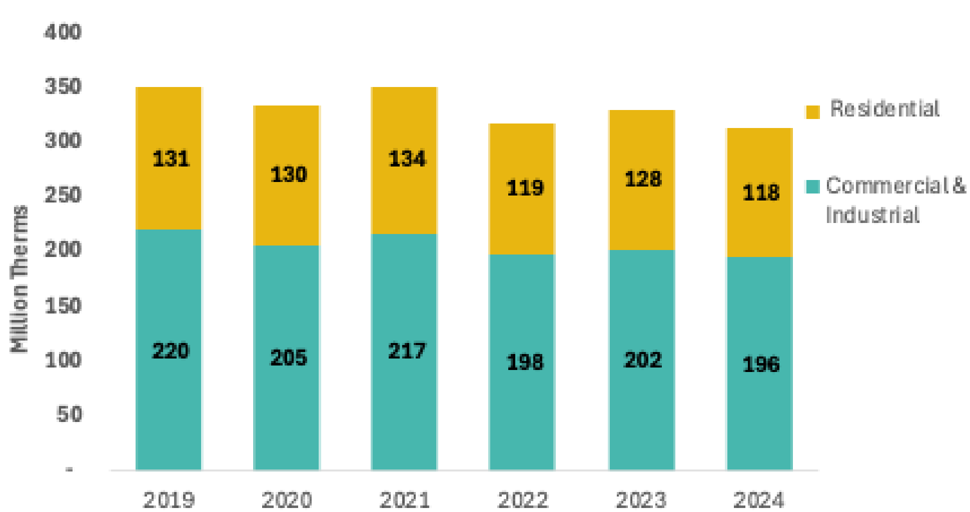
Figure 3: Percent Change in Natural Gas Consumption from 2019 Baseline



SDG&E 2026

A comparison of the natural gas use by customer class in 2019–2024 is shown in Figure 4.

Figure 4: Citywide Natural Gas Consumption by Customer Class (2019 – 2024)



SDG&E 2026

A1.2 CAP Performance Target Progress: Decarbonize New & Existing Buildings

Measure 1.1: Decarbonize Existing Buildings and Measure 1.2: Decarbonize New Building Development

- *2030 Targets:*
  - *Phase out 45% of natural gas usage from existing buildings (Measure 1.1)*
  - *All-electric reach code starting 2023 at new residential and commercial development (Measure 1.2)*

- *2035 Targets:*
  - *Phase out 90% of natural gas usage from existing buildings (Measure 1.1)*
  - *Ongoing implementation of all-electric new residential and commercial development (Measure 1.2)*

Table 3 provides the total citywide energy consumption, or the total grid electricity and natural gas consumption combined using million British Thermal Units (MMBtu), and emissions from 2019–2024. MMBtu is a common unit of energy used to enable comparison of the energy content of different fuel types. In this case, electricity in kilowatt-hours (kWh) and natural gas in therms are converted to the same MMBtu unit. Total 2024 citywide energy consumption was 9% lower than 2019 levels and 3% lower than 2023 levels. Emissions associated with energy use have decreased 25% since 2019.

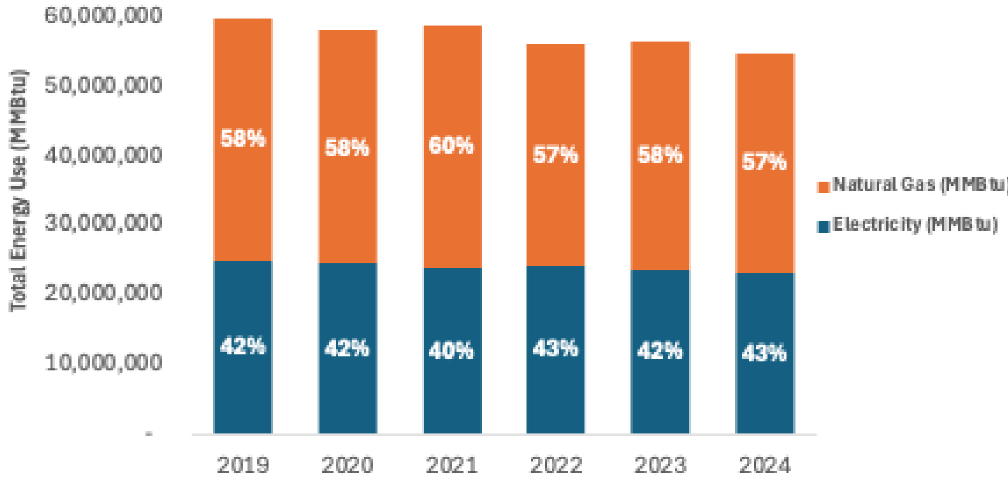
Table 3: Citywide Energy Consumption and Emissions (2019 – 2024)

Year	Electricity[1] (MMBtu)	Natural Gas (MMBtu)	Total Energy (MMBtu)	Emissions from Energy Use (MMT CO_2e)
2019	24,951,000	35,057,000	60,008,000	4.2
2020	24,562,000	33,483,000	58,045,000	4.1
2021	23,738,000	35,159,000	58,897,000	3.6
2022	24,349,000	31,716,000	56,065,000	3.3
2023	23,554,000	32,989,000	56,543,000	3.4
2024	23,370,000	31,344,000	54,714,000	3.2
% Change 2023-2024	-1%	-5%	-3%	-6%
% Change 2019-2024	-6%	-11%	-9%	-25%

MMBtu = million British Thermal Units
Conversion factors are 293 kWh/MMBtu and 10 therms/MMBtu.
MMT CO_2e = million metric tons carbon dioxide equivalent
[1] Citywide electricity consumption includes that consumed by the water sector
SDG&E 2026, Energy Policy Initiatives Center, University of San Diego 2026

A comparison of the total energy use, including grid-supplied electricity and natural gas, for 2019–2024 is shown in Figure 5.

Figure 5: Citywide Grid-supplied Electricity and Natural Gas Consumption (2019 – 2024)



SDG&E 2026, Energy Policy Initiatives Center, University of San Diego 2026

A1.3 CAP Performance Target Progress: Decarbonize City Facilities

Measure 1.3: Decarbonize City Facilities

- *2030 Target: Phase out 50% of natural gas usage in municipal facilities*
- *2035 Target: Phase out 100% natural gas usage in municipal facilities*

Total energy use for municipal operations in 2024 was 7% higher than the 2019 baseline and 8% lower than in 2023.

Table 4 shows both electricity and natural gas use by municipal operations. This data includes energy use for facilities other than buildings (streetlights, traffic lights, etc.) but does not include natural gas use for City vehicles. Emissions from municipal buildings, however, decreased 70% from 2019 levels as municipal facilities started receiving power from SDCP’s Power 100 rate tier in March 2021.

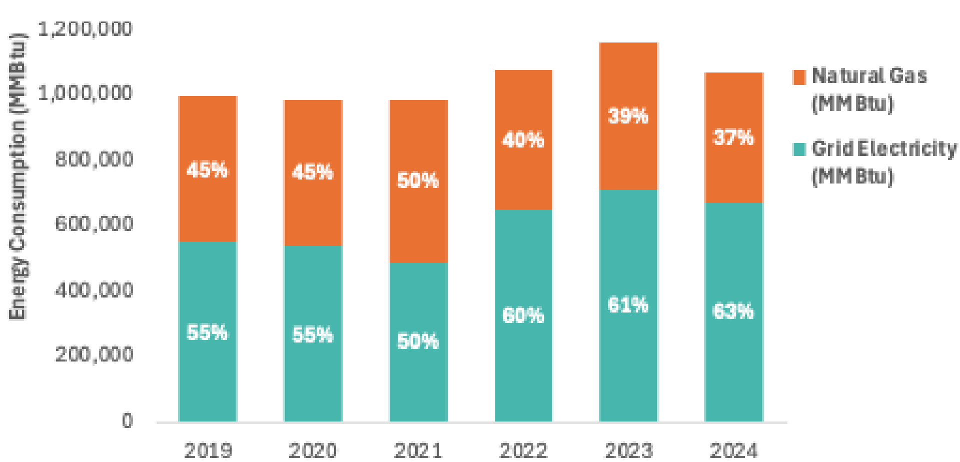
Table 4: Energy Use in Municipal Buildings (2019 – 2024)

Energy Use	2019	2020	2021	2022	2023	2024	% Change 2023-2024	% Change 2019-2024
Grid Electricity (MWh)	161,397	158,212	143,755	191,155	208,464	197,638	-5%	22%
Grid Electricity (MMBtu)	550,285	539,425	490,134	651,744	710,759	673,849	-5%	22%
Emissions from Grid Electricity (MT CO_2e)[1]	46,300	45,400	10,300	0	0	0	0%	-100%
Natural Gas (million therms)	4.47	4.47	4.94	4.27	4.51	3.97	-12%	-11%
Natural Gas (MMBtu)	446,927	446,927	493,868	427,263	451,281	396,680	-12%	-11%
Emissions from Natural Gas Use (MT CO_2e)	23,700	23,700	26,200	22,700	24,000	21,100	-12%	-11%
Total Energy Use (MMBtu)	997,212	986,352	984,002	1,079,007	1,162,039	1,070,529	-8%	7%
Total Emissions from Energy Use (MT CO_2e)	70,000	69,100	36,500	22,700	24,000	21,100	-12%	-70%

[1] City of San Diego facilities transitioned to SDCP Power 100 in March of 2021
Natural gas emissions listed in this table do not include natural gas use for vehicles. Municipal natural gas for vehicle use is shown in Figure 12. Natural gas emissions from vehicles are included in the Natural Gas sector of the citywide inventory as data is not available at the citywide level to disaggregate between building and vehicle use.
City of San Diego General Services Department, City of San Diego Public Utilities Department, Energy Policy Initiatives Center 2026

The total energy consumption for municipal operations from 2019 to 2024 is provided in Figure 6.

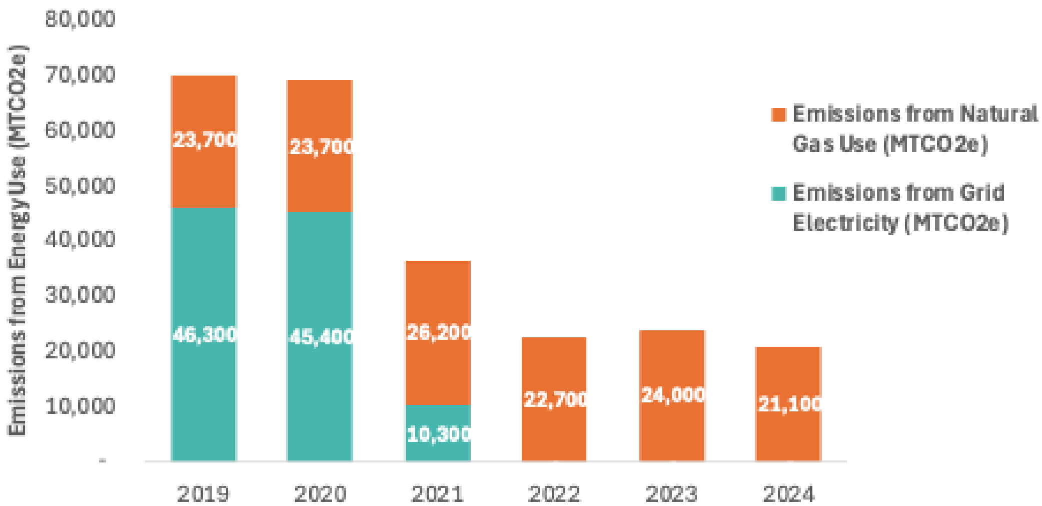
Figure 6: Municipal Grid-supplied Electricity and Natural Gas Consumption (2019–2024)



SDG&E grid purchases only. Does not include on-site electricity generation.
Does not include natural gas purchases for CNG vehicles.
City of San Diego General Services Department, City of San Diego Public Utilities Department 2026

The total emissions from energy consumption for municipal operations from 2019 to 2024 is provided in Figure 7.

Figure 7: Emissions from Municipal Grid-supplied Electricity and Natural Gas Consumption (2019–2024)



SDG&E grid purchases only. Does not include on-site electricity generation.
Does not include natural gas purchases for CNG vehicles.
City of San Diego transitioned to using SDCP's Power 100 in March of 2021
City of San Diego General Services Department, City of San Diego Public Utilities Department 2026

A.2 Strategy 2: Access to Clean and Renewable Energy

A2.1 Activity and Emissions Trends Related to Renewable Energy Access within the City of San Diego

Emissions from the consumption of grid-supplied electricity accounted for 18% of total citywide emissions in 2024. Grid-supplied electricity consumption has trended downward since 2019, with a 6% reduction from the 2019 baseline as shown previously in Table 1. Emissions from the consumption of electricity have reduced even further, with a 37% reduction from the 2019 baseline. This outsized decrease in emissions compared to the decrease in electricity consumption is due to an increase in the supply of electricity from renewables as well as carbon-free sources.

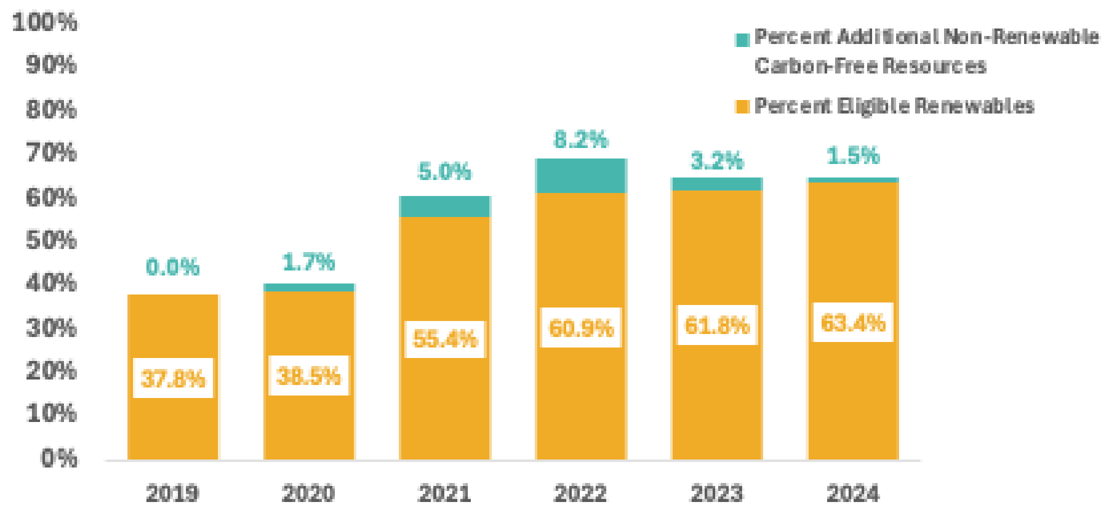
Carbon-free energy refers to any power source that emits no carbon dioxide during generation, while renewable energy refers to sources that naturally replenish themselves. As defined by the California Public Utilities Commission (CPUC) under the Renewable Portfolio Standard (RPS), solar, wind, geothermal, biomass, and small hydroelectric energy are considered eligible renewables.[2] Carbon-free energy includes all renewable sources as well as large hydroelectric and nuclear energy. California's Senate Bill 100 (Leon, 2018) mandates that 100% of retail electricity sales come from renewable or

[2] California Public Utilities Commission (CPUC). RPS Program.

carbon-free sources by 2045, with an interim target of 60% renewable by 2030.[3] This requirement applies to Direct Access energy suppliers, SDG&E and SDCP.

Figure 8 shows the percent renewables and carbon-free resources supplying customers in San Diego. The carbon-free resources other than renewables are mainly large hydroelectric in these years, and nuclear energy in certain years but not every year. Table 5 further shows the percent of renewables in the electricity supply for each load-serving entity.

Figure 8: Citywide Percent Renewables and Carbon-Free Electricity (Including Behind-the-Meter PV) (2019 – 2024)



California Energy Commission 2026, Energy Policy Initiatives Center, University of San Diego 2026

A2.2 CAP Performance Target Progress: Increase Access to Grid Renewables

Measure 2.1: Citywide Renewable Energy Generation

- *2030 Target: 100% renewable or GHG-free power for all SDCP customers within the City of San Diego*
- *2035 Target: 100% renewable or GHG-free power for all SDCP customers within the City of San Diego*

Percent of renewables in grid-provided electricity through SDG&E, SDCP, and Direct Access providers from 2019 – 2024 is outlined in Table 5. San Diego Gas & Electric (SDG&E)'s renewable electricity supply increased from 31% in 2019 to 41% in 2024. In March 2021, San Diego Community Power (SDCP) started serving customers within the San Diego region, including those within the City of San Diego. By the end of 2021, eligible commercial and industrial customers from SDG&E's bundled service (i.e. SDG&E's default service) were enrolled in SDCP automatically with the option to opt-out (return to SDG&E) or opt-up to an SDCP product with 100% renewable electricity (SDCP Power 100). In early 2022, eligible SDG&E bundled residential customers were then enrolled in SDCP automatically with the same option to opt-out or opt-up. Additionally, in 2024, SDCP added another rate option, Power Base, that customers can opt-in to. City-specific percent renewables in grid-supplied electricity is calculated

[3] Senate Bill 100 (Leon, 2018).

by taking a weighted average of SDG&E bundled, SDCP Power On, Power Base, and Power 100 electricity consumption from San Diego customers and the power supply's associated percent renewable content.

Table 5: Percentage of Renewables in Grid-supplied Electricity (2019 – 2024)

Year	SDG&E Bundled	SDCP Power Base	SDCP Power On	SDCP Power 100	Direct Access[3]	City-Specific Percent Renewables in Grid-Supplied Electricity[4]
2019	31%	n/a	n/a	n/a	16%	28%
2020[1]	31%	n/a	n/a	n/a	20%	29%
2021[2]	45%	n/a	55%	100%	23%	43%
2022	45%	n/a	54%	100%	30%	49%
2023	41%	n/a	51%	100%	39%	49%
2024	41%	45%	53%	100%	56%	54%

The percent renewable is for grid-supplied electricity; it does not account for behind-the-meter renewable supply.
[1]The California Energy Commission has updated the method to report renewable content in the Power Source Disclosure Program. The percentage starting 2022 does not reflect the supplier's Renewables Portfolio Standard compliance and does not include unbundled renewable energy credits.
[2] San Diego Community Power started serving customers within the San Diego region, including those within the City of San Diego, in March 2021.
[3] Data to estimate the percent renewable content for Direct Access electricity is not available before 2021. The data here is linearly estimated from the estimated emissions factor of the energy supply.
[4]City-Specific percent renewables in grid-supplied energy does not include behind-the-meter PV.
California Energy Commission 2026

Table 6 shows the percentage of both renewable and carbon-free electricity (total carbon-free) supplied to the city from grid supplier. As with the city-specific renewables metric, city-specific percent carbon-free in grid-supplied electricity is calculated by taking a weighted average of SDG&E bundled, SDCP Power On, Power Base, and Power 100 electricity consumption from San Diego customers and the power supply's associated percent total carbon-free content.

