CITY OF LOS ANGELES
2021 MUNICIPAL GREENHOUSE GAS INVENTORY

March 2023

Department of Public Works
LA Sanitation & Environment
Regulatory Affairs Division

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Executive Summary

This report presents the City of Los Angeles' municipal greenhouse gas (GHG) inventory for baseline year 2008 and 2017-2021. The municipal GHG inventory is an accounting of GHG emissions resulting from City of Los Angeles operations.

In 2019, LA Sanitation & Environment (LASAN) released the City's first Municipal Greenhouse Gas Emissions Inventory Report which determined that the City had reached its target of reducing municipal GHG emissions 35% below 2008 levels by 2025, eight years ahead of schedule. That same year, Los Angeles released its Green New Deal which included updated and accelerated targets for the City's municipal emissions:

- 55% reduction by 2025
- 65% reduction by 2035
- Carbon neutral by 2045

In 2021, the Los Angeles City Council passed a motion[1] intended to further accelerate the City's municipal carbon neutrality target to 2030 and its 100% renewable energy target to 2035. The motion instructed city departments to report back to the council by the end of 2022 with plans to achieve these accelerated goals, so their implementation remains to be seen.

Overall emissions have been decreasing as shown in Figure 1 below, and as of 2021, emissions are 55% below the 2008 baseline, once again reaching the City's 2025 emissions reduction goal ahead of schedule. It is important to note, however, that the COVID-19 pandemic impacted municipal operations in 2020, and those impacts continued in 2021. Therefore, the 2021 emissions reduction may or may not be attributed to actions or policy implemented by the City.

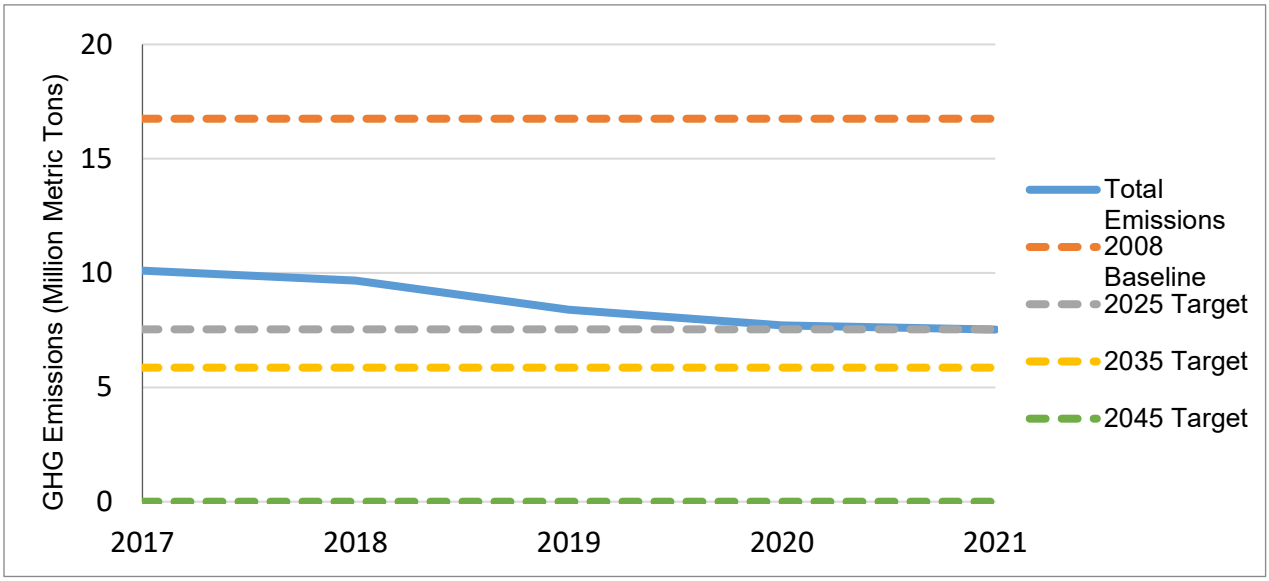

Figure 1. Municipal Emissions Progress Compared to Green New Deal Targets

[1] https://clkrep.lacity.org/onlinedocs/2021/21-1042_rpt_eccejr_10-7-21.pdf

1. Introduction

As a lead municipal agency in providing environmental services to the residents of Los Angeles, LA Sanitation & Environment (LASAN) plays a crucial role in supporting the City's climate goals for the future. In 2014, LASAN was tasked by the Mayor's Office of Sustainability (MOS) with producing greenhouse gas (GHG) inventories for the City of Los Angeles' municipal operations. In 2019, LASAN published the City's 2017 Municipal Greenhouse Gas Inventory Report.