Table 6: Percentage of Renewable and Carbon-Free in Grid-supplied Electricity (2019 – 2024)

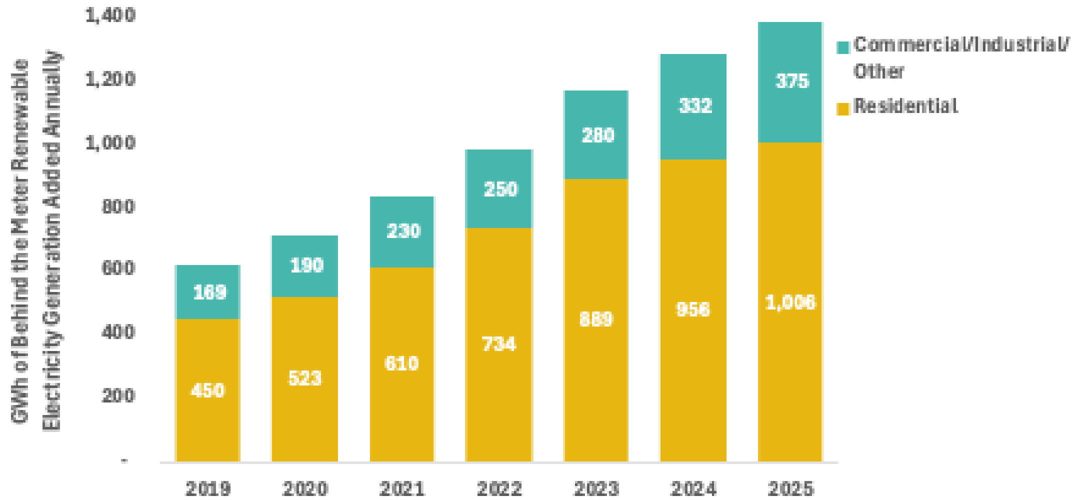
Year	SDG&E Bundled	SDCP Power Base	SDCP Power On	SDCP Power 100	Direct Access[3]	City-Specific Percent Carbon-Free in Grid-Supplied Electricity[4]
2019	31%	n/a	n/a	n/a	25%	30%
2020[1]	33%	n/a	n/a	n/a	29%	32%
2021[2]	47%	n/a	67%	100%	34%	50%
2022	45%	n/a	67%	100%	35%	57%
2023	42%	n/a	55%	100%	43%	53%
2024	41%	45%	55%	100%	59%	56%

The percent carbon-free is for grid-supplied electricity; it does not account for behind-the-meter renewable supply.
[1]The California Energy Commission has updated the method to report renewable content in the Power Source Disclosure Program. The percentage starting 2022 does not reflect the supplier's Renewables Portfolio Standard compliance and does not include unbundled renewable energy credits.
[2] San Diego Community Power started serving customers within the San Diego region, including those within the City of San Diego, in March 2021.
[3] Data to estimate the percent renewable content for Direct Access electricity is not available before 2021. The data here is linearly estimated from the estimated emissions factor of the energy supply.
[4]City-Specific percent carbon-free in grid-supplied energy does not include behind-the-meter PV.
California Energy Commission 2026

Behind-the-meter solar photovoltaic (PV) generation reduces demand on the grid, thereby decreasing the total electricity supply that utilities must source renewable and carbon-free generation for. The California Energy Commission Distributed Energy Generation database[4] has 2025 data available, so it is provided here. In 2025, solar projects for residential customers accounted for 54% of new solar generation[5] and 97% of projects. The cumulative capacity of PV systems interconnected to the grid installed as of the end of 2025 was 789 MW in the city. Figure 9 shows the estimated new solar generation added each year from 2019 to 2025.

[4] California Solar Initiative, California Distributed Generation Statistics. Accessed February 2026.
[5] Distributed Generation Statistics are provided in project capacity, not system generation. Annual generation is estimated by applying a 20% capacity factor to all projects, reflecting average solar resource availability and system performance. A 20% capacity factor is consistent with typical values used in Southern California, though actual values would be dependent on panel orientation, shading, weather variability, and system losses.

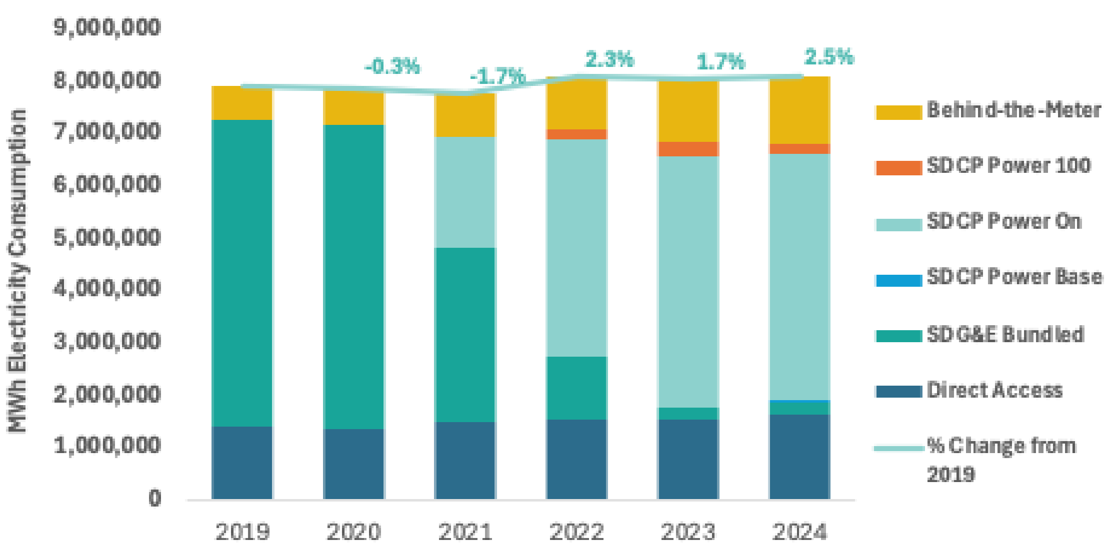
Figure 9: Citywide Estimated Solar Generation from Behind-the-Meter PV (2019–2025)



California Solar Initiative, [California Distributed Generation Statistics] database, Accessed February 2026
CPUC created the first NEM policy in 1996, NEM 2.0 went into effect in July of 2017, and NEM 3.0 in April of 2023.
SDG&E Interconnected Project Sites Database
Energy Policy Initiatives Center University of San Diego, 2026

Citywide electricity consumption by supplier is shown in Figure 10, including grid-supplied electricity from SDCP and SDG&E bundled, consumption from DA customers, and estimated behind-the-meter PV generation.

Figure 10: Citywide Electricity Consumption by Electricity Provider (2019 – 2024)



California Solar Initiative, [California Distributed Generation Statistics] database, Accessed February 2026
SDG&E Interconnected Project Sites Database
Note: The 2024 Annual Report did not include Direct Access energy, and only showed Residential energy consumption
Energy Policy Initiatives Center, University of San Diego, 2026

The City also has numerous facilities with on-site City-owned or privatized renewable generation, including: (1) combined heat and power generation using landfill gas or digester gas at Metropolitan Biosolids Center (MBC) and Point Loma Wastewater Treatment Plant (PLWTP); (2) hydroelectric generation at Point Loma Wastewater Treatment Plant ocean outfall; and (3) PV systems at office buildings' roofs or parking lots, water treatment facilities, libraries, recreation centers and fire stations.

Total on-site renewable generation at municipal facilities for 2021– 2024 is shown in Table 7. On-site renewable generation data from municipal sites was not collected until after the adoption of the 2022 CAP which is why data only goes back to calendar year 2021. The reduction in solar generation beginning in 2023 is due to solar inverters at the Otay Water Treatment Plant going offline.

Table 7: On-Site Renewables Generation at Municipal Facilities (2021 – 2024)

Municipal On-Site Generation	Estimated Annual Output 2021 (kWh)	Estimated Annual Output 2022 (kWh)	Estimated Annual Output 2023 (kWh)	Estimated Annual Output 2024 (kWh)
Solar	10,490,020	10,665,902	8,481,782	9,056,639
Hydroelectric	Not estimated	Not estimated	Not estimated	Not estimated
Co-gen with Biogas (PLWTP)	28,156,816	23,200,496	30,466,769	34,446,816
Power Plant with Landfill Gas (NCWRP)	25,107,338	6,084,753	0	0
Co-gen with Landfill Gas (MBC)	43,463,260	43,462,998	19,511,378	18,678,314

In previous Annual Reports, solar data from smaller City facilities was omitted due to a lack of monitoring data. The City has since installed monitoring systems to better understand energy generation at the smaller facilities. Historical data are updated in this report to reflect this new monitoring data.
City of San Diego General Services Department, City of San Diego Public Utilities Department 2026

The City's landfill gas power plant at North City Water Reclamation Plant (NCWRP) was put offline in 2023 as the facility transitions to the Pure Water facility. The NCWRP also has a privately-owned co-generation plant that runs on landfill gas, which provides power for operations of the NCWRP. Up until April 2023, the co-generation plant also delivered electricity to the grid under a power purchase agreement with SDG&E. The lower annual output (kWh) from the co-generation plant shown in Table 6 reflects the reduction in output resulting from the expiration of the power purchase agreement in April 2023.

A2.3 CAP Performance Target Progress: Increase Municipal Zero Emission Vehicles

Measure 2.2: Increase Municipal Zero Emission Vehicles

- *2030 Target: Percent of all municipal fleet vehicles to be ZEVs: Cars 75%, LDV 50%, MDV 50%, HDV 50%*
- *2035 Target: Percent of all municipal fleet vehicles to be ZEVs: Cars and LDV 100%, MDV 75%, HDV 75%*

As of 2025, 15% of the City's on-road vehicle fleet of 5,037 vehicles were zero emission vehicles (ZEVs) or near-zero emission vehicles (NZEVs), including 196 battery electric vehicles (BEVs, a ZEV) and 100 plug-in hybrid electric vehicles (PHEVs, a NZEV). Table 8 shows the percentage of ZEVs and NZEVs in the municipal fleet from 2020 – 2025. The municipal fleet includes on-road vehicles as well as offroad equipment, such as tractors, forklifts, or mowers. Additionally, some plug-in hybrid classifications have changed in previous years to include after-market accessory hybrids, such as trucks with person-buckets powered by a plug-in battery.

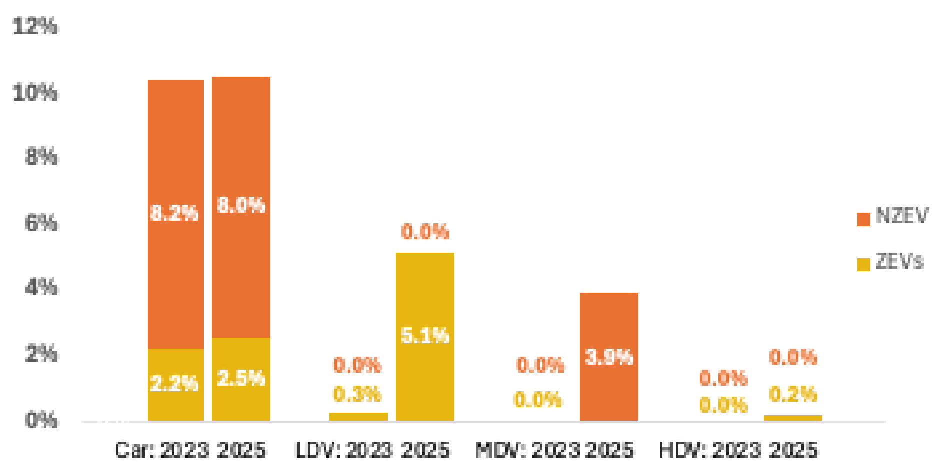
Table 8: Percent of ZEV and NZEVs in Municipal Vehicle and Offroad Equipment Fleet (2020 – 2025)

Year	2020	2021	2022	2023	2024	2025
Percent of ZEVs in Municipal Fleet	2.6%	2.5%	2.7%	2.8%	4.3%	4.6%
Percent of NZEVs in Municipal Fleet	5.5%	7.1%	9.1%	9.0%	10.8%	10.1%

Data provided in previous Annual Reports accounted for ZEVs in the municipal vehicle fleet. The data reflected here includes ZEVs and NZEVs in both the municipal vehicle fleet as well as the municipal offroad equipment fleet. Data incorporating both fleets is only available for years 2020 and beyond.
City of San Diego General Services Department 2026

The breakdown of municipal fleet by vehicle type (Cars, Light-Duty, Medium-Duty, and Heavy-Duty Vehicles) is available from point-in-time counts done in December of 2023 and December of 2025. Figure 11 shows how the municipal fleet vehicle breakdown has changed between 2023 and 2025. Numbers may be slightly different from those in Table 8 as Figure 11 does not include offroad vehicles. These are the only years with data available at the vehicle type level.

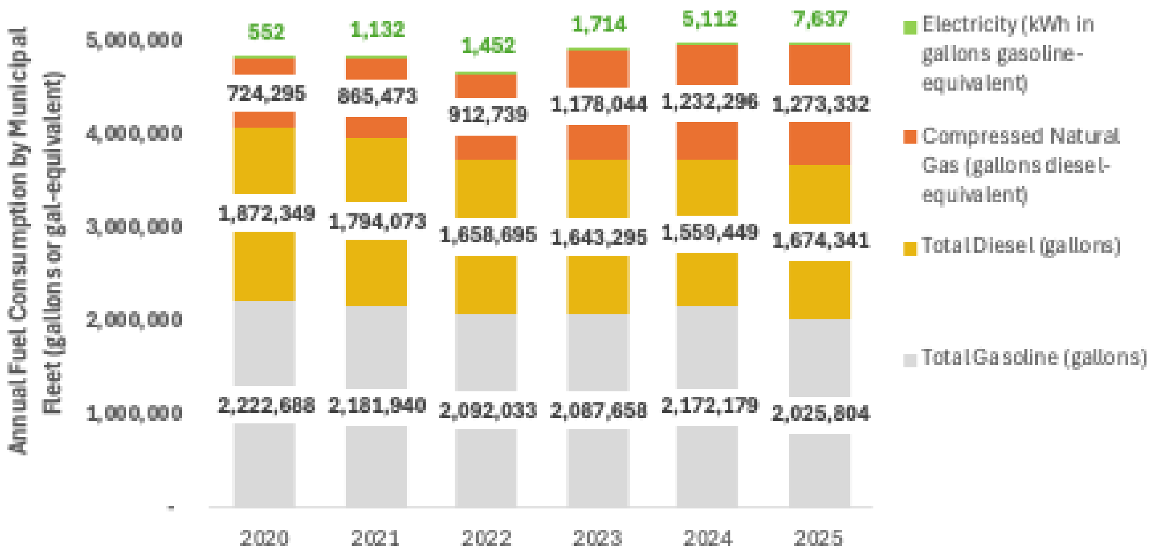
Figure 11: Percent of ZEV and NZEV in Municipal Fleet Vehicles by Vehicle Type (2023, 2025)



City of San Diego General Services Department 2026

Figure 12 provides fuel consumption by the municipal fleet from 2020 to 2025 to indicate how municipal fleet vehicle changes impacts the fuel consumption.

Figure 12: Fuel Consumption by Municipal Fleet by Fuel Type (2020 - 2025)



City of San Diego General Services Department 2026, City of San Diego Environmental Services Department 2026, Energy Policy Initiatives Center, University of San Diego 2026

A2.4 CAP Performance Target Progress: Increase Citywide Zero Emission Vehicles

Measure 2.3: Increase Electric Vehicle Adoption

- *2030 Target: 16% e-VMT out of all Light-duty VMT*
- *2035 Target: 25% e-VMT out of all Light-duty VMT*

Table 9 estimates the number of registered zero emission and near-zero emission vehicles in the city. The estimates are based on vehicle registration data in zip codes within the city. Where a zip code is partially located within the city, the number of vehicle registrations for that zip code within the city is assumed to be proportional to the number of housing units within that zip code within the city. For example, if 50 percent of a zip code's housing units are located in the city, then 50 percent of vehicle registrations are also assumed to be within the city.

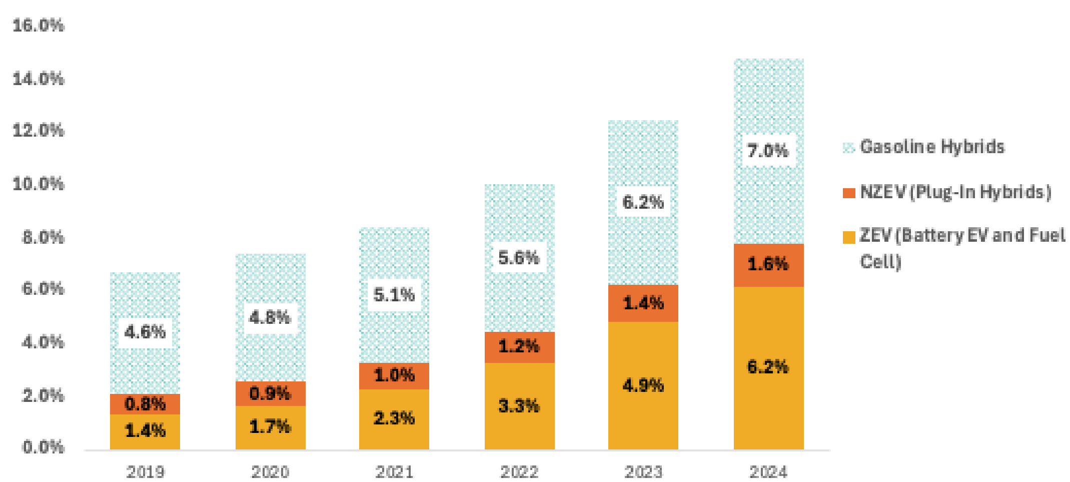
Table 9: Citywide Number of Registered Electric Vehicles (2019 – 2024)

Number of Vehicles	Number of ZEVs (Battery Electric and Fuel Cell Vehicles)	Number of NZEV (Plug-In Hybrid Vehicles)	Total Number of Registered Vehicles
2019	14,211	8,378	1,050,670
2020	17,359	8,981	1,031,615
2021	24,218	10,992	1,070,166
2022	34,762	12,484	1,054,823
2023	51,229	14,925	1,054,486
2024	65,317	17,184	1,054,166
% Change 2023-2024	27%	15%	0%
% Change 2019-2024	360%	105%	0.3%

ZEV and infrastructure data from the CEC is available at the county and zip code. City-specific vehicle counts were estimated using zip code data and housing data using 2020 census data.
California Energy Commission [ZEV and Infrastructure Stats Data] 2026, [US Census Bureau] 2026, Energy Policy Initiatives Center, University of San Diego, 2026

The number of ZEVs has increased 360% from 2019 to 2024. In 2024, 7.8% of all registered vehicles in the city were ZEV or NZEVs. The share of vehicles that are gasoline-electric hybrids, while not considered a ZEV or NZEV, has increased each year since 2019. Figure 13 shows the BEV, PHEV, and gasoline hybrid vehicle population as a percentage of total registered vehicles in the city.

Figure 13: Citywide Percent of Registered ZEV, NZEV, and Gasoline Hybrid Vehicles (2019 – 2024)



California Energy Commission [ZEV and Infrastructure Stats Data] 2026

The rising number of EVs increases demand for EV charging. As of December 2025, 58 public EV charging ports[6] have been installed at City facilities, 38% of which are located in communities of concern.

Table 10 shows the cumulative number of electric vehicle charging stations (EVCS) within the City.

Table 10: Citywide Estimated Number of Electric Vehicle Charging Stations (2019 - 2025)

Year	2019	2020	2021	2022	2023	2024	2025	% Change 2023-2024	% Change 2019-2024
Number of Sites with EVCSs (public and private)	300	329	627	719	732	841	952	15%	180%
Number of Public Level 2 EVCSs	930	1,284	1,322	1,557	1,626	2,043	2,626	26%	120%
Number of Public DC Fast EVCSs	230	181	210	325	379	478	659	26%	108%

EVCS = electric vehicle charging station
Number of EVCSs are the number of nozzles or plugs. One site may have more than one nozzle or plug. EVCSs installed through SDG&E's Power Your Drive program are not considered public chargers as they are installed primarily at workplaces (including municipal facilities) and multi-family buildings (apartments and/or condo buildings).
Data do not include other private workplace or in-home (e.g. single-family homes) charging stations.
US Department of Energy **Alternative Fuels Data Center** 2026, Energy Policy Initiatives Center, University of San Diego 2026

A.3 Strategy 3: Mobility and Land Use

A3.1 Activity and Emissions Trends Related to Transportation within the City of San Diego

Transportation accounted for 57% of all citywide emissions in 2024. Strategy 3 aims to reduce vehicle miles traveled (VMT) by reducing the length of vehicle trips and increasing the use of transit, bicycling, and walking throughout the city.

The 2019 – 2024 VMT and on-road transportation emissions attributed to the city are shown in Table 11. The data sources and method to calculate on-road transportation emissions are provided in Appendix B, Section B4.1.

[6] An EV charging port is defined as the system within a charger that charges one EV. A charging port may have multiple connectors, but it can only provide power to charge one EV at a time. Code of Federal Regulations **Title 23, Chapter I Subchapter G Part 680 Section 680.104**

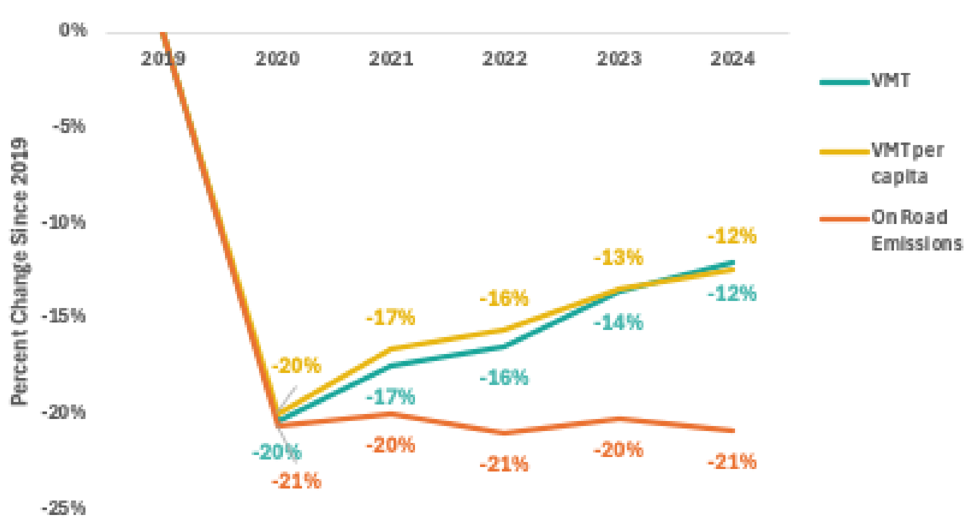
Table 11: Vehicle Miles Traveled (VMT) within City of San Diego (2019 – 2024)

Year	Total VMT (million miles / year)	San Diego Regional Average Vehicle Emission Rate (g CO2e / mile)	Per Capita VMT (miles per capita per year)	GHG Emissions (MTCO2e)
2019	13,666	428	9,835	5,854,000
2020	10,891	427	7,875	4,650,000
2021	11,288	415	8,200	4,683,000
2022	11,416	405	8,300	4,628,000
2023	11,807	396	8,513	4,674,000
2024	12,016	386	8,618	4,637,000
% Change 2023 - 2024	2%	-3%	1%	-1%
% Change 2019 - 2024	-12%	-10%	-12%	-21%

The 2019 VMT are estimates based on the 2016 City of San Diego VMT estimates from SANDAG's Activity Based Mode l (ABM2+) and Final 2021 Regional Plan, multiplied by the 2016-2022 San Diego regional VMT annual rates of growth. Annual rates of growth are estimated from the annual California Department of Transportation (CalTrans) Highway Performance Monitoring System public road data and Performance Measure System freeway data.
SANDAG 2021, CalTrans 2026, CARB2021, Energy Policy Initiatives Center, University of San Diego 2026

Figure 14 shows the changes to total VMT, per capita VMT, and on-road emissions in relation to the 2019 baseline.

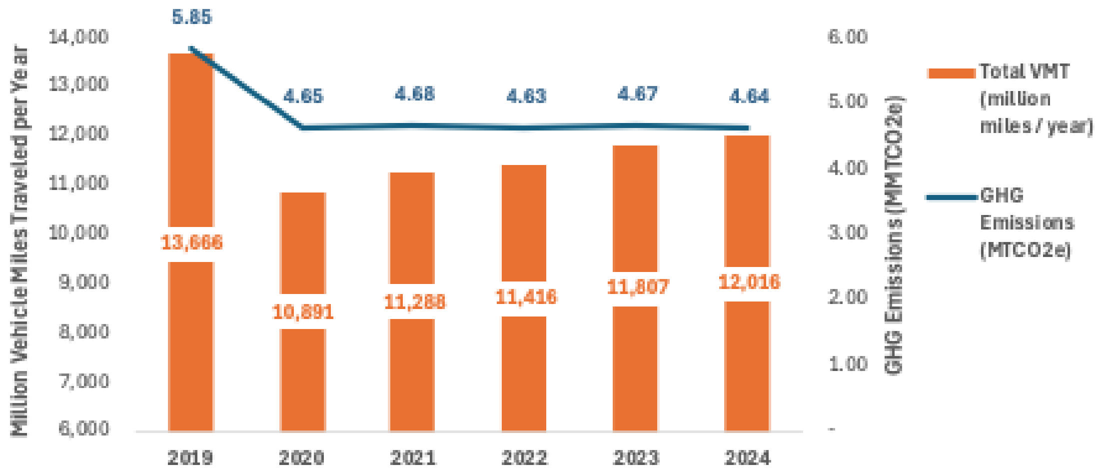
Figure 14: Changes in VMT, Per Capita VMT, and On-Road Emissions from 2019 Baseline



SANDAG 2021, CalTrans 2026, CARB2021, Energy Policy Initiatives Center, University of San Diego 2026

Due to reductions in the average vehicle emissions rate (emissions per mile), emissions from on-road transportation have remained relatively stable since the dip during the 2020 pandemic despite VMT levels increasing from 2020, as shown in Figure 15. Compared to the 2019 baseline, VMT has reduced 12% and on-road emissions have reduced 21%.

Figure 15: Citywide On-Road Vehicle Miles Traveled and Emissions (2019 – 2024)



SANDAG 2021, Caltrans Highway Performance Monitoring System 2026, CARB2021, Energy Policy Initiatives Center, University of San Diego 2026

A3.2 CAP Performance Target Progress: Reducing Vehicle Miles Traveled

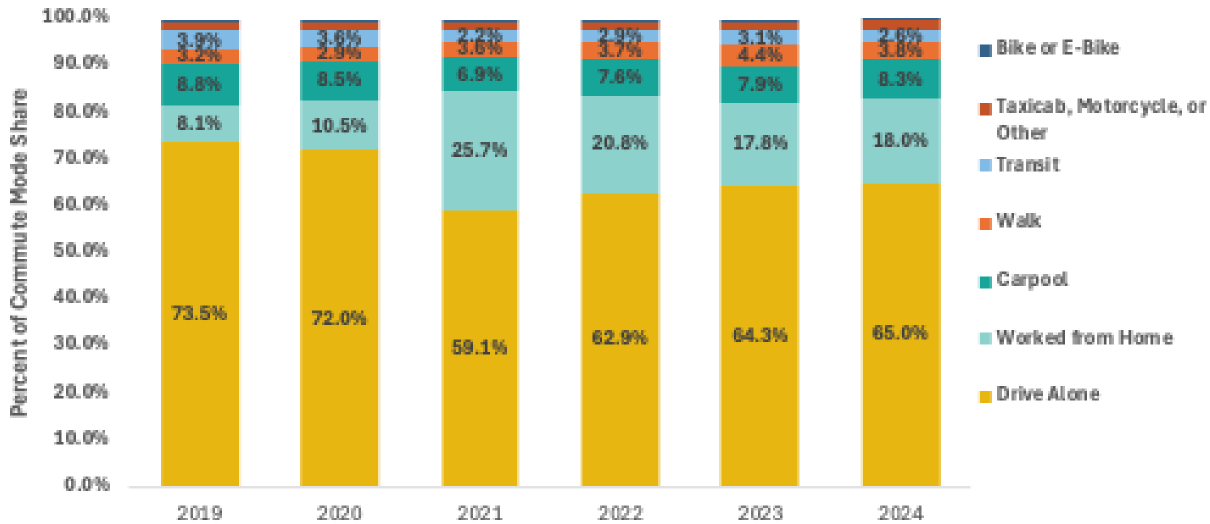
Measure 3.1: Safe and Enjoyable Routes for Pedestrians and Cyclists

- *2030 Target: 19% walking and 7% cycling mode share of all City of San Diego resident trips*
- *2035 Target: 25% walking and 10% cycling mode share of all City of San Diego resident trips*

While mode share data for all City of San Diego resident trips is not available, data is available for trips related to work commuting. Resident commute trips by transportation mode share are shown in Figure 16. This mode share data is estimated from American Community Survey[7] data, and refers only to a worker's travel from home to work and work to home without including any trip chains.[8] Previous Annual Reports used SANDAG's Employee Center survey data, though only data years 2019 and 2023 were available.

[7] **American Community Survey data.**
[8] Commuting definition by US Census Bureau, https://www.census.gov/topics/employment/commuting/guidance/commuting.html

Figure 16: Resident Mode Share for Work Commute Trips (2019 – 2024)



American Community Survey 2026

Bicycle facility improvements completed in fiscal years 2019 to 2024 are shown in Table 12. Class I bike lanes are paved right-of-way for exclusive use by bicyclists, pedestrians, and other non-motorized modes of travel. Class II bike lanes are defined by pavement striping and signage used to allocate a portion of a roadway for exclusive or preferential bicycle travel. Class IV bike lanes are referred to as "protected bike lanes" and are lanes physically separated from vehicle traffic and distinct from the sidewalk.

Table 12: Bicycle Facility Improvements (2019 – 2025)

Year	2019	2020	2021	2022	2023	2024	2025	Total, 2019-2025
New Class I Bike Lane Miles Added	-	-	-	-	-	4.3	6.1	10.4
New Class II Bike Lane Miles Added	10.8	2.2	17.4	52.4	38.3	10.8	10.2	142.0
New Class IV Bike Lane Miles Added	2	3.7	34.2	34.9	28.8	10.5	7.5	121.6
Existing Bike Lane Miles Improved[1]	34.6	81.6	65.3	15.2	-	46.5	21.5	264.7
Total Miles Added and Improved	**47.4**	**87.5**	**116.9**	**102.4**	**67.0**	**72.2**	**45.3**	**538.7**

1 Includes Class I, II, and IV bike facilities
City of San Diego Transportation and Storm Water Departments 2026

Sidewalk improvements from 2022 to 2024 are shown in Table 13. Data prior to 2022 is not available.

Table 13: Sidewalk Improvements (2022 – 2025)

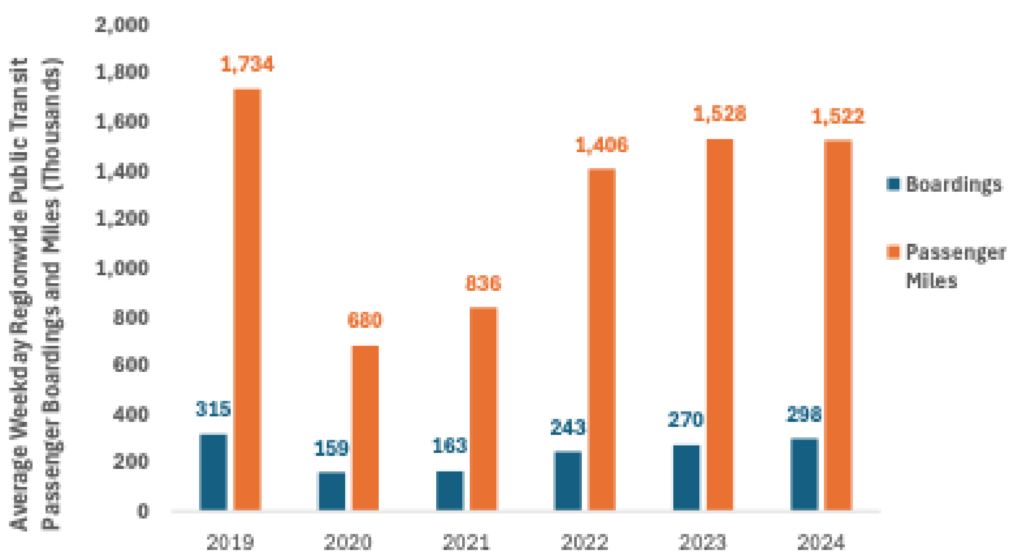
Year	2022	2023	2024	2025	Total, 2022-2025
Linear feet of new sidewalk improved	2,190	3,450	1,050	1,250	7,940
Linear feet of sidewalk replaced/repaired	53,469	94,331	92,819	115,017	355,636
Total Linear Feet of Sidewalk Improved and Repaired	**55,659**	**97,781**	**93,869**	**116,267**	**247,309**
City of San Diego Transportation and Storm Water Department 2026					

Measure 3.2: Increase Safe, Convenient, and Enjoyable Transit Use

- *2030 Target: 10% transit mode share of all San Diego resident trips*
- *2035 Target: 15% transit mode share of all San Diego resident trips*

Transit ridership data specific to residents from the City of San Diego does not exist, so regional and transit-authority data is used as a proxy. Figure 17 provides the average weekday passenger boardings and miles on all public transit systems regionwide.

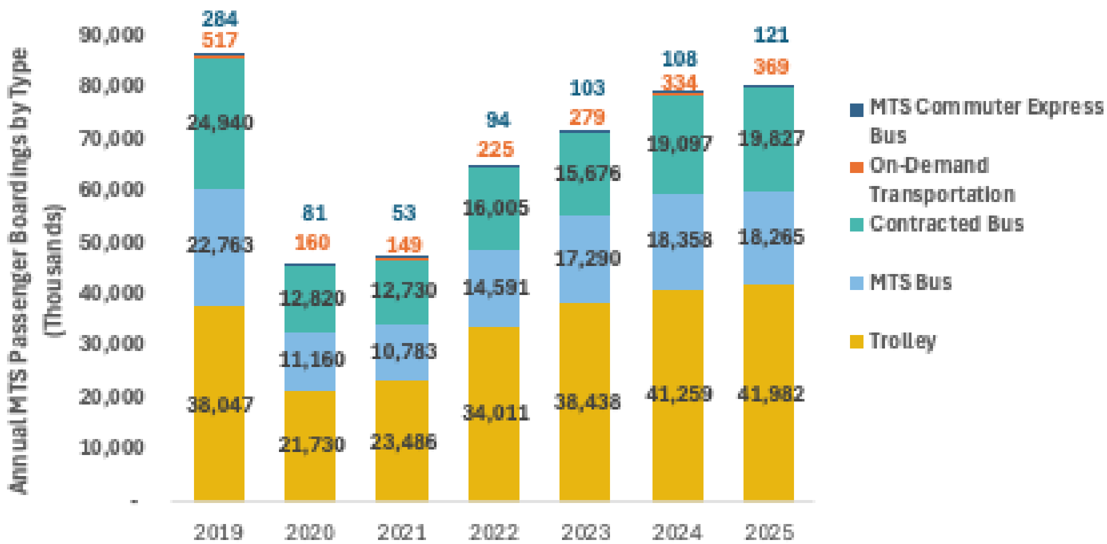
Figure 17: Average Weekday (Daily) Regional Transit Boardings and Passenger Miles (2019 – 2024)



San Diego Association of Governments, State of the Commute, 2024

Data from the entire Metropolitan Transit System (MTS) is also available which is used to better understand the breakdown of transit ridership closer to the San Diego metro area. The MTS service area includes the entire city as well as the cities of Chula Vista, Coronado, El Cajon, Imperial Beach, La Mesa, Lemon Grove, National City, Poway, and Santee. Figure 18 shows the annual passenger boardings by transit type from 2019 – 2024 across the full MTS system.

Figure 18: Annual MTS Transit Boardings by Transit Type (2019 – 2025)



Federal Transit Administration, National Transit Database, Complete Monthly Ridership 2026

Measure 3.3: Work from Anywhere

- *2030 Target: Achieve 4% citywide VMT reduction through telecommute*
- *2035 Target: Achieve 6% citywide VMT reduction through telecommute*

The percent of work commute designated as telecommute or 'work from home', has increased to 18% of mode share in 2024 from 8.1% in 2019 as shown previously in Figure 16.

Measure 3.4: Reduce Traffic Congestion to Improve Air Quality

- *2030 Target: Install 13 new roundabouts*
- *2035 Target: Install 20 new roundabouts*

The City installed 3 new roundabouts in 2024 and re-timed 305 traffic signals as shown in Table 14. These measures have been shown to reduce emissions by improving vehicle flow and reducing vehicle idling.

Table 14: Annual Roundabouts Installed and Traffic Signals Retimed (2019 – 2025)

Year	2019	2020	2021	2022	2023	2024	2025
Roundabouts Installed	0	0	2	7	4	3	5
Traffic Signals Retimed	60	70	52	404	405	305	358
City of San Diego Transportation Department 2026							

Measure 3.5: Climate-Focused Land Use

- *2030 Target: 8% VMT (commuter and non-commuter) reduction per capita*
- *2035 Target: 15% VMT (commuter and non-commuter) reduction per capita*

Measure 3.6: Vehicle Management

- *No associated targets*

The goals of measures 3.5 and 3.6 are to reduce per capita VMT through land use and parking policies. Per capita VMT changes shown previously in Table 11 and Figure 14 are attributable to many factors, including land use and parking policies.

A.4 Strategy 4: Circular Economy and Clean Communities

A4.1 Activity and Emissions Trends Related to Waste and Wastewater within the City of San Diego

Waste and wastewater accounted for 3% of total citywide emissions in 2024. The 2019– 2024 total and per capita waste disposed and generated within the city are shown in Table 15. The amount of waste disposed of in recent years has remained relatively consistent, but due to organics recycling efforts, the emissions from waste disposed have decreased by 22% since 2019. Landfill gas capture infrastructure at City-owned landfills has undergone improvements in recent years, including additional extraction wells and a new blower system installed in 2018, and further extraction wells at the West Miramar Landfill in 2021. Total quantity of landfill gas collected has increased since 2019 when ownership of the landfill gas rights reverted to the City. However, direct measurements of methane capture rates are technically complex, and the difference in methane captured before and after these site-specific improvements is not available, and therefore, is not reflected in the emissions estimates. Instead, an industry-standard landfill gas capture rate of 75% was applied for purposes of this inventory, consistent with standard practice for annual GHG reporting (refer to Appendix B).

Waste emissions are calculated using waste characterization studies, which have been conducted infrequently and represent conditions at a fixed point in time. A statewide waste characterization study released in 2021 reflected a reduced share of organics disposed to landfill, and the resulting emission factor has been applied to all inventory years from 2021 onward. The slight (1%) increase in waste sector emissions observed from 2023 to 2024 is attributable to a rise in total waste disposed to landfill. Absent an updated waste characterization study, it is not possible to determine whether or how the composition of disposed waste may have changed during this period.