As the City's municipal operations strive for carbon neutrality by 2045 as established by the 2019 Green New Deal, these inventories are essential to measuring and tracking Los Angeles' progress towards its climate goals. This report is intended to inform City leaders, officials, and managers on that progress. Metrics produced from these reports can also provide insight as to how the City can optimize its efforts to reduce its carbon footprint.

LASAN has produced a municipal greenhouse gas emissions inventory for a baseline year of 2008 and for years 2017-2021. 2008 was established as the municipal baseline in the City's Sustainable City pLAn. The most recent municipal inventory that has been completed is for 2021.

2. Methodology

2.1 Greenhouse Gases and Global Warming Potentials

The City of Los Angeles' municipal inventory assesses emissions of the three core internationally-recognized GHGs:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)

Emissions of each gas are calculated separately and then converted to metric tons of CO_2 equivalent (CO_2e) using Global Warming Potential (GWP) values from the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (AR4) (see Table 1 below).

Table 1. IPCC AR4 Global Warming Potential Values

Greenhouse Gas	Formula	GWP
Carbon Dioxide	CO_2	1
Methane	CH_4	25
Nitrous Oxide	N_2O	298
Note: Values are 100-year GWP values.		

The inventories utilize IPCC's AR4 GWP values to stay consistent with California Air Resources Board's (CARB) annual statewide California Greenhouse Gas Emissions Inventory. This report only presents emissions as CO_2e.

2.2 LGOP Methodology

To ensure reproducibility, accuracy, and consistency with best practices in GHG emissions accounting, this inventory follows the methodology outlined in the Local Government Operations Protocol (LGOP), published by ICLEI-Local Governments for Sustainability. The LGOP protocol was selected due to its widespread usage among municipalities, allowing for comparison between cities.

2.2.1 Inventory Boundaries

The boundaries of the City's municipal inventory are designed to capture the majority of GHG emissions on which it exercises operational control. The City of Los Angeles has operational control over numerous departments (including proprietary departments), bureaus, and agencies, which operate buildings, vehicle fleets, solid waste facilities, potable water supply facilities, power generation facilities, and water reclamation facilities.

2.2.2 Scopes

The City's operational boundaries identify emission sources as either direct or indirect, and then categorize these emissions by LGOP sector. The municipal inventories currently document only Scope 1 and 2 emissions.

Scope 1 emissions are considered "direct" emissions released on-site from owned or controlled sources. Direct emissions can occur from stationary or mobile combustion sources and physical or chemical industrial processes.

Scope 2 emissions are "indirect" emissions associated with the consumption of purchased or acquired electricity, heating, cooling, or steam. Indirect emissions are caused by activities under the City's operational control, but occur and are released into the atmosphere offsite, at sources operated by another entity.

Scope 3 emissions, whose reporting is optional under LGOP, are all indirect emissions not covered in Scope 2, such as emissions from transportation by vehicles not owned or controlled by the City. Scope 3 emissions are from sources that are related to local government operations but are not directly under the government's operational or financial control. These emissions are not currently reported in the municipal inventory due to a lack of available data, these will be included in the report as the data becomes available.

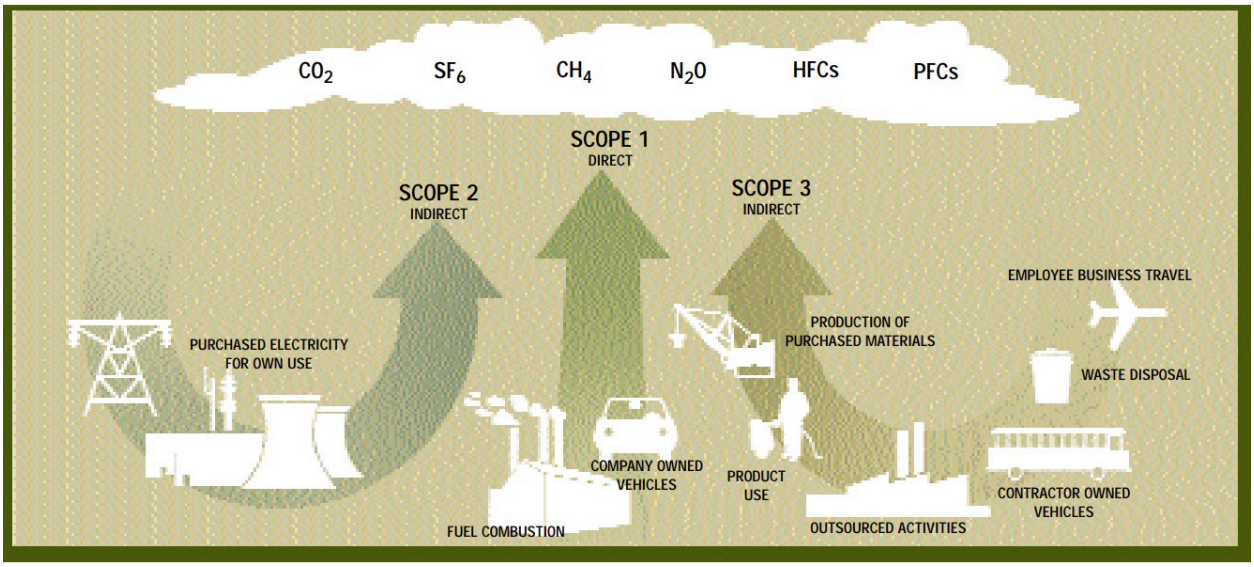

Figure 2. Overview of GHG emission scopes[2]