Table 15: Tons of Waste Disposed and Emissions (2019 – 2024)

Year	Waste Disposed in Landfills (tons)	Per Capita Waste Disposed (daily pounds per capita)	GHG Emission Factor (MT CO_2e/Short Ton)	GHG Emissions (MT CO_2e)
2019	1,569,447	6.2	0.785	277,000
2020	1,543,627	6.1	0.785	273,000
2021	1,631,802	6.5	0.589	216,000
2022	1,597,546	6.4	0.589	212,000
2023	1,607,277	6.3	0.589	213,000
2024	1,631,407	6.4	0.589	216,000
% Change 2023 - 2024	2%	1%	0%	1%
% Change 2019 - 2024	4%	4%	-25%	-22%
City of San Diego Environmental Service Department, CalRecycle Jurisdiction Review Reports 2026, Energy Policy Initiatives Center 2026				

The 2019–2024 wastewater flow and associated emissions are shown in Table 16. In 2022, there was a sharp decrease in emissions associated with wastewater treatment. This is because the on-site generation facilities, power plants using landfill gas, at the North City Water Reclamation Plant were put offline that year. Emissions from those plants have remained lower through 2024.

Table 16: Wastewater Generated and Emissions (2019 - 2024)

Year	2019	2020	2021	2022	2023	2024	% Change 2023-2024	% Change 2019-2024
Wastewater Generated (million gallons)	38,241	38,192	37,591	36,865	39,143	39,028	-3%	-8%
GHG Emissions (MT CO_2e)	26,000	23,000	24,000	13,000	13,000	12,000	-1%	-54%
City of San Diego Public Utilities Department, Energy Policy Initiatives Center 2026								

A4.2 CAP Performance Target Progress: Waste and Wastewater

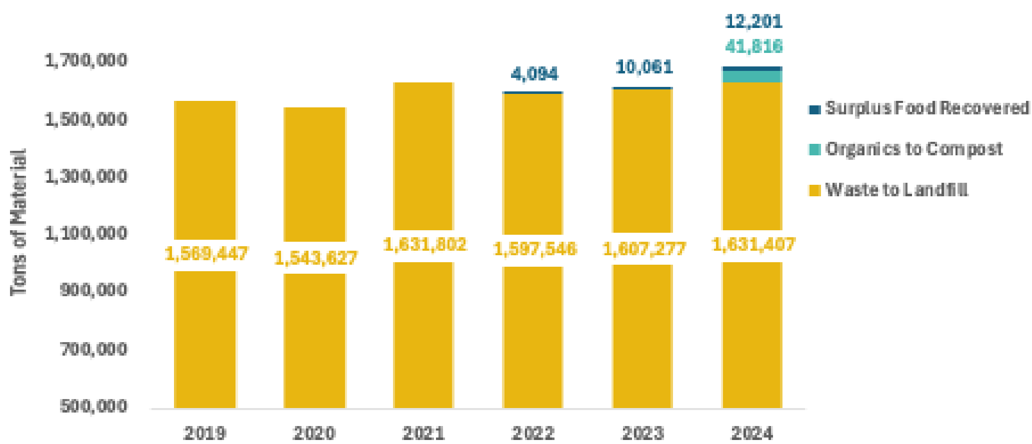
Measure 4.1: Changes to the Waste Stream

- *2030 Target: 82% Waste Diversion Rate and 85% Landfill Gas Capture*
- *2035 Target: 90% Waste Diversion Rate and 90% Landfill Gas Capture*

Figure 19 shows the total tons of waste to landfill as well as organic material diverted through composting and surplus food recovery within the city. Yard waste has historically been collected from city residents; however, standardized diversion reporting was not required until SB 1383 mandated tracking and documentation of organic waste recovery starting in 2022. As a result, the apparent increase in composted organics and surplus food recovery in recent years partially reflects improved data availability rather than solely representing a change in diversion volumes.

This reporting complexity compounds the challenge of accurately characterizing waste sector emissions over time. Because waste emissions are derived from waste characterization studies conducted infrequently (the most recent are a statewide study from 2021 or a regional study from 2014), the composition of material disposed to landfill—including the organic fraction, which drives methane generation—is not continuously monitored. As mentioned previously, the 2021 statewide waste characterization study captured a reduced organics share consistent with growing diversion efforts, and its emission factor has been applied to subsequent inventory years. However, as diversion reporting matures under SB 1383 and more organic material is tracked and recovered, future waste characterization studies may reflect further shifts in landfill disposal composition. Until such studies are available, the emissions inventory cannot fully account for these evolving conditions, and year-over-year comparisons should be interpreted with this limitation in mind.

Figure 19: Tons of Material to Landfill, Compost, and Recovery from Sources within City of San Diego (2019 – 2024)



City of San Diego Environmental Services Department 2026

Measure 4.2: Municipal Waste Reduction

- *No defined targets*

Data tracking municipal waste from is not currently available.

Measure 4.3: Local Food Systems and Food Recovery

- *No defined targets*

Surplus food recovery efforts have expanded to recovering over 12,000 tons of surplus food in 2024, up from a reported 4,094 tons in 2022 when reporting began (see Table 17).

Table 17: Surplus Food Recovered by Food Recovery Organizations (2022-2024)

Year	Total Surplus Food Recovered (tons)
2022	4,094
2023	10,061
2024	12,201
City of San Diego Environmental Services Department 2026	

Measure 4.4: Zero Waste to Landfill

- *No defined targets*

As shown previously in Figure 19, the tons sent to landfill by generators within the City of San Diego and waste diversion rate have each remained relatively steady since the 2019 baseline.

Measure 4.5: Capture Methane from Wastewater Treatment Facilities

- *2030 Target: 95% Methane Capture*
- *2035 Target: 95% Methane Capture*

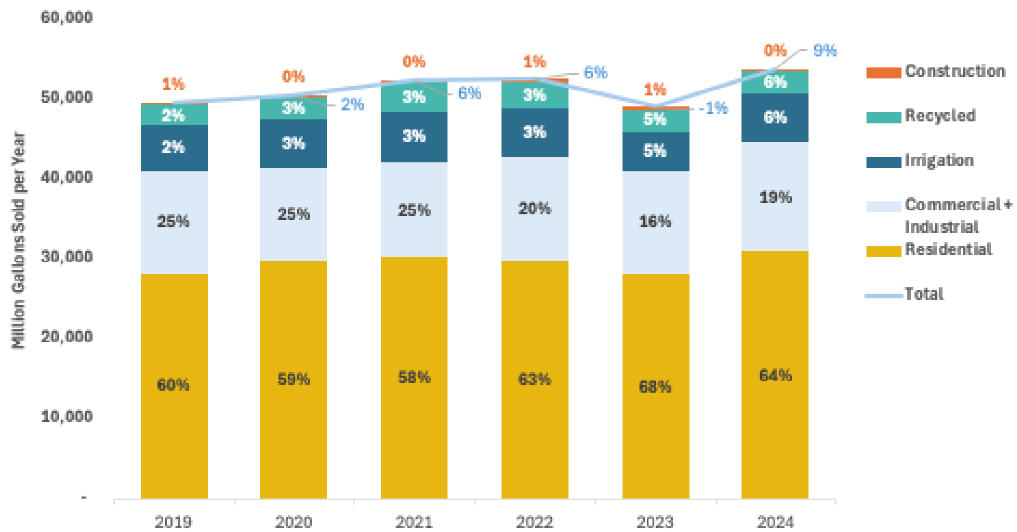
The City of San Diego's Point Loma Wastewater Treatment Plant (Point Loma WWTP) is energy self-sufficient with on-site renewable electricity production using biogas (captured methane from wastewater treatment) and hydropower. The excess renewable electricity generated at the Point Loma WWTP is exported to the grid. The digester capture rate at Point Loma WWTP is 99.9%. South Bay and North City Water Reclamation Plants are much smaller secondary treatment plants and do not generate electricity on-site.

A.5 Strategy 5: Resilient Infrastructure and Healthy Ecosystems

A5.1 Activity and Emissions Trends Related to Water Use within the City of San Diego

Emissions from the upstream supply, conveyance, treatment, and distribution of water as well as the treatment of wastewater are currently 1% of the total citywide emissions. The breakdown of citywide water sales by sector including recycled water is given in Figure 20. While overall water use has fluctuated over time, 2024 saw a 9% increase in total water sales from the 2019 baseline, up 10% from 2023.

Figure 20: Water Sales by Customer Sector (2019–2024)



Sales within City of San Diego only. Does not include sales to other agencies.
City of San Diego Public Utilities Department 2026

A5.2 CAP Performance Target Progress: Habitat, Trees and Water Supply

Measure 5.1: Sequestration

- *2030 Target: Restore 350 acres of salt marsh land and other associated tidal wetland and riparian habitats*
- *2035 Target: Restore 700 acres of salt marsh land and other associated tidal wetland and riparian habitats*

The City had restored 56 acres of riparian and wetland ecosystems prior to 2023, the latest year with data available. Table 18 shows projects and project phasing that were in progress as of 2023 (the latest year for which this data is available).

Table 18: Acres of Riparian and Wetland Restoration in Progress (2023)

Ecosystem Type	Design, Permitting, Contracting	Restoration Implementation	Long Term Maintenance
Fresh and Saltwater Marsh	4.1	0.0	0.0
Riparian	0.0	0.0	96.1
Other / Unspecified[1]	78.3	1.2	17.0

1 The Other/Unspecified category is frequently a combination of any of the following: saltmarsh, brackish marsh, freshwater marsh, riparian forest, oak riparian forest, riparian woodland, riparian scrub, vernal pools, and salt panne where it is difficult to quantify the specific types.
City of San Diego Public Utilities Department 2025

The City has a goal of conserving 52,727 acres of land within the Multi-Habitat Planning Area (MHPA). As of 2024, the City has achieved 99.5% of the conservation goal. Table 19 details the acres of land conserved from 2019 – 2024.

Table 19: Multiple Species Act Conservation Acreage (2019 – 2024)

Year	MHPA conservation requirement (acres)	Conserved lands within the MHPA (acres)	Conserved lands outside the MHPA (acres)	Lands obligated for future MHPA conservation (acres)	Remaining MHPA conservation requirement (acres)	% toward goal
2019	52,727	36,002	2,994	14,932	1,793	96.6%
2020	52,727	36,259	3,015	14,932	1,536	97.1%
2021	52,727	36,403	3,108	14,932	1,392	97.4%
2022	52,727	36,544	3,200	14,932	1,251	97.6%
2023	52,727	36,608	3,244	14,932	1,187	97.7%
2024	52,727	37,519	2,442	14,932	276	99.5%
2024 Multiple Species Conservation Program Annual Report, City of San Diego Planning Department						

Measure 5.2: Tree Canopy

- *2030 Target: 28% urban canopy cover*
- *2035 Target: 35% urban canopy cover*

The City of San Diego has established a target to increase urban tree canopy from a baseline[9] of 13% total coverage (reflecting 2014 conditions) to 28% by 2030 and 35% by 2035. According to a remote sensing study completed in 2025 using lidar data from 2021, San Diego's tree canopy was found to be at 15%, approximately a 2% increase from 2014 conditions.[10] Increasing urban tree canopy contributes to the capture and storage of carbon, as well as other benefits including storm water management, improved air quality, and increased property values. Table 20 shows tree planting and maintenance (trimming, removing, and evaluating) trends from 2020 to 2024; data for the CAP baseline year of 2019 is not available.

[9] The updated urban tree canopy coverage reflecting 2014 conditions was 13% in the City of San Diego, based on the Urban Tree Canopy Assessment preliminary results developed by the University of Vermont and the USDA Forest Service, funded by California Department of Forestry and the Fire Protection (CalFire) for the City of San Diego. https://research.fs.usda.gov/download/treesearch/68811.pdf

[10] The Urban Forestry Program within the Transportation Department, staff report presented at Environment Committee on May 22, 2025.

Table 20: Tree Planting and Maintenance (2020 – 2024)

Tree Planting and Maintenance Year	2020	2021	2022	2023	2024
Trees Planted[1]	1,863	1,707	1,649	1,586	1,978
Trees Trimmed[2]	33,254	35,206	61,665	48,754	55,829
Trees Removed[1]	1,824	2,151	2,004	2,827	1,169
Trees Evaluated[3]	5,316	13,393	12,237	13,296	10,488

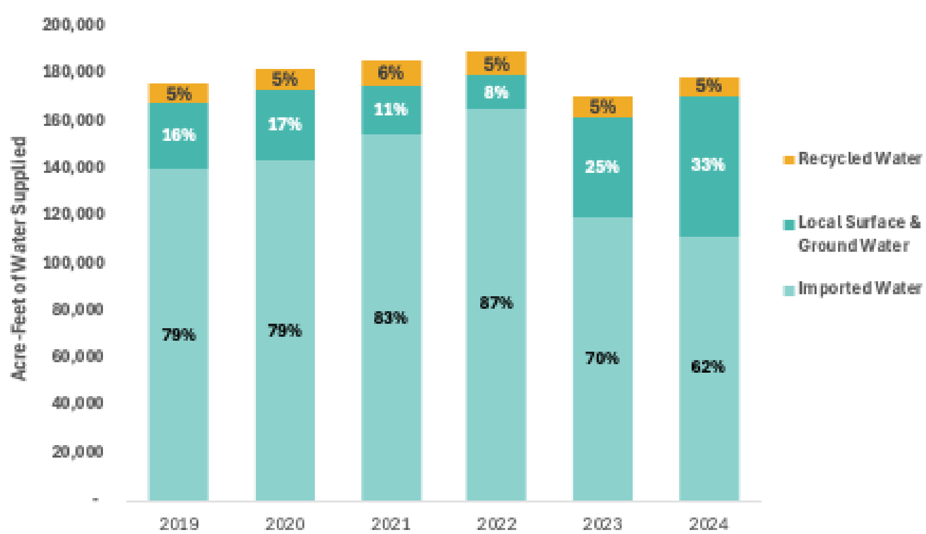
[1] Planted or removed by the Transportation Street Division and Parks and Recreation Department;
[2] Includes shade trees and palms trees;
[3] Trees are evaluated for species type, tree condition, diameter, and defects to determine the amount of corrective tree work that may be needed for the health of the tree and/or to address public safety adjacent to the tree. Historical values have been updated for this metric.
City of San Diego Transportation and Storm Water Department 2026

Measure 5.3: Local Water Supply

- *2030 Target Provide 33,000 acre-feet local water supply from PureWater*
- *2035 Target Provide 93,000 acre-feet local water supply from PureWater*

The PureWater project is still under construction, therefore no data is available to report at this time. However, other local water supply versus total water supply has been fluctuating in recent years as shown in Figure 21. The current availability of local water generally depends on rainfall and runoff into local reservoirs. In 2019, 16% of total water supply was from local surface and groundwater, in 2022 it was 8%, and in 2024 it accounted for 33% of water supply. A higher percentage of local water supply reduces the need to import water from San Diego County Water Authority and the energy and GHG emissions associated with imported water. The City also produces recycled water to meet local demand, using recycled water to meet about 5-6% of the city's overall demand between 2019 and 2024. The total acre-feet of water delivered to customers within the City of San Diego according to source (local, imported, and recycled) is shown in Figure 21.

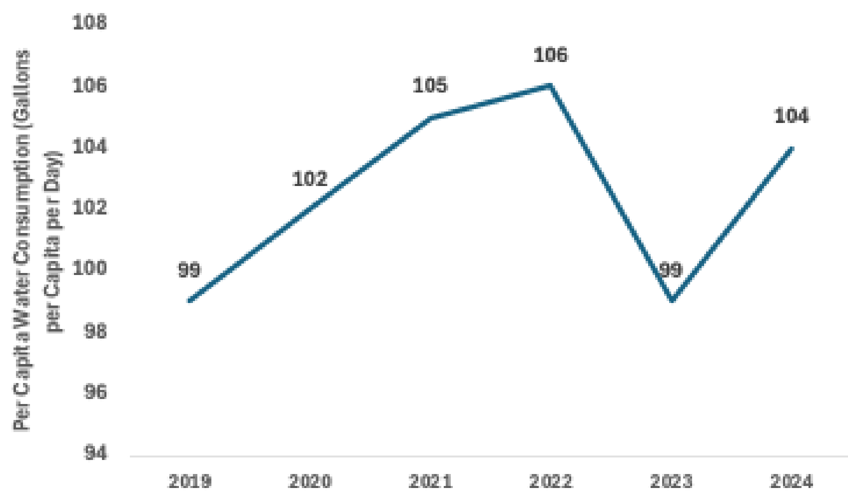
Figure 21: Acre-Feet of Water Delivered to Customers within City of San Diego (2019 – 2024)



City of San Diego Public Utilities Department 2026

Per capita water use, measured in gallons per capita per day (GPCD), increased 5% from the 2019 baseline (Figure 22).

Figure 22: Per Capita Water Use (2019 – 2024)



City of San Diego Public Utilities Department 2026

The amount of recycled water and water used for irrigation from 2019 to 2024 is provided in Table 21. Metered irrigation increased 25% when compared to 2023.

Table 21: Metered Recycled and Irrigation Water Use (2019 – 2024)

Year	Recycled Water Sales (million gallons)	Metered Irrigation Water Use (million gallons)
2019	2,606	5,631
2020	2,881	5,988
2021	3,688	6,298
2022	3,263	6,217
2023	2,827	4,917
2024	2,761	6,124

Metered irrigation water, including agricultural and landscape water use.
City of San Diego Public Utilities Department 2026

A.6 Strategy 6: Emerging Climate Action

- *2030 Target: Residual Emissions 391,000 additional reduction needed to reach fair-share target*
- *2035 Target: Residual Emissions 2,262,000 additional reduction/removal needed to reach carbon neutrality*

Measure 6.1: Explore further opportunities to achieve net zero GHG emissions

As the City of San Diego assesses and plans future climate action, updates will be provided in future reports and on the City's online CAP Dashboard.

APPENDIX B: CITY OF SAN DIEGO GREENHOUSE GAS EMISSIONS INVENTORY METHODOLOGY AND UPDATES

Supplement to 2025 Annual Climate Action Plan Report

June 2026

Prepared for the City of San Diego

The City of SAN DIEGO

Prepared by the Energy Policy Initiatives Center

EPIC
ENERGY POLICY INITIATIVES CENTER
UNIVERSITY OF SAN DIEGO SCHOOL OF LAW

About EPIC

The Energy Policy Initiatives Center (EPIC) is a non-profit research center of the University of San Diego School of Law that studies energy policy issues affecting California and the San Diego region. EPIC's mission is to increase awareness and understanding of energy- and climate-related policy issues by conducting research and analysis to inform decision makers and educate law students.

For more information, please visit the EPIC website at **www.sandiego.edu/epic**.

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B1 OVERVIEW

This document presents a summary of the greenhouse gas (GHG) emissions estimates for the City of San Diego for calendar years 2019–2024 and the methods used. In this document, the government agency of City of San Diego will be referred to as 'the City', and the physical boundaries and activities that occur within them will be referred to as 'the city'.

This document includes the following sections:

- Section B2 describes the background sources and common assumptions used for the GHG emissions inventory;
- Section B3 provides the 2019–2024 GHG emissions inventory results summary;
- Section B4 provides the methods used to prepare each category of the inventory; and
- Section B5 provides a log of refinements to prior-year (2019–2023) inventory calculations reported in previous Annual Reports. Historical revisions are necessary when improved activity data or more comprehensive emission factor studies for the prior years become available while developing the latest 2024 inventory calculation. Consistent with the Intergovernmental Panel on Climate Change (IPCC) guidance on time-series integrity, this report applies such updates retroactively across all affected years rather than the most recent year alone which would otherwise risk misrepresenting emissions trends. Therefore, emissions estimates for a given year may be different between editions of the Annual Reports as data are updated.[1]

Rounding is used for the final GHG values within the tables and figures throughout the document. Values are not rounded in the intermediary steps in any calculation. Because of rounding, some totals may not equal the values summed in any table or figure.

B2 BACKGROUND

B2.1 Greenhouse Gases

The primary GHGs included in the emissions estimates presented here are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Each GHG has a different capacity to trap heat in the atmosphere, known as its global warming potential (GWP), which is normalized relative to CO_2 and expressed in carbon dioxide equivalents (CO_2e). In general, the 100-year GWPs reported by the Intergovernmental Panel on Climate Change (IPCC) are used to estimate GHG emissions. The GWPs used in this inventory are from the IPCC Fourth Assessment Report (AR4),[2] provided in Table 1. The GWPs used in this inventory are consistent with the California statewide GHG inventories and the national GHG inventories.[3]

Table 1: Global Warming Potentials Used in GHG Emission Inventory & Projections

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	25

[1] California Air Resources Board (CARB): California Greenhouse Gas Emissions for 2000 to 2023. Trends of Emissions and Other Indicators. (2025)

[2] IPCC Fourth Assessment Report: Climate Change 2007: Direct Global Warming Potentials (2013).

[3] Some CARB programs, other than the statewide GHG inventory, may use different GWPs. For example, the short-lived climate pollutants (SLCP) strategy uses the 20-year GWP because the SLCP has greater climate impacts in the near-term compared to the long-lived GHGs.

Nitrous oxide (N_2O)	298
IPCC Fourth Assessment Report, 2013.	

B2.2 Demographics

California Department of Finance develops population and housing estimates for cities and counties in the State. The population and housing estimates used in the inventory are provided in Table 2.[4]

Table 2: Population, Housing, and Jobs Estimates within the City of San Diego (2019–2024)

Year	Population Estimates	Total Housing Estimates (Units)	Occupied Housing Estimates (Units)
2019	1,389,543	545,645	514,548
2020	1,383,020	548,934	515,676
2021	1,376,694	552,410	518,029
2022	1,375,403	558,788	524,566
2023	1,387,001	565,822	531,199
2024	1,394,317	571,542	536,856

2019 population and housing estimates are benchmarked against 2010 census, and 2020 - 2024 population and housing estimates are benchmarked against the 2020 census. Population and housing estimates are updated to reflect the most recent estimates by the California Department of Finance.
Housing unit types include single detached units, single attached units, two to four units, five plus, or apartment units, and mobile homes.
California Department of Finance 2021, 2025

B3 SUMMARY OF 2019–2024 GHG EMISSIONS INVENTORY

B3.1 Greenhouse Gas (GHG) Emissions Inventory

In 2024, total emissions were 8.1 million metric tons of carbon dioxide equivalent (MMT CO_2e), a 23% reduction from the 2019 baseline and 3% reduction from 2023. GHG emissions by category from San Diego in 2019–2024 are shown in Table 3.

Table 3: Citywide Greenhouse Gas Emissions (2019 – 2024)

Emissions Sector	2019 Emissions[1] [MT CO_2e]	2019 Emissions Revised[2] [MT CO_2e]	2020 Emissions [MT CO_2e]	2021 Emissions [MT CO_2e]	2022 Emissions [MT CO_2e]	2023 Emissions [MT CO_2e]	2024 Emissions [MT CO_2e]
On-Road Transportation	5,805,000	5,854,000	4,650,000	4,683,000	4,628,000	4,674,000	4,637,000
Electricity[3]	2,375,000	2,336,000	2,286,000	1,714,000	1,558,000	1,594,000	1,475,000
Natural Gas[4]	1,911,000	1,912,000	1,827,000	1,918,000	1,730,000	1,800,000	1,710,000
Solid Waste	277,000	277,000	273,000	216,000	212,000	213,000	216,000
Off-Road Transportation (Construction	70,000	69,000	57,000	57,000	57,000	57,000	57,000

[4] California Department of Finance: E-4 & E5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2025 with 2020 Census Benchmark (May 2025), accessed May 2025. E-4 Historical Population Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark (May 2021), accessed May 2025.

Emissions Sector	2019 Emissions[1] [MT CO_2e]	2019 Emissions Revised[2] [MT CO_2e]	2020 Emissions [MT CO_2e]	2021 Emissions [MT CO_2e]	2022 Emissions [MT CO_2e]	2023 Emissions [MT CO_2e]	2024 Emissions [MT CO_2e]
Equipment Only)							
Water	68,000	61,000	70,000	66,000	65,000	57,000	51,000
Wastewater	26,000	26,000	23,000	24,000	13,000	13,000	12,000
Total Emissions	**10,532,000**	**10,535,000**	**9,186,000**	**8,678,000**	**8,263,000**	**8,408,000**	**8,158,000**

[1] 2019 Emissions match those reported in the 2022 CAP
[2] 2019 Emissions updated to reflect best available data. This report will reference the 2019 Revised Emissions for the remainder of this report. These values are the same as in the 2024 Annual Report.
[3] Historical emissions from electricity have been modified in this Annual Report to incorporate newly public data for direct access electricity customers as well as more granular electricity consumption data received from SDG&E.
[4] Historical emissions from natural gas have been modified to reflect more granular natural gas consumption data received from SDG&E.
Sums may not add up to totals due to rounding. GHG emissions for each category are rounded to the nearest thousand. Values are not rounded in the intermediary steps in the calculation.
MT CO_2e = metric tons of carbon dioxide equivalent.
Energy Policy Initiatives Center, University of San Diego 2026

This report will reference the 2019 revised emissions for the remainder of the report and will refer to them as the '2019 emissions.' More information on the differences between the methods, data availability, and sources used to calculate GHG emissions in the 2022 CAP and this report are provided in Section B5: Methodology Differences and Data Refinement. Table 4 shows how emissions in each category have changed relative to 2019.

Table 4: Emissions Change from 2019 Baseline by Emissions Sector (%)

Emissions Sector	2019	2020	2021	2022	2023	2024
On-Road Transportation	--	-21%	-20%	-21%	-20%	-21%
Electricity	--	-2%	-27%	-33%	-32%	-37%
Natural Gas	--	-4%	0%	-10%	-6%	-11%
Solid Waste	--	-1%	-22%	-23%	-23%	-22%
Off-Road Transportation (Construction Equipment Only)	--	-17%	-17%	-17%	-17%	-17%
Water	--	15%	8%	7%	-7%	-16%
Wastewater	--	-12%	-8%	-50%	-50%	-54%
Total Emissions	**--**	**-13%**	**-18%**	**-22%**	**-20%**	**-23%**

Energy Policy Initiatives Center, University of San Diego 2026

In 2024, total emissions were 8.1 $MMTCO_2e$, a 23% reduction from the 2019 baseline and a 3% decrease from 2023. Most citywide emissions reductions can be attributed to changes in the transportation and building energy sectors given their relative emissions scale to other sectors, including: (1) an increase in renewable electricity supplied to the city, (2) a reduction in both natural gas and electricity consumption, (3) a citywide reduction in vehicle miles traveled, and (4) an increase in on-road vehicle efficiency and adoption of electric and plug-in hybrid vehicles. While water and wastewater constitute a small (1% combined) portion of the city's overall emissions, the sectors have achieved notable reductions compared to baseline (23% and 54% reduction, respectively).

For more information on GHG changes and CAP performance, refer to Appendix A: Progress Tracking Towards CAP Measures.

B3.2 Per Capita Greenhouse Gas Emissions

The 2019 – 2024 per capita GHG emissions in the city are given in Table 5. This represents emissions from the seven emissions categories analyzed.

Table 5: Per Capita GHG Emissions (2019 – 2024)

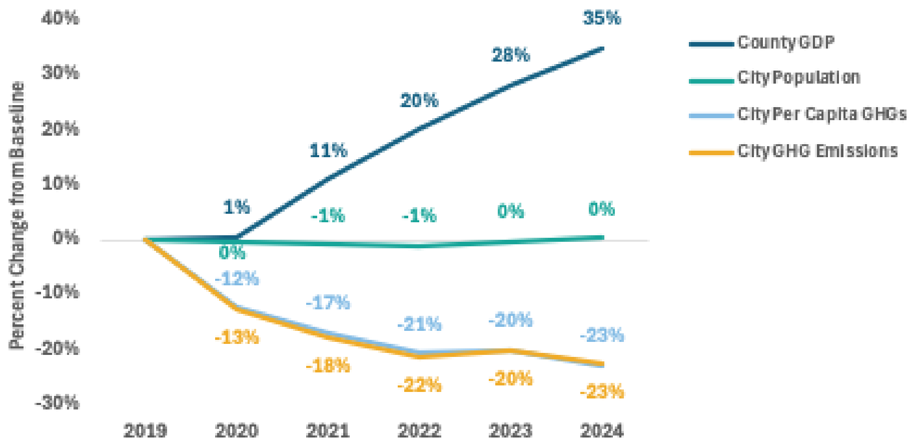
Year	2019	2020	2021	2022	2023	2024
Total Emissions (MMTCO_2e)	10.54	9.19	8.68	8.26	8.41	8.16
Total Population	1,389,543	1,383,020	1,376,694	1,375,403	1,387,001	1,394,317
Per Capita GHG Emissions (MTCO_2e per capita)	7.58	6.64	6.30	6.01	6.06	5.85

MT CO_2e = metric tons of carbon dioxide equivalent
Per capita emissions are based on six emission categories only and cannot be compared with California statewide per capita emissions or per capita emissions targets.
2019 population is based on 2010 census benchmark. 2020 - 2024 population estimates are based on 2020 census benchmark. Populations are updated with the latest California Department of Finance population estimates.
Energy Policy Initiatives Center, University of San Diego 2026

Figure 2 shows countywide Global Domestic Product (GDP) growth compared to the city population and GHG emissions changes since 2019. County GDP is used as city-specific GDP data is not available. From 2019 to 2024, the per capita GHG emissions in the city reduced 23%, while the population remained largely stable[5].

[5] Per capita emissions from the city are not comparable to per capita emissions retrieved from the California statewide GHG emissions inventory, as the statewide inventory includes emissions from all economic sectors of the state. These would include emissions from aviation, marine vessels, all offroad equipment categories, industrial fuels, and other combustion fuels.

Figure 1: Changes in County GDP Compared to Citywide Population and GHG Emissions from 2019 Baseline



GDP listed is for San Diego County. Population and emissions are for the city.
CA Dept of Finance, U.S. Bureau of Economic Analysis, Energy Policy Initiatives Center, University of San Diego 2026

B4 METHOD TO CALCULATE GHG EMISSIONS INVENTORY

The CAP emissions inventory follows the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol)[6], developed by ICLEI USA. It requires a minimum of five basic emissions-generating activities to be included in a Protocol-compliant community-scale GHG inventory. These categories are: electricity, natural gas, on-road transportation, water and wastewater, and solid waste. These categories are generally recognized as being under the collective control and management of the community (in this case, the City government) whereas other emissions-generating activities such as air travel, shipping, or high global warming potential gases are under the control of other public agencies and entities. Allocating emissions from these other emission-generating categories to cities is either not possible due to lack of data or lack of proxy data, or is better handled at a higher geographic level of aggregation. The City's Climate Action Plan includes the Protocol-compliant emissions categories as well as off-road emissions from construction equipment as an optional additional category.

Different protocols and guidance for reporting GHG emissions exist for individual entities, such as private corporations and local government operations. The Local Government Operations Protocol, developed by ICLEI, CARB, and the Climate Registry (TCR), and the General Reporting Protocol, developed by TCR, are widely used to develop inventories of emissions resulting from the operations of local governments and other public agencies. The method to determine boundaries in the U.S. Community Protocol is different from the method in the Local Government Operations Protocol or the General Reporting Protocol, which depends on the entity's financial or operational control. This inventory accounts for the emission-generating activities and sources throughout the city limits, as opposed to only those within the City's financial or operational control (e.g., emissions from City-owned buildings and vehicles).

GHG emissions are calculated by multiplying activity data (e.g., kilowatt-hours of electricity, tons of solid waste) by an emission factor (e.g., pounds of CO_2e per unit of electricity). The U.S. Community Protocol provides guidance for developing inventories of emissions from sources and activities within a

[6] CARB, ICLEI, and The Climate Registry: Local Government Operations Protocol; the Climate Registry: **General Reporting Protocol Version 3.0**

community (e.g., driving, building energy use, solid waste disposal). All activity data and GHG emissions reported in this document are annual values, and all emission factors reported in this document are annual average values, unless stated otherwise.

B4.1 On-Road Transportation

The emissions associated with on-road transportation are calculated by multiplying the estimated annual vehicle miles traveled (VMT) attributed to city trips (per Origin-Destination method as explained in Section B4.1.1) with the average annual vehicle emission rate in the San Diego region.

B4.1.1 Vehicle Miles Traveled (VMT)

The San Diego Association of Governments (SANDAG) uses an activity-based model (ABM) to support Regional Transportation Plan development, generating outputs on transportation system performance, including VMT. Every three to five years, SANDAG produces the Regional Growth Forecast, a long-range forecast through 2050 of population, housing, and employment growth, along with VMT forecast for the San Diego region by jurisdiction. The CAP uses the city-specific population, housing, employment, and VMT forecast from the Series 14 Regional Growth Forecast (with a 2016 base year and 2050 forecast horizon) which informed SANDAG's 2021 Regional Plan adopted in December 2021. The VMT estimates and forecast were produced with the ABM2+ model.

As of May 2026, the most recent Regional Growth Forecast is the Series 15 Growth Forecast with a 2022 base year, which informed SANDAG's 2025 Regional Plan[7] adopted in December 2025. The last VMT forecast (with a 2022 base year and 2050 forecast horizon) was produced with the latest model version, ABM3, using land use patterns and transportation networks approved in the 2025 Regional Plan. Although Series 15 jurisdiction-specific data became available to the City in April 2026, this Annual Report maintains a consistent methodology for tracking progress against 2019 emissions. Accordingly, the ABM2+ model[8] with a 2016 base year was retained to calculate 2024 VMT and associated emissions.

SANDAG provides VMT estimates of city trips for specific ABM model base years (2016 for ABM 2+ and 2022 for ABM3) as well as projections for select future years. To monitor progress, these projections (i.e., VMT data other than ABM base year VMT estimates) cannot be used to infer current conditions, additional sources are needed to estimate year-over-year VMT change. Public road and freeway data in the San Diego region from the California Department of Transportation (Caltrans) Highway Performance Monitoring System (HPMS)[9] is used to scale VMT accordingly. Caltrans HPMS was selected because it represents the most comprehensive assessment of VMT on public roads: it is segmented at the jurisdictional level, updated annually, and includes data predating the CAP baseline year of 2019. While HPMS provides a reliable annual indicator of VMT trends, it does not disaggregate travel using the Origin-Destination (O-D) method.[10] The O-D VMT method is the preferred method proposed by the U.S. Community Protocol in *"TR.1 Emissions from Passenger Vehicles"* and *"TR.2 Emissions from Freight and Service Trucks"* that attributes miles traveled to cities and regions based on where trips originate and end (Figure 2).[11]

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[7] **2025 Regional Plan**. SANDAG

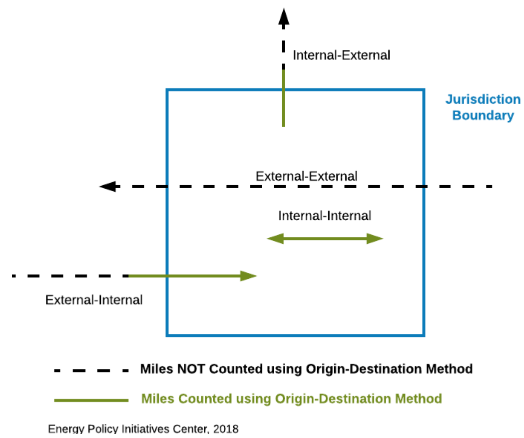
[8] 2016 VMT was provided by SANDAG to City of San Diego (January 2022). SANDAG Activity Based Model 2+ Release v14.2.2, Final 2021 Regional Plan Networks, Policies, and Assumptions, Year 2016, Reference Scenario 458. The forecast in the Final 2021 Regional Plan was based on the Sustainable Communities Strategy land use pattern, which may be different from jurisdictions' general plan land use pattern.

[9] California Department of Transportation: Highway Performance Monitoring System (HPMS) Data.

[10] SANDAG (2013): Vehicle Miles Traveled Calculation Using the SANDAG Regional Travel Demand Model. Technical White Paper.

[11] **ICLEI – Local Governments for Sustainability USA**: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix D: Transportation and Other Mobile Emission Activities and Sources.

Figure 2: Components of O-D Method for VMT Calculation



O-D VMT allocated to the city include all miles traveled for trips that originate and end within city limits (referred to as Internal-Internal), and half of the miles traveled for trips that either begin or end within city limits (referred to as Internal-External), or vice versa (referred to as External-Internal). In accordance with the methodology, VMT from trips that pass through the city but originate and terminate outside its boundaries (referred to as External-External) are excluded from the city's total VMT. The total average weekday VMT were multiplied by 347 to adjust from average weekday VMT to average annual VMT, which includes weekends.[12]

The average weekday Series 14 O-D VMT estimates for each trip type in 2016 provided by SANDAG and the total VMT allocated to the city based on the ICLEI methodology described above are given in Table 6.[13]

Table 6: 2016 O-D VMT Estimates by Trip Types and Total VMT provided by SANDAG (2016)

Year	VMT by Trip Type (Miles/Weekday) Internal-Internal (I-I) Trips	VMT by Trip Type (Miles/Weekday) External-Internal/Internal-External (I-E/E-I) Trips	VMT by Trip Type (Miles/Weekday) External-External Trips (Information only, excluded from City VMT)*	Total City VMT (100% * I-I + 50% * I-E/E-I) (Miles per Weekday)	Total City VMT (Miles per Year)
2016	22,264,735	28,279,389	32,824,891	36,404,429	12,632,336,902

*Though excluded from this analysis, miles from External-External trips (pass-through trips) shown here are the portion only within the city boundary, not from the entire trip.
Based on SANDAG Series 14 (Final 2021 Regional Plan) and ABM2+ VMT estimates. The conversion factor from miles per weekday to miles per year is 347.
SANDAG 2022, Energy Policy Initiatives Center, University of San Diego 2024

As mentioned previously, annual VMT adjustments are derived from Caltrans HPMS data and are used to scale the O-D 2016 base year data from SANDAG ABM2+. For example, to estimate 2024 O-D VMT, the 2016 O-D VMT was adjusted by the annual rates of increase from 2016 to 2024, as indicated by Caltrans HPMS. Caltrans HPMS estimates VMT across all public roads, including city streets, county

[12] The conversion of 347 weekdays to 365 days per year as used by CARB. [CARB: California's 2000–2014 Greenhouse Gas Emission Inventory Technical Support Document (2016 Edition),] p. 41 (September 2016).
[13] The 2016 data used here are different from (1-3% lower) the 2016 data used in the San Diego Climate Action Plan update 2022, which were from SANDAG ABM2+ Release v14.2.1, Draft 2021 Regional plan (October 2020).

roads, state highways, roads maintained by state and federal agencies, freeways, etc. It is derived using both real-time traffic detectors and short-term traffic counts, as well as jurisdictional reporting. Annual changes in the HPMS VMT for the full San Diego region were applied to the city's 2016 O-D VMT data (Table 6), as VMT across the full region was determined to be more representative of I-E/E-I trips. The estimated daily VMT and annual rate of increase or decrease from 2016 to 2024 from Caltrans HPMS data are provided in Table 7.[14]

Table 7: San Diego Region Daily VMT Derived from the Caltrans Highway Performance Monitoring System

Year	San Diego Region Daily VMT (thousand miles/day)	Annual Rate of Increase (%)
2016	79,622	-
2017	81,253	2.0%
2018	82,618	1.7%
2019	86,136	4.3%
2020	68,650	-20.3%
2021	71,151	3.6%
2022	71,954	1.1%
2023	74,422	3.4%
2024	75,736	1.8%
Caltrans Highway Performance Monitoring System Public Roads Data, 2016 – 2024, Energy Policy Initiatives Center, University of San Diego 2026		

B4.1.2 Average Annual Vehicle Emission Rate

The average annual vehicle emission rate expressed in grams of CO_2e per mile driven (g CO_2e/mile) is derived from the statewide mobile source emissions model EMFAC2021 developed by CARB.[15] CARB released EMFAC2025 version 2.1.0 in March 2026, refining emission factors for historical inventory years as well as projections for the future vehicle population. Every time CARB develops a new emissions model, the EPA approves of the use of the model for various uses including air quality conformity analyses and State Implementation Plan programs. As of May 2026, EMFAC2025 has not received EPA approval. The emissions model may change again before it is approved by the EPA, which is why this current version of the model has not been integrated into the inventory. Once the new model is approved, integrating the updated emission factors would require editing all emission factors dating back to the baseline year to maintain a consistent time-series of data and avoid misrepresenting trends. That being said, the emissions factor trends in EMFAC 2021 and EMFAC 2025 v2.1.0 for historical years are quite similar.

To obtain vehicle emission factors from EMFAC2021, the model was run in the 'default activity mode' to generate the total VMT, per CARB's default estimate, and total vehicle GHG emissions by vehicle class, model year, and fuel types for the San Diego region.[16] GHG emissions were then divided by CARB's default estimate of region-wide VMT to get a emissions per mile (emissions factor) for each vehicle class and fuel type. That emissions factor was then applied to the VMT obtained through the process

[14] Caltrans: 2024 HPMS Data released November 2025
[15] CARB: EMission FACtors model, **EMFAC2021 v1.0.1**, released on April 30, 2021, downloaded on August 30, 2021. CARB published an updated version, **EMFAC2021 v1.0.2**, on May 2, 2022. The updates fixed bugs that were not related to GHG emissions.
[16] *Id.*

documented in Section B4.1.1. This document assumes that the city has the same distribution of vehicle class and fuel types as the San Diego region.

B4.1.3 Total Emissions from On-Road Transportation

Total estimated VMT, average vehicle emission rates, and corresponding GHG emissions from on-road transportation from 2019–2024 are given in Table 8.

Table 8: VMT, Emission Rate, and GHG Emissions from On-Road Transportation (2019–2024)

Year	Total VMT (Million Miles/year)	Average Vehicle Emission Rate (g CO_2e/mile)	GHG Emissions (MMT CO_2e)
2019	13,666	428	5.85
2020	10,892	427	4.65
2021	11,288	415	4.68
2022	11,416	405	4.63
2023	11,807	396	4.67
2024	12,016	386	4.64

GHG emissions for each category are rounded. Values are not rounded in the intermediary steps in the calculation.
Energy Policy Initiatives Center, University of San Diego 2026

B4.2 Electricity

Emissions from electricity consumed within the city were estimated using the Built Environment (BE.2) method from the U.S. Community Protocol, by multiplying electricity use by the annual city-specific electricity emission factor.[17]

B4.2.1 Electricity Use

Annual metered electricity sales data within the city for 2021-2024 were provided by the local utility, San Diego Gas & Electric (SDG&E) broken down by customer class: (1) residential and (2) commercial and industrial.[18] The electricity sales data do not include the electricity sales to San Diego County Regional Airport Authority, San Diego Unified Port Authority and District Tenants, and the military.

In 2019 and 2020, the electricity sales included the sales to SDG&E bundled customers[19] and Direct Access (DA) customers.[20] In March 2021, San Diego Community Power (SDCP), a community choice aggregator (CCA), started serving customers within the San Diego region, including those within the City of San Diego. By the end of 2021, eligible SDG&E bundled commercial and industrial customers were enrolled in SDCP automatically with the option to opt-out (return to SDG&E) or opt-up to an SDCP product with a higher percentage of renewable electricity. In early 2022, residential accounts were automatically enrolled in SDCP with the same options to opt-out or opt-up. In 2024, SDCP added another rate tier for all customer types, "Power Base" that customers were able to opt-in to.

[17] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix C: Built Environment Emission Activities and Sources.
[18] Electricity sales were provided to EPIC by SDG&E (January 2026). 2019–2020 data provided by SDG&E previously were not updated.
[19] SDG&E Bundled customers include any customer who received both their electric delivery and electric generation from SDG&E.
[20] Direct Access customers include customers who purchase retail electricity from a competitive provider called an electricity Service Provider (ESP), instead of from a regulated electric utility. Definition from CPUC, Direct Access Program.

The way in which electricity sales data has been provided by SDG&E has changed throughout the years due to data privacy protocols. The 2019 and 2020 electricity use per customer class provided by SDG&E have the same format, with bundled and DA customers' electricity use identified separately. For data year 2021, when SDCP started its operations, within each customer class, only total non-bundled electricity use was provided by SDG&E without differentiating DA or SDCP electricity consumption; but in data year 2022, within each customer class, SDG&E provided a breakout for SDCP electricity consumption but not for DA electricity consumption. For those years, the 2020 percentage of electricity consumption used by DA customers was used as a proxy to break out DA consumption from the result of the electricity consumption. In 2021 participation rate provided by the SDCP was used to estimate consumption via SDCP customers. For data year 2023, SDG&E provided electricity use by customer class and by energy provider, matching the 2019 and 2020 format. For this appendix, data years 2022-2024 and partial data year 2021 were received with bundled, DA, and SDCP consumption separated. This allows for historical year inventories to be updated with more accurate electricity consumption data by energy provider and for consistent electricity consumption data to be used throughout the time-series, providing for more accurate emissions calculation and comparison based on the electric suppliers and their renewable contents across inventory years 2019-2024.

The electricity sales were then adjusted by (1) a loss factor[21] of 0.085[22] to account for transmission and distribution losses; and (2) subtracting electricity use associated with moving water within the city limits, which is allocated to the water supply emissions category.

The adjusted net energy for load (electricity sales + losses) is provided in Table 9.

B4.2.2 City-Specific Electricity Emission Factor

For a given year, the city-specific electricity emission factor, expressed in pounds of CO_2e per Megawatt-hour (lbs CO_2e/MWh), is estimated based on the specific mix of bundled power, DA power, and SDCP power, if any, in the city and their respective emission factors. Emission factors from grid electricity suppliers are sourced from the California Energy Commission (CEC) Power Source Disclosure (PSD) Program. The CEC PSD Program, under the requirements of Assembly Bill (AB) 1110 (Ting, Chapter 656, Statutes of 2016), requires retail electric providers to disclose GHG emissions intensity (i.e., electricity emission factor) separately from unbundled renewable energy credits, starting in 2021 for 2020 procurements. The emission factors for SDG&E and SDCP for years 2020–2024 are provided directly in the power content labels reported under the CEC PSD Program and listed in Table 9.

The 2019 SDG&E bundled emission factors were calculated using Federal Energy Regulatory Commission (FERC) Form 1[23] data, the California Energy Commission (CEC) Power Source Disclosure (PSD) Program[24] data on SDG&E-owned and purchased power, and U.S. EPA Emissions and Generating Resource Integrated Database (eGRID) 2019 Edition[25] on specific power plant emissions. The 2019 SDG&E bundled

[21] The transmission and distribution loss factor is used to scale end-use demand or retail sales to produce net energy for load. L. Wong, ***A Review of Transmission Losses In Planning Studies***, CEC Staff Paper (August 2011).
[22] California Energy Commission (CEC): ***California Energy Demand 2015–2025 Final Forecast Mid-Case Final Baseline Demand Forecast Forms***, SDG&E Mid. The transmission and distribution loss (T&D) factor is calculated based on the ratio of net energy for load (total sales + net losses) and total sales from SDG&E Form 1.2 Mid. While T&D losses fluctuate, 1.085 is used as a constant for all jurisdictions regionally.
[23] FERC: **Form 1 – Electric Utility Annual Report**.
[24] CEC: **Power Source Disclosure Program** under Senate Bill 1305. The SDG&E annual power source disclosure reports in 2019 were provided to EPIC by CEC staff. SDG&E **2019 Power Content Label**, version October 2020. The CEC PSD Program, under the requirements of Assembly Bill (AB) 1110 (Ting, Chapter 656, Statutes of 2016), requires retail electric providers to disclose GHG emissions intensity (i.e., electricity emission factor) and unbundled renewable energy credits, starting in 2021 for 2020 procurements. Starting in 2021, the GHG emissions intensity reported by retail electric providers for the PSD Program will be used directly to calculate GHG emissions from the electricity category.
[25] U.S. EPA. **eGRID 2019 Edition**, released on February 23, 2021.

emission factor calculated using the sources above is 633 lbs CO_2e/MWh, with 31% eligible renewable, also shown in Table 9.

DA emission factors are not supplied directly by the PSD program, nor does the data exist to understand exactly which Energy Service Providers (ESPs) the DA customers located in San Diego are procuring power from. In the absence of detailed data, DA emission factors are estimated, when possible, based on the weighted average of all statewide ESPs generation and the corresponding annual emissions. The data required for this calculation was not published with the remaining PSD reports until 2021. Starting in data year 2021, the standard statewide annual average emission factor was calculated using the emission factors of all electric service providers in that year based on their PSD reports and power content labels.[26] For data years before 2021 (2019 and 2020), DA emission factors are linearly interpolated between an estimated 2014 California Public Utilities Commission (CPUC) emission factor (836 lbs CO_2e/MWh, based on a 2014 CPUC Decision D.14-12-037)[27] and the calculated 2021 DA emission factor. In data year 2023, the DA emission factor calculation was not possible due to data confidentiality issues in the PSD Program. However, the standard statewide annual average emission factor for data year 2024 was calculated again using the previous method (for data year 2021 and 2022 DA emission factors). This annual report updates the 2023 DA emission factor based on average values from 2022 to 2024 for the missing confidential pieces of information from 2023 data. All DA emission actors are shown in Table 9.

The city-specific electricity emission factors are provided in Table 9. This metric is calculated using a weighted average of net energy for load (electricity sales + losses) by electricity provider and the annual emission factor for that electricity provider.

B4.2.3 Total Emissions from Electricity

Emissions are calculated by multiplying the adjusted net energy for load (electricity sales + losses) and the corresponding city-specific electricity emission factor. The net energy for San Diego's load (electricity sales + losses), electricity emission factors, and corresponding GHG emissions from the electricity category for 2019-2024 are shown in Table 9.

Table 9: Net Energy for Load, Emission Factor, and GHG Emissions from Electricity Category (2019–2024)

Year	SDG&E Bundled Emission Factor (lbs CO_2e/ MWh)	SDCP Power On Emission Factor (lbs CO_2e/ MWh)	SDCP Power Base Emission Factor (lbs CO_2e/ MWh)	SDCP Power 100 Emission Factor (lbs CO_2e/ MWh)	DA Energy Service Provider Emission Factor (lbs CO_2e/ MWh)	Net Energy for Load (electricity sales + losses)[1] (MWh)	City-Specific Emission Factor (lbs CO_2e/ MWh)[2]	GHG Emissions (MT CO_2e)[4]
2019	633	n/a	n/a	n/a	735	7,934,303	649	2,336,000
2020	636	n/a	n/a	n/a	702	7,810,499	645	2,286,000
2021	504	378	n/a	0	668	7,548,576	501	1,714,000
2022	508	375	n/a	0	641	7,742,843	444	1,558,000
2023[3]	537	460	n/a	0	579	7,490,087	469	1,594,000
2024	663	442	672	0	447	7,431,403	438	1,475,000

[26] CEC: Annual Power Content Label for 2021 and Annual Power Content Label for 2022.
[27] CPUC: Decision 14-12-037, December 18, 2014 in Rulemaking 11-03-012 (filed March 24, 2011). The recommended emission factor is 0.379 MT CO_2e/MWh (836 lbs CO_2e/MWh). The recommended emission factor has not changed since 2014. However, all electric service suppliers must meet the Renewables Portfolio Standards in the target years.

n/a indicates that the rate tier was not available in this year.
1.The net energy for load does not include the net energy for load from San Diego County Regional Airport Authority, San Diego Port Authority and District tenants, and the military. 2022 and 2023 historical values have been updated based on more granular electricity sales data received from SDG&E, as described in Section B4.2.1. For the purposes of calculating a city-specific emissions factor, this column includes energy load from the water sector.
2. City-Specific emission factors are for electricity consumed within the City of San Diego city limits only. The city-specific emission factors are not the same as the emission factors of SDG&E bundled electricity, and do not represent citywide emission factors of other jurisdictions in the San Diego region.
3. Not all statewide direct energy service provider emission factors were available in the 2024 Annual Report. This Annual Report revises the 2023 DA emission factor to an estimate based on 2022 and 2024 values.
4. 2022 and 2023 historical values have been updated based on more granular electricity sales data received from SDG&E, as described in Section B4.2.1. Additionally, emissions from water energy have been updated to reflect updated data from water utilities
GHG emissions for each category are rounded. Values are not rounded in the intermediary steps in the calculation.
Energy Policy Initiatives Center, University of San Diego 2026

B4.3 Natural Gas

Emissions from natural gas use in San Diego were estimated using method Built Environment (BE.1) from the U.S. Community Protocol, by multiplying the natural gas use (the activity) and the natural gas emission factor each year.[28]

B4.3.1 Natural Gas Use

Annual natural gas sales were provided for years 2021-2024 by SDG&E. The annual natural gas sales for each year were broken down by customer class: (1) residential, and (2) commercial and industrial.[29] Natural gas sales data does, in some cases, include the natural gas used as a transportation fuel if the gas is purchased from SDG&E through standard delivery and compressed on-site into Compressed Natural Gas (CNG). The natural gas sales data do not include the sales to San Diego County Regional Airport Authority, San Diego Unified Port Authority and District Tenants, and the military. Additionally, natural gas that is purchased through SDG&E standard delivery and is then used for utility-scale energy generation is excluded from the natural gas sector and included in the electricity generation emission factors. For natural gas that is purchased through SDG&E standard delivery and used on-site for electricity generation, those emissions are included in the natural gas sector.

B4.3.2 Natural Gas Emission Factor

The natural gas emission factor is based on the heat content of the fuel and the fuel's CO_2, CH_4, and N_2O emissions. The heat content of fuel and the emissions from CO_2, CH_4, and N_2O were based on the CARB statewide inventory.[30] The natural gas emission factor is given in Table 10.

B4.3.3 Total Emissions from Natural Gas

To estimate emissions from the combustion of natural gas, end-use sales were multiplied by the emission factor. The total natural gas end-use and corresponding GHG emissions from the natural gas category for 2019-2024 are given in Table 10.

[28] ICLEI– Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix C: Built Environment Emission Activities and Sources.
[29] Natural gas sales were provided to EPIC by SDG&E (January 2026). 2019–2020 data provided by SDG&E previously were not updated.
[30] CARB: GHG Current California Emission Inventory Data.

Table 10: Natural Gas End-Use and GHG Emissions from Natural Gas Category (2019-2024)

Year	Residential Natural Gas End-Use (Million Therms)	Non-Residential Natural Gas End-Use[1] (Million Therms	Total Natural Gas End-Use (Residential + Non-Residential) (Million Therms)	Natural Gas Emission Factor (Million MT CO_2e/Million Therms)	GHG Emissions (MT CO_2e)
2019	220	131	351	0.00545	1,912,000
2020	205	130	335	0.00545	1,827,000
2021	217	134	352	0.00545	1,918,000
2022	198	119	317	0.00545	1,730,000
2023	202	128	330	0.00545	1,800,000
2024	196	118	314	0.00545	1,710,000

1.Commercial and industrial natural gas end-use are combined under non-residential end-use because for certain customers, they may switch between commercial and industrial customer class (or vice versa) from one year to the next due to the demand in that year.
The natural gas sales do not include the sales to San Diego County Regional Airport Authority, San Diego Unified Port District, and the military.
GHG emissions for each category are rounded to the nearest thousand. Values are not rounded in the intermediary steps in the calculation.
2022 and 2023 historical values have been updated based on more granular historical data received from SDG&E.
SDG&E 2020-2026, Energy Policy Initiatives Center, University of San Diego 2026

B4.4 Off-Road Transportation (Construction Equipment Only)

The emissions from gasoline and diesel fuel use for construction vehicles and equipment were estimated based on CARB off-road models. While the CARB model includes many off-road equipment types, the smallest data area available is at the County-level. As limited methods exist to scale the data to the city-level, only construction related equipment and its emissions are covered here as they are considered the most relevant off-road emissions source in the city. Common equipment types are excavators, off-highway tractors, and paving equipment. CARB's OFFROAD Emissions Inventory is the main model for estimating off-road transportation emissions.[31]

Due to the lack of jurisdiction-specific data from CARB models, the construction equipment emissions from CARB model outputs for the San Diego region were scaled to the city based on the ratio of regional and citywide construction jobs[32]. The ratio and the corresponding GHG emissions from the off-road transportation category for 2019-2024 are given in Table 11.

[31] CARB: OFFROAD2021 (v1.0.6) Emissions Inventory, all adopted rules -exhaust. Downloaded on May 20, 2024. An updated OFFROAD model (v1.1.3) was released in February 2025 that resulted in very minor County-wide emissions from construction equipment. To maintain a consistent time-series for modeled data, v1.0.6 is maintained.

[32] SANDAG Series 14 Jobs estimates are used to estimate the percent of construction jobs in the city compared to countywide. While Series 15 jobs data is available for year 2022, Series 14 estimates are used to maintain a consistent times-series of data.

Table 11: GHG Emissions from Off-Road Transportation (Construction Equipment Only) Category (2019 - 2024)

Year	GHG Emissions from Construction Equipment within San Diego Region ($MT\ CO_2e$)	Construction Jobs Ratio (City of San Diego/San Diego Region)	GHG Emissions from Construction Equipment within City of San Diego ($MT\ CO_2e$)
2019*	177,000	39%	69,000
2020	145,000	39%	57,000
2021	145,000	39%	57,000
2022	145,000	39%	57,000
2023	145,000	40%	57,000
2024	144,000	40%	57,000

*Emissions from 2019 have been updated since the 2022 CAP to reflect updates to the underlying CARB model.
CARB OFFROAD2021 (v1.0.6), Energy Policy Initiatives Center, University of San Diego 2026

B4.5 Solid Waste

Emissions from the decomposition of organic material in waste disposed at landfills were estimated using method Solid Waste (SW.4) from the U.S. Community Protocol, by multiplying the amount of waste disposed by the city in 2019 and an emission factor for mixed solid waste. [33] This represents the immediate and all future emissions from decay of this waste.

B4.5.1 Solid Waste Disposal

Solid waste disposal is the waste disposed by the city in landfills, including landfills located inside and outside of the city boundary. The vast majority of the waste (over 90%) from the city is disposed at West Miramar Sanitary Landfill (Miramar Landfill), Otay Landfill, and Sycamore Landfill.[34] The remaining amount is disposed at other landfills in California.[35]

The total waste disposal from the city was 1,631,407 short tons (1,479,988 metric tons) in 2024, 4% higher than in 2019. The total and per-capita solid waste disposal are given in Table 13.

B4.5.2 Mixed Solid Waste Emission Factor

The emission factor of mixed solid waste depends on the percentage of each waste type within the waste stream disposed in a landfill. Inventory years 2021 and after use CalRecycle's statewide waste characterization study to determine the emissions from a pound of landfilled waste.[36] Inventory years previous to CalRecycle's study year of 2021 uses the City of San Diego's 2012–2013 Waste Characterization Study, conducted at Miramar Landfill, which is the most recent waste characterization study done by the City.[37] Only the CH_4 emissions from waste degradation are included in this category because they represent a direct and human-caused (anthropogenic) climate impact. Emissions from other gases, including CO_2 emissions from waste degradation are considered biogenic and not included in this category. Biogenic CO_2 is considered part of the short-term carbon cycle (i.e., it results from

[33] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix E: Solid Waste Emission Activities and Sources.
[34] CalRecycle: Disposal Reporting System (DRS): Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility.
[35] CalRecycle RDRS Report 2: Jurisdiction Disposal and Beneficial Reuse by Destination, accessed April 2026

[36] CalRecycle: 2021 Disposal-Facility-Based Characterization of Solid Waste in California (DRRR-2024-1737). Published May 30, 2024.
[37] City of San Diego: Waste Characterization Study 2012–2013 Final Report (2014), accessed November 4, 2019.

recently living biological material that itself took up carbon from the atmosphere). Biogenic carbon is excluded from anthropogenic inventories, in accordance with ICLEI methodology.

The EPA Waste Reduction Model (WARM) is used to determine the emission factor of each waste type. WARM is a lifecycle GHG model to assess and compare waste management options (e.g., landfilling, recycling, source reduction, composting), through the lifecycle of waste materials (from material extraction to disposal). However, under the U.S Community Protocol, only emissions from the disposal and associated degradation of waste are included. Therefore, only the landfill emission factors in EPA WARM are used in the calculation. WARM reports the landfill CH_4 emission factor of each waste material in MT CO_2e/short ton, with and without Landfill Gas (LFG) recovery.

The mixed solid waste emission factor is given in Table 12. The landfill emission factors without LFG recovery are identified here; the LFG recovery is applied later.

Table 12: Mixed Solid Waste Emission Factor Comparison: 2021 Statewide Study and 2013 Regional Study

Waste Component	CH_4 without Landfill Gas Recovery (WARM v15) (MT CO_2e/short ton disposed)[3]	Pre-2021 Waste Distribution (%)[1]	2021 – 2024 Waste Distribution (%)[2]
Paper		16.8%	15.5%
Corrugated Containers/Cardboard	2.36	*5.0%*	7.4%
Newspaper	0.94	*0.8%*	0.3%
Magazine	1.08	*0.6%*	0.4%
Mixed Paper (general)	2.14	*10.4%*	5.7%
Plastic	0	8.9%	13.7%
Glass	0	1.7%	2.3%
Metal	0	3.5%	4.9%
Organics		38.9%	28.9%
Food	*1.62*	*15%*	9.2%
Tree (Branches)	*1.3*	*5.3%*	1%
Leaves and Grass	*0.59 (leaves)*	*6.8%*	2.2%
Trimmings	*0.73*	*3.5%*	2.8%
Mixed Organics	*0.53*	*8.3%*	13.0%
Electronics	0	0.6%	0.9%
Construction & Demolition Inerts	0	24.6%	12.0%
Household Hazardous Waste	0	0.2%	0.3%
Special Waste	0	3.1%	5.2%
Mixed Residue	0	1.6%	16.9%
Mixed Waste Emission Factor (MT CO_2e/short ton)		**0.785**	**0.589**

1 City of San Diego 2014.
2 CalRecycle 2021 Statewide Waste Characterization Study

Waste Component	CH_4 without Landfill Gas Recovery (WARM v15) (MT CO_2e/short ton disposed)[3]	Pre-2021 Waste Distribution (%)[1]	2021 – 2024 Waste Distribution (%)[2]
3 EPA Waste Reduction Model (WARM) Version 15 (May 2019). A minor update to the emission factor of food waste has been published in WARM v16. To maintain a consistent time-series of data and document progress from waste reduction and diversion efforts primarily, WARM v15 is used.			

B4.5.3 Total Emissions from Solid Waste Disposed in Landfills

The mixed waste emission factor given in Table 12 is the emission factor without landfill gas collection. Landfill gas collection systems are in place at Miramar, Otay, and Sycamore landfills; however, site-specific methane studies are not available to estimate the landfill gas capture rate. Instead, a 75% default capture rate of CH_4 emissions from landfills, from the U.S. Community Protocol, is applied in the emissions calculation. The total and per-capita solid waste disposal and the corresponding GHG emissions for 2019 are given in Table 13.

Table 13: Solid Waste Disposal into Landfills and Associated GHG Emissions (2019–2024)

Year	Citywide Solid Waste Disposal (Short Tons/Year)	Per Capita Solid Waste Disposal (lbs/person/day)[1]	GHG Emission Factor (MT CO_2e/Short Ton)	Oxidation Rate[2]	Total GHG Emissions (MT CO_2e)	Default CH_4 Capture Rate	Remaining Emissions (MT CO_2e)
2019	1,569,447	6.19	0.785	10%	1,108,000	75%	277,000
2020	1,543,627	6.12	0.785	10%	1,090,000	75%	273,000
2021	1,631,802	6.49	0.589	10%	864,000	75%	216,000
2022	1,596,546	6.36	0.589	10%	846,000	75%	212,000
2023	1,607,277	6.35	0.589	10%	851,000	75%	213,000
2024	1,631,407	6.41	0.589	10%	864,000	75%	216,000

GHG emissions for each category are rounded. Values are not rounded in the intermediary steps in the calculation.
[1] Informational, based on total waste disposal and population estimates. Population estimates are from California Department of Finance as shown in Table 2. Previous iterations of the Annual Report reported these values in kg/person/day. This Annual Report modifies the units to lbs/person/day to be consistent with CalRecycle tracking.
[2] The oxidation rate is a default estimate of methane that is oxidized and not emitted, therefore only 90% of total methane emissions are produced per the ICLEI Community Protocol.
Energy Policy Initiatives Center, University of San Diego 2026

B4.5.4 Estimating Emissions from Previously Disposed Solid Waste (Not Reported in Inventory)

The Community Protocol recognizes that there are emissions from waste previously disposed in landfills located within the city boundary (i.e., in-boundary landfills). The emissions from waste-in-place can be reported optionally in addition to emissions from waste disposal. The Protocol provides a separate method to estimate emissions from past disposal (waste-in-place). The of San Diego has two active landfills and four closed landfills within its boundary. Emissions from waste already in place in the two active and four closed landfills are tracked separately here and are not included in the reported value for solid waste emissions in the city GHG emissions total.

For landfills that were required to report GHG emissions through the Environmental Protection Agency's Mandatory Greenhouse Gas Reporting Program (EPA MRR), including West Miramar, Sycamore, and

North Miramar Landfills, the reported values are used directly.[38] For the landfills not subject to EPA MRR, emissions were calculated based on the Landfill Emissions Tool developed by CARB using the first order decay model recommended by the IPCC.[39] As of May 2026, the EPA has not released MRR or other data under the Greenhouse Gas Reporting Rule (GHGRP) for data year 2024. The EPA has proposed to eliminate these reporting obligations under Executive Order 14192.

The solid waste emissions inventory accounts for GHG emissions associated with waste generated and disposed of by city residents and businesses in the current inventory year, regardless of where that waste is ultimately disposed. This approach captures the projected lifetime methane emissions attributable to material disposed in a given year. However, because the city also hosts active landfills within its boundaries, emissions from those facilities are presented as a separate informational item. These in-boundary landfill emissions represent current-year releases from waste that has accumulated at the landfill over many years. Because the two estimates reflect fundamentally different accounting boundaries—one based on where waste is generated, the other on where it physically decomposes—they cannot be directly summed and are reported separately to avoid double-counting.

The emissions from San Diego landfills are given in Table 14.

Table 14: Emissions from In-boundary Landfills (Information Only, Not Reported in GHG Inventory)

Landfill, Status	2019 Landfill Emissions (MT CO_2e)	2020 Landfill Emissions (MT CO_2e)	2021 Landfill Emissions (MT CO_2e)	2022 Landfill Emissions (MT CO_2e)	2023 Landfill Emissions (MT CO_2e)	2024 Landfill Emissions (MT CO_2e)[5]
West Miramar Sanitary Landfill, Active[1]	154,932	198,685	152,566	141,544	115,295	Data not available
Sycamore Landfill, Active[1]	86,057	87,168	107,175	155,748	105,269	Data not available
North Miramar Sanitary Landfill, Closed in 1983[1]	2,974	2,211	3,420	3,210	3,564	Data not available
South Chollas Sanitary Landfill, Closed in 1981[2]	n/a	n/a	n/a	n/a	n/a	n/a
Arizona Street Landfill, closed in 1974[3]	9,598	9,408	9,222	9,039	8,860	8,685
Mission Bay Landfill #1[4]	5,530	5,420	5,313	5,104	5,104	5,003
Total	259,091	302,892	277,696	314,645	238,092	Not available

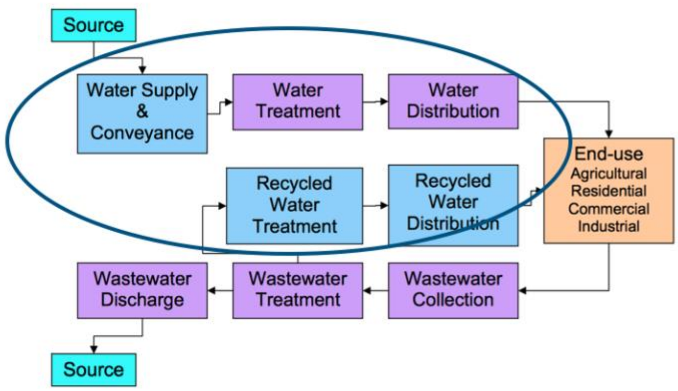
1.Source: EPA MRR
2.Discontinued reporting to EPA MRR in 2015
3.CARB Landfill Emission Tool (CARB LET) result using waste received before closing
4.CARB LET result using operational period 1952-1959 and waste-in-place at the end of 1990
5.EPA MRR data not available for CY2024
n/a = not available
Landfill emissions reported in EPA MRR were estimated from methane recovery, destruction and other factors. The emissions may differ from modeled methane generation and from previous versions.
CARB 2026, EPA 2024, Energy Policy Initiatives Center, University of San Diego 2026

[38] EPA: 2019 Greenhouse Gas Emissions from Large Facilities, accessed November 10, 2020.
[39] CARB: Landfill gas tool, released September 24, 2021, download date: January 9, 2023. Results may differ from the previous v1.3 tool released in 2011. Tool reports CO_2e of CH_4 using 21 as CH_4 GWP; recalculated by EPIC using 25 as CH_4 GWP.

B4.6 Water

Emissions from water use in a jurisdiction result from the energy required to move water from origin sources to end-use customers, including upstream supply and conveyance, water treatment, and water distribution, as circled in Figure 3. The energy used to move and treat water supplies used in the city is primarily electricity but may include natural gas or other fuels.

Figure 3: Segments of the Water Cycle



California Energy Commission, 2005

Emissions from water were estimated using the method Wastewater and Water (WW.14) from the U.S. Community Protocol, based on the water use, water source types, energy intensities per unit of water, and the electricity emission factor associated with the energy use.[40] Emissions associated with water end-use, such as water heating and cooling, are included in the electricity and natural gas categories, not in this water category, as data are not available to separate out those values.

Water agencies developing their own GHG inventories would not follow the U.S. Community Protocol because the U.S. Community Protocol is specifically for community-wide inventories, not for other types of entities. Therefore, the scope and boundary of emissions included in this sector are different from those of a water agency's GHG inventory. For example, the water agencies may account only the emission generating activities within their operational or financial control in their GHG inventories.

B4.6.1 Water Use

The City of San Diego is a member agency of the water wholesaler in the San Diego region, the San Diego County Water Authority (SDCWA). The City of San Diego delivers potable and recycled water within the city boundary, and also sells water to or treats water for neighboring water agencies and cities, such as the City of Del Mar, South Bay Irrigation Water District, and the California American Water Company (CalAm).[41]

The potable water supply sources for the City of San Diego include (1) water purchased from the San Diego County Water Authority (SDCWA), either directly delivered to one of the City's treatment plants or stored in various reservoirs; (2) local supply including groundwater and captured local runoff from

[40] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix F: Wastewater and Water Emission Activities and Sources.
[41] California American Water Company (CalAm)'s service area in San Diego region includes Cities of Imperial Beach and Coronado, and portions of the City of Chula Vista. California American Water: 2020 Urban Water Management Plan, Southern Division – San Diego County District (2021).

rainfall within the City's nine reservoirs; (3) recycled water for non-potable use; and (4) the Phase 1 Pure Water San Diego Program (potable reuse) which is approved, permitted, and in progress.[42] Recycled water is produced at the City's North City Water Reclamation Plant (North City WRP) and South Bay Water Reclamation Plant (South Bay WRP) and is used for non-potable uses, such as landscape irrigation.

The potable water supplied to city customers (excluding sales to other water agencies) and the percentage of water from each source, as well as total recycled water supplied are provided in Table 15.[43]

Table 15: Water Supplied and Supply Source (2019–2024)

Year	Potable Water: Imported SDCWA Treated	Potable Water: Imported SDCWA Untreated	Potable Water: Local Surface Reservoir	Potable Water: Local Groundwater Basin	Total Potable Water Supplied (Acre-Feet)	Recycled Water Supply (Acre-Feet)
2019	10%	77%	14%	0.1%	161,472	7,999
2020	12%	73%	14%	0.1%	166,742	8,842
2021	8%	84%	7%	0.3%	161,995	8,586
2022	6%	86%	8%	0.3%	171,984	10,012
2023	10%	66%	23%	0.3%	155,215	8,675
2024	11%	57%	32%	0.3%	164,159	8,472

Percentages may not add up to totals due to rounding. Potable water supplied (acre-feet) is the City of San Diego's water production excluding sales to other water agencies.
City of San Diego Public Utilities Department 2026, Energy Policy Initiatives Center, University of San Diego 2026

B4.6.2 Energy Intensity of Water

The energy used to produce and distribute water from each water source is different due to the different raw source type and its location. The energy intensity of water, or the energy needed to move one unit of water through each segment of the water-use cycle (water supply and conveyance, water treatment, and water distribution) individually, expressed in kWh per acre foot (kWh/Acre-foot), is described below.

<u>Upstream Supply and Conveyance</u> – This is defined as supply and conveyance of water from the raw sources to the local service area. The upstream supply and conveyance energy use for SDCWA untreated water consists of conveyance of water from the State Water Project and the Colorado River through Metropolitan Water District's (MWD) and SDCWA's service area. The energy use associated with upstream supply and conveyance for SDCWA treated water consists of that associated with SDCWA untreated water and water treatment before the water is delivered to City of San Diego's service area. The water may be treated at MWD or SDCWA's water treatment plants (WTPs). The City does not have operational control over the upstream supply and conveyance. Upstream energy intensity of water supplied is shown in Table 16.

[42] City of San Diego, 2025 Urban Water Management Plan, Section 4 Water Supplies (2026).
[43] Recycled water sales, water production at each of City's water treatment plants (WTPs) from each water source and sales to other agencies (City of Del Mar and CalAm) were provided by City of San Diego from 2017 to 2019. Water sale to City of Del Mar is from the imported raw water treated in City of San Diego's WTPs. The water sale to CalAm (excluding CalAm's service area in City of San Diego's South Bay area) is from local water treated in WTPs. Starting in 2021, water sales to South Bay Irrigation District is from a mixture of local supply and imported water treated in Otay WTP. Recycled water was produced at the City's North City Water Reclamation Plant and provided to City customers only.

Table 16: Components of Average Upstream Energy Intensity for SDCWA Member Agencies

Water System Segment	FY 2018 and 2019 Average Energy Intensity (kWh/Acre-Foot)[4]	CY 2023 Energy Intensity (kWh/Acre-Foot)[5]
MWD delivered untreated[1]	1,767	2709.2
SDCWA conveyance[2]	-33.4	31.8
SDCWA Untreated Subtotal	**1,733**	**2,741**
SDCWA treatment	110.0	140.1
SDCWA distribution[3]	9.4	17.5
SDCWA Treated Total	**1,853**	**189**

MWD - Metropolitan Water District, SDCWA – San Diego County Water Authority, UWMP - Urban Water Management Plan. "Upstream" refers to moving water from the original source to SDCWA's member agency's service area or first connection point
[1]Includes conveyance from the State Water Project & Colorado River water to MWD's distribution system, and distribution from MWD to MWD's member agencies.2018-2019 data source: MWD UWMP 2020 Appendix 10.
[2]Conveyance of raw water supplies to the water treatment plants or to member agency connections (negative value means hydro-electric generation by SDCWA).
[3]Distribution of treated water from SDCWA's Twin Oaks Water Treatment Plant to SDCWA's member agencies.
[4] All FY 2018-2019 data comes from the 2020 MWD UWMP and 2020 SDCWA UWMP
[5] CY 2023 data is sourced from the City of San Diego 2025 UWMP
San Diego County Water Authority: 2025 Urban Water Management Plan **(March 2026),** 2020 Urban Water Management Plan **(March 2021); Metropolitan Water District of Southern California:** 2020 Urban Water Management Plan **(June 2021), City of San Diego:** 2025 Urban Water Management Plan **(May 2026), Energy Policy Initiatives Center, University of San Diego 2026**

Local Supply and Conveyance – This is defined as supply and conveyance of local surface and groundwater within the water agency service area to water treatment plants, such as pumping water from local surface water reservoirs to nearby water treatment plants. Due to the way data is provided, the local supply and conveyance energy intensity is combined with local water treatment energy intensity.

Local Potable Water Treatment – This is the energy used for water treatment plant operations. The energy intensity depends on the source water quality, the treatment level, and capacity and efficiency of the associated WTP. The City of San Diego owns three WTPs: Alvarado, Miramar, and Otay WTP that treat raw water to potable levels. The WTPs treat both imported untreated SDCWA water and local water. Both Alvarado and Otay WTP have on-site behind-the-meter PV systems. The PV systems are connected to the raw water pump stations at Alvarado and Otay WTP that pump water to and from the WTPs to the nearby reservoirs. Because the water conveyance and treatment operations are connected, the local water conveyance and treatment energy intensity are combined and given in Table 17.

Table 17: Local Water Conveyance and Treatment Energy Intensity (2019–2024)

Combined Miramar, Otay and Alvarado WTPs	2019	2020	2021	2022	2023	2024
Water Treated (Acre-Feet)[1]	152,586	153,389	162,374	169,185	146,273	152,640
Total Treatment + Conveyance Energy Use (kWh)[2]	11,519,163	11,442,957	12,055,042	15,297,562	15,975,577	14,377,358
Total Treatment + Conveyance Energy Intensity (kWh/Acre-Foot)[3]	75	85	No data	105	126	123
Solar Production (kWh)[4]	2,272,785	2,172,498	No data	2,138,351	1,588,996	1,717,268
Net Treatment + Conveyance Energy Use (kWh)[5]	9,255,955	9,279,866	No data	13,159,211	14,386,581	12,660,090
Net Treatment + Conveyance Energy Intensity (kWh/Acre-Foot)[6]	**61**	**60**	**60**	**78**	**98**	**83**

1.Total water treated at three WTPs
2.Total electricity consumption including treatment plant operation, lake pump stations and electricity generated at Alvarado and Otay on-site PV systems
3.Total Energy Intensity (total electricity divided by water treated)
4.Annual electricity generated Alvarado and Otay on-site PV systems
5.Net electricity purchase from the grid (SDG&E). Total electricity consumption minus solar production.
6.Net Energy Intensity (net energy divided by water treated)
City of San Diego Public Utilities Department 2026, Energy Policy Initiatives Center, University of San Diego 2026

Starting in March 2019, not all the solar generated at Otay Lake Pump Station (OLPS) is used solely by the pump station. The excess solar generation goes to the grid and is shared with other City accounts. The solar generation share allocated to the OLPS was available for 2020 but not for 2021, therefore, the 2020 energy intensity was used as a proxy for 2021. Data was available all other inventory years.

Local Potable Water Distribution – This is defined as the energy required to move treated water from water treatment plants to end-use customers. Distribution energy use includes energy use for water pump stations and/or pressure reduction stations, water storage tanks, etc. Local distribution energy intensity depends on the service area's geological conditions, such as the elevation the water is pumped to/from, the pump station's energy efficiency, and whether a pump station is offline for maintenance or repair, which would cause water to be pumped to other pressure zones and rerouted back. The City of San Diego's water service area has some areas with gravity-fed system (no energy needed) and some areas that use water pumping. The citywide water distribution energy intensity is given in Table 18.

Table 18: Local Water Distribution Energy Intensity (2019–2024)

Citywide Water Distribution	2019	2020	2021	2022	2023	2024
Total Water Moved (Acre-Feet)	168,014	173,787	174,952	179,695	162,145	170,734
Distribution Pump Stations Energy Use (kWh)	25,340,506	26,614,233	27,273,076	27,185,368	25,969,218	27,030,009

Citywide Water Distribution	2019	2020	2021	2022	2023	2024
Water Distribution Energy Intensity (kWh/Acre-Foot)	**151**	**153**	**156**	**151**	**160**	**158**
The energy intensities are the citywide water distribution system energy intensities, and do not represent the energy intensity of a specific area or pressure zone within the City. 1.Total City of San Diego water production from all water sources (including sales to other water agencies) 2.Electricity use at water pump stations excluding lake pump stations 3.Citywide water distribution energy intensity **City of San Diego 2026, Energy Policy Initiatives Center, University of San Diego 2026**						

Local Recycled Treatment and Distribution – This is energy required to treat recycled water (tertiary treatment, in addition to conventional wastewater treatment) and deliver it to end-use customers. In the City, the recycled water is delivered to customers in purple pipes, separated from the potable water distribution system. The recycled water energy intensity from the City's UWMP voluntary reporting is 38 kWh/Acre-Foot[44] (used for inventory years 2019-2022), and 6,605 kWh/Acre-Foot[45] (used for inventory years 2023-2024) . The intensity includes energy use for tertiary treatment at WTPs and for recycled water distribution.

B4.6.3 Total Emissions from Water

To convert the energy intensity of water to GHG emissions per unit of water, the electricity emission factor associated with the energy use is applied. For upstream energy use, a California-wide average emission factor from EPA eGRID is applied.[46] For local (i.e., not upstream of the San Diego region) energy use, including potable water conveyance and treatment, distribution, and recycled water treatment and distribution, SDG&E's bundled electricity emission factor is applied for 2019 and 2020 because SDG&E was the electricity supplier. SDCP electricity emission factors were applied for 2021 through 2024 because municipal accounts were switched to SDCP in 2021. The electricity emission factors are given in Table 19.

Table 19: Electricity Emission Factors for Water-Energy Intensities (2019–2024)

Year	Electricity Emission Factors for Water-Energy Intensities: Upstream (WECC-California from eGRID) (lbs CO_2e/MWh)[1]	Electricity Emission Factors for Water-Energy Intensities: Local (SDG&E or SDCP)[2] (lbs CO_2e/MWh)
2019	455	633 (SDG&E bundled)
2020	515	636 (SDG&E bundled)
2021	534	378 (SDCP)[2]
2022	499	0 (SDCP Power 100)
2023	438	0 (SDCP Power 100)
2024	438[1]	0 (SDCP Power 100)
1.EPA eGRID did not estimate emission factors for the CAMX region for data year 2024. Values from 2023 are used as a proxy.		

[44] City of San Diego, 2020 Urban Water Management Plan, Table 7-5 Energy Intensity for Wastewater and Recycled Water, released June 2021.
[45] City of San Diego, 2025 Urban Water Management Plan, Table 7-6 Energy Intensity for Wastewater and Recycled Water, released May 2026.
[46] The Western Electricity Coordinating Council (WECC) CAMX (eGRID Subregion) emission rates from eGRID were used as representative of the average California electricity emission rate for upstream electricity. U.S. EPA. eGRID2019, released February 23, 2021; eGRID2020, re-released January 30, 2023; eGRID2021, released January 30, 2023; eGRID2022 released Feb 26, 2024.

2.SDG&E bundled emission factor is different from City-specific electricity emission factor, which is based on percentages of electricity sales to SDG&E bundled and DA customers, SDG&E and DA emission factors.
EPA 2024, Energy Policy Initiatives Center, University of San Diego 2026

For upstream supply and conveyance emissions, the volume of water from SDCWA (treated and untreated) was multiplied by the upstream energy intensities (Table 16) and the upstream electricity emission factor (Table 19). Because the electricity use and GHG emissions associated with upstream supply and conveyance are outside the city boundary and would not be included in the electricity category, they are accounted for in the water category.

For local conveyance and treatment emissions, the volume of water treated at three WTPs and delivered within the city (excluding sales to other agencies) was multiplied by the net water treatment energy intensity (Table 17) and local grid electricity emission factor (Table 19). Because WTPs are located within San Diego, the electricity use associated with water treatment is included in the electricity category for San Diego. Therefore, electricity and GHG emissions associated with water treatment occur within the city boundary and have been subtracted from the electricity category, as they are accounted for in the water category.

For local water distribution emissions, total water within the city (excluding sales to other agencies) was multiplied by the water distribution energy intensity (Table 18) and local grid electricity emission factor (Table 19). Electricity and GHG emissions associated with water distribution occur within the city boundary and have been subtracted from the electricity category, as they are accounted for in the water category.

For recycled water treatment and distribution emissions, total recycled water supplied was multiplied by the recycled water energy intensity (38 kWh/Acre-Foot) and local grid electricity emission factor (Table 19). Electricity and GHG emissions associated with recycled water treatment and distribution occur within the city boundary and have been subtracted from the electricity category, as they are accounted for in the water category.

The total potable and recycled water supplied and the corresponding GHG emissions from the water category are given in Table 20.

Table 20: Water Supplied and GHG Emissions from the Water Category (2019–2024)

Year	Potable Water Supplied (Acre-Feet)	Recycled Water Supplied (Acre-Feet)	Upstream GHG Emissions (MT CO_2e) [1]	Local GHG Emissions (MT CO_2e)[2]	Total GHG Emissions (MT CO_2e)
2019	161,472	7,999	51,000	10,000	61,000
2020	166,742	8,842	59,000	11,000	70,000
2021	161,995	8,586	64,000	2,000	66,000
2022	171,984	10,012	65,000	0	65,000
2023[1]	155,215	8,675	57,000	0	57,000
2024	164,159	8,472	51,000	0	51,000

GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
1 Upstream emissions have been updated since the 2024 Annual Report to incorporated newly released water energy intensity data from water agency's 2025 Urban Water Management Plans.

2 Local emissions have been updated from the 2024 Annual Report to reflect that all City facilities receive power from SDCP Power 100 starting in April 2021. **Energy Policy Initiatives Center, University of San Diego 2026**

B4.7 Wastewater

The emissions from wastewater generated by San Diego were estimated by multiplying the total amount of wastewater generated in 2024 and the emission factor of the wastewater treatment processes. Unlike the water category, in which the GHG emissions result from the energy used to move and treat water, wastewater-related GHG emissions include only "*process, stationary and fugitive GHG emissions,*" as described in U.S Community Protocol "WW.1 – WW.14."[47]

B4.7.1 Wastewater Generation

Wastewater generated in the city is conveyed to the City of San Diego Metropolitan Sewerage System (Metro System). The Metro System collects and treats wastewater from 12 partner agencies. Wastewater collected by the Metro System is treated at one of the three wastewater treatment plants (WWTPs): Point Loma WWTP, North City WRP, and South Bay WRP.[48]

It is assumed that the percentage of City of San Diego's wastewater treated at each WWTP is the same as that of the entire Metro System. The City's wastewater generation and the percentage treated at each WWTP are given in Table 21.

Table 21: City of San Diego Wastewater Generation (2019–2024)

Year	% of Wastewater Treated at Point Loma WWTP	% of Wastewater Treated at South Bay WRP	% of Wastewater Treated at North City WRP	Wastewater Flow to Metro System Average Million Gallons per Day (MGD)	Wastewater Flow to Metro System Million Gallons per Year
2019	86%	4%	10%	105	38,241
2020	86%	4%	10%	105	38,192
2021	87%	4%	9%	103	37,591
2022	88%	4%	8%	101	36,865
2023	88%	4%	8%	107	39,143
2024	88%	4%	8%	104	38.028
Sums may not add up to totals due to rounding. WWTP – wastewater treatment plant; WRP – water reclamation plant. **City of San Diego 2026, Energy Policy Initiatives Center, University of San Diego 2026**					

B4.7.2 Wastewater Emission Factor

Point Loma WWTP and North City WRP both report plant operation GHG emissions to CARB under the Mandatory GHG Reporting Regulation (MRR) program;[49] South Bay WRP falls under the threshold for mandatory reporting[50]. The reported GHG emissions include three components: (1) direct CO_2 from combustion of anaerobic digester gas; (2) CH_4 and N_2O emissions from digester gas combustion; and (3)

[47] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2 (2019), Appendix F: Wastewater and Water Emission Activities and Sources.
[48] City of San Diego, 2025 Urban Water Management Plan, Section 1 (2026). Some of the North City WRP's flow (non-tertiary flow) is conveyed to Point Loma WWTP for discharge.
[49] CARB: Mandatory GHG Reporting – Reported Emissions. CARB MRR uses 21 as the CH_4 GWP, therefore the CO_2e for CH_4 in this report is recalculated using 25 as the CH_4 GWP to be consistent with other categories in the inventory.
[50] Industrial sources that emit more than 10,000 MT CO_2e are required to report under CARB's MRR.

operational fossil fuel emissions assuming complete combustion. Direct CO_2 from combustion of anaerobic digester gas is considered biogenic and is not included in this inventory in accordance with ICLEI Community Protocol guidelines on biogenic emissions.

The wastewater treatment emission factor (MT CO_2e/million gallons) at Point Loma WWTP and North City WRP are calculated by dividing the reported GHG emissions by the plants' wastewater flows, as shown in Table 22. Because the exact emissions are not known for South Bay WRP, a weighted average of annual flow and emissions are calculated from Point Loma WWTP and North City WRP and applied to the additional flow treated at South Bay WRP.

Table 22: Emission Factors at Wastewater Treatment Plant (2019–2024)

Year	Point Loma WWTP Annual Flow (million gallons)	Point Loma WWTP GHG Emissions (MT CO_2e)	Point Loma WWTP Wastewater Emission Factor (MT CO_2e/million gallon)	North City WRP Annual Flow (million gallons)	North City WRP GHG Emissions (MT CO_2e)	North City WRP Wastewater Emission Factor (MT CO_2e/million gallon)
2019	52,571	15,955	0.30	5,905	17,733	3.0
2020	52,122	17,403	0.33	5,858	13,503	2.3
2021	51,556	17,289	0.34	5,074	13,503	2.7
2022	53,546	15,072	0.28	4,873	3,815	0.8
2023	55,060	21,450	0.39	5,170	72	0.01
2024	55,225	18,887	0.34	4,938	86	0.02

WWTP – wastewater treatment plant; WRP – water reclamation plant.
On average 99% of the emissions from Point Loma WWTP and 98% of emissions from North City WRP are biogenic.
City of San Diego 2026, Energy Policy Initiatives Center, University of San Diego 2026

B4.7.3 Total Emissions from Wastewater

To calculate GHG emissions, the wastewater emission factor derived from Point Loma WWTP and North City WRP was applied to the total wastewater flow into all three plants. The total wastewater flow, the citywide weighted average wastewater emission factors, as well as the corresponding GHG emissions are given in Table 23. In 2022, there was a sharp decrease in emissions associated with wastewater treatment. This is because the on-site power plants using landfill gas at the North City Water Reclamation Plant were decommissioned that year.

Table 23: Wastewater Generated and GHG Emissions from Wastewater Category (2019–2024)

Year	Total Wastewater Generated (Million Gallons/year)	Wastewater Emission Factor[1] (MT CO_2e/ Million Gallon)	GHG Emissions (MT CO_2e)
2019	38,241	0.67	26,000
2020	38,192	0.60	23,000
2021	37,591	0.63	24,000
2022	38,865	0.34	13,000
2023	39,143	0.34	13,000
2024	38,028	0.30	12,000

[1] Weighted average emission factor of wastewater treated at three wastewater treatment plants in City of San Diego.
GHG emissions for each category are rounded to the nearest thousand. Values are not rounded in the intermediary steps in the calculation.
Energy Policy Initiatives Center, University of San Diego 2026

B5 METHODOLOGY DIFFERENCES AND DATA REFINEMENT

Table 24 provides a log of refinements to prior-year inventory calculations reported in this Annual Report as well as previous Annual Reports. Historical revisions are necessary when improved activity data or more comprehensive emission factor studies become available. Consistent with IPCC guidance on time-series integrity, this report applies such updates retroactively across all affected years rather than the most recent year alone which would otherwise risk misrepresenting emissions trends. This approach to revise historical inventories also follows the approach used by the California Air Resources Board (CARB) when updating the California statewide GHG inventory.[51] "No change" indicates that no method or data changes occurred since the 2022 CAP.

Table 24: Methodology Differences and Data Refinements of Annual GHG Inventory

Category	Category Detail	2019 Inventory (Used for 2022 CAP)	2019–2024 Inventory (This Annual Report)
Electricity	Activity (kWh)	Requested data from SDG&E by customer class, service provider, and rate schedule for customers with City of San Diego town code	2019–2020: No change 2021: Data requested from SDG&E by customer class within City of San Diego town code. No service provider or rate schedule available. Direct access and San Diego Community Power customer electricity use were estimated. 2022: Data requested from SDG&E by customer class within City of San Diego town code. No service provider or rate schedule available. Direct access customer electricity use was estimated based on previous year's data. SDCP consumption data provided. 2023: Data requested from SDG&E by customer class within City of San Diego town code. Received data disaggregated by service provider (SDG&E, SDCP, Direct Access) 2024: Received 2022-2024 and partial data year 2021 activity data including breakouts for customer class as well as service provider (DA, CCA, and SDG&E). Given the newly provided service-provider disaggregated data received in 2023, historical year's activity data was requested for this Annual Report.

[51] California Air Resources Board (CARB): California Greenhouse Gas Emissions for 2000 to 2023. Trends of Emissions and Other Indicators. (2025)

Category	Category Detail	2019 Inventory (Used for 2022 CAP)	2019–2024 Inventory (This Annual Report)
	Emission Factor (lbs CO_2e/MWh)	Created a weighted average emission factor based on a) SDG&E kWh procured from each fuel type at each facility/power plant and the emission factor of electricity generation at each facility/power plant (EPA eGRID2019 database specific plant level emission factor) for SDG&E's purchased power.	2020-2022: Used the SDG&E and San Diego Community Power emission factors reported under CEC's power source disclosure program. 2023: Updated the Direct Access emission factor using newly publicly provided statewide emissions factor for all direct Energy Service Providers throughout the state. Previously used a 2016 CPUC default factor for all direct access energy. Updated past years with newly available data. Only available up to date year 2022 2024: Updated Direct Access emission factor for data year 2023 using 2022 and 2024 data to estimate (Data year 2023 still censored due to confidentiality reasons for select Energy Service Providers. *More information in Section B4.2.2*)
Natural Gas	Activity (Therms)	Requested data from SDG&E by customer class, service provider, and rate schedule for customers with City of San Diego town code	2020: No change 2021-2022: Data requested from SDG&E by customer class within City of San Diego town code. No service provider or rate schedule available. 2023: Data requested from SDG&E by customer class within City of San Diego town code. Received data disaggregated by service provider (SDG&E, On-Site Generation, Direct Access) 2024: Received more granular 2022-2024 and partial data year 2021 activity data including breakouts for customer type and service provider.
	Emission Factor (MT CO_2e / Therm)	Natural gas emission factor in California based on California Air Resources Board statewide inventory	No change

Category	Category Detail	2019 Inventory (Used for 2022 CAP)	2019–2024 Inventory (This Annual Report)
Transportation	Activity (VMT)	Applied annual average VMT rate of increase from 2016-2019 HPMS data to 2016 VMT estimates. 2016 VMT estimates were provided by SANDAG using Series 14 Forecast and ABM2+ from the Draft 2021 Regional Plan	2020: Applied annual average VMT rate of increase from 2016–2019 HPMS data to 2016 VMT estimates provided by SANDAG using Series 14 Forecast and ABM2+ from the Final 2021 Regional Plan 2021: Applied the VMT 2019 to 2021 percent increase from PeMS data to 2019 VMT estimates, due to a delay in release of HPMS data (i.e., was not available at time of inventory publication) 2022: Applied HPMS data to 2016 VMT estimates to years 2021 and 2022 2023: No change 2024: No change
	Emission Factor (g CO_2e/mile)	San Diego region emission rate per vehicle class from EMFAC2021 with model default assumptions on vehicle mix, travel activities, etc.	No change *Note: EMFAC 2025 model was not incorporated into inventory estimates as the updated model has not yet been approved by the EPA. More information in Section B4.1.2*
Water	Activity (acre-feet)	Potable and recycled water supplied to City of San Diego (water production) separated into wholesale water (from San Diego County Water Authority) and local water (surface and groundwater) Removed water purchased by Del Mar and CalAm service area not in the City	No change
	Emission Factor (energy intensity - kWh/acre-foot)	Local energy intensity based on water treatment plants and lake pump stations electricity consumption, all other water pump stations and facilities electricity consumption Upstream supply energy intensity calculated based on Metropolitan Water District and SDCWA 2015 Urban Water Management Plan	2020-2023: Upstream energy intensity of water uses FY 2018-2019 energy intensity estimates from the 2020 Metropolitan Water District and San Diego County Water Authority Urban Water Management Plans 2024: Upstream energy intensity for 2023 and 2024 updated to reflect CY 2023 estimates sourced from the City of San Diego 2025 Urban Water Management Plan

Category	Category Detail	2019 Inventory (Used for 2022 CAP)	2019–2024 Inventory (This Annual Report)
	Electricity Emission Factor (lbs CO_2e/MWh)	Upstream: eGRID 2016	2019: eGRID2019 2020: eGRID2020 2021: eGRID2021 2022: eGRID2022 2023: eGRID2023 2024: eGRID data not available due to EPA program pause
Wastewater	Activity (gallons)	City of San Diego's annual average flow (MGD) entering into Metropolitan Sewerage System (include Point Loma WWTP, South Bay WRP and North City WRP)	No change
	Emission Factor (MT CO_2/gallon)	Calculated by dividing Point Loma WWTP and North City WRP GHG Emission reported in CARB Mandatory GHG Reporting by Point Loma WWTP and North City WRP total flow	No change
Solid Waste	Activity (tons)	Annual waste disposed tonnage provided by City of San Diego Environmental Services Department	2019–2020: No change 2021: Used 2020 waste tonnage due to a delay in reported data 2022: Updated 2021 waste tonnage with City's primary data. No other change 2023: No change 2024: No change
	Emission Factor (MT CH4/tons)	Emission factor for each waste component from EPA WARM Model Version 15 (2019 version) and waste components from City of San Diego waste characterization study 2012–2013	2019 – 2021: No change 2021-2023: Updated post-2021 data with 2021 statewide waste characterization study. 2024: No change *Note: EPA WARM Model v16 not incorporated into this inventory as the slight changes to the emission factors to food waste would not reflect trends related to progress but instead would require full time-series adjustment of underlying assumptions. More information in Section B4.5.2.*