[2] Source: World Resources Institute/World Business Council for Sustainable Development GHG Protocol Corporate Standard Revised Edition, Chapter 4 (2004).

2.2.3 Sectors

Under LGOP, emissions are categorized into local government sectors. The local government sectors identified in LGOP are:

- Building and Other Facilities
- Streetlights and Traffic Signals
- Water Delivery Facilities
- Water Reclamation Facilities
- Port Facilities
- Airport Facilities
- Vehicle Fleet
- Transit Fleet
- Power Generation Facilities
- Solid Waste Facilities

These sectors create a framework that is relevant to local government activities and allow them to communicate inventory information clearly.

2.3 Data Collection and Providers

Through cooperation and collaboration with a variety of departments and agencies, LASAN has established a data collection process for preparation of the annual inventories. Table 2 below is a summary of the data providers.

Table 2. Municipal Inventory Data Providers

Data Provider	Data
City Departments	
Bureau of Street Services	Asphalt plant natural gas usage
General Services Department	Vehicle fuel usage
	Asphalt plant natural gas usage
LA Department of Transportation	Department vehicle fuel usage
LA Department of Water & Power	Department electricity usage
	Department natural gas usage
	Department vehicle fuel usage
	Power generation
LA Fire Department	Department vehicle fuel usage
LA Police Department	Department vehicle fuel usage
LA Sanitation & Environment	Wastewater process data
	Digester gas data
	Landfill gas data
Los Angeles World Airports	Department electricity usage
	Department natural gas usage
	Department vehicle fuel usage
Port of Los Angeles	Department electricity usage
	Department natural gas usage
	Department vehicle fuel usage
Utilities	
LA Department of Water & Power	Electricity usage
SoCal Gas	Natural gas usage

3. Findings by Sector

The sections below present the findings from the City of Los Angeles 2017-2021 municipal inventories compared to the 2008 baseline. Annually, LASAN updates the municipal GHG inventory to incorporate revised protocols, as well as make improvements to data collection processes, methodologies, emission factors, and quality assurance. Inventories from previous years are updated and revised to reflect these changes and to maintain a consistent time-series following recommendations from the IPCC for developing GHG inventories.

In 2020, due to the COVID-19 pandemic, some of the City's operations changed, but many of its essential services were not shut down. The effects of COVID-19 on some municipal operations persisted through 2021. These effects should be considered when reading through the report and interpreting the emissions data.

Table 3 presents total emissions by sector, as well as overall municipal emissions for years 2008, and 2017-2021. In 2021, power generation was the largest source of municipal emissions, followed by solid waste facilities and then buildings and other facilities.

Table 3. Total Emissions by Sector (MT CO_2e)

LGOP Category	2008	2017	2018	2019	2020	2021
Building and Other Facilities	266,795	159,544	170,628	155,099	136,609	141,070
Streetlight and Traffic Signals	153,247	36,793	45,203	38,865	30,654	32,453
Water Delivery Facilities	67,763	39,213	41,720	35,113	28,845	34,948
Water Reclamation Facilities	189,137	118,379	102,404	98,152	92,705	101,205
Port Facilities	7,654	6,466	6,822	6,380	5,013	4,705
Airport Facilities	135,388	86,889	90,801	91,605	78,381	79,089
Vehicle Fleet	191,292	171,349	161,986	145,038	132,047	137,959
Transit Fleet	35,263	24,463	29,370	20,420	19,980	24,122
Power Generation	16,206,619	9,616,772	9,179,050	7,931,835	7,263,656	7,078,694
Solid Waste Facilities	196,470	164,080	160,861	157,692	154,531	151,485
Total Municipal Emissions[3]	**16,750,555**	**10,105,814**	**9,668,591**	**8,394,385**	**7,709,448**	**7,530,111**

[3] As the City is both an electricity generator and consumer, adding Scope 1 and 2 emissions to generate a single City-wide total would result in double counting of emissions. Therefore, Scope 1 emissions are added together to generate the City-wide municipal total, and each sector's specific Scope 1 and Scope 2 are added together to show an overview of total emissions resulting from each sector's overall annual energy consumption.

As shown in Figure 3 below, 2021 saw a total GHG emission reduction of approximately 55% compared to 2008 baseline emissions.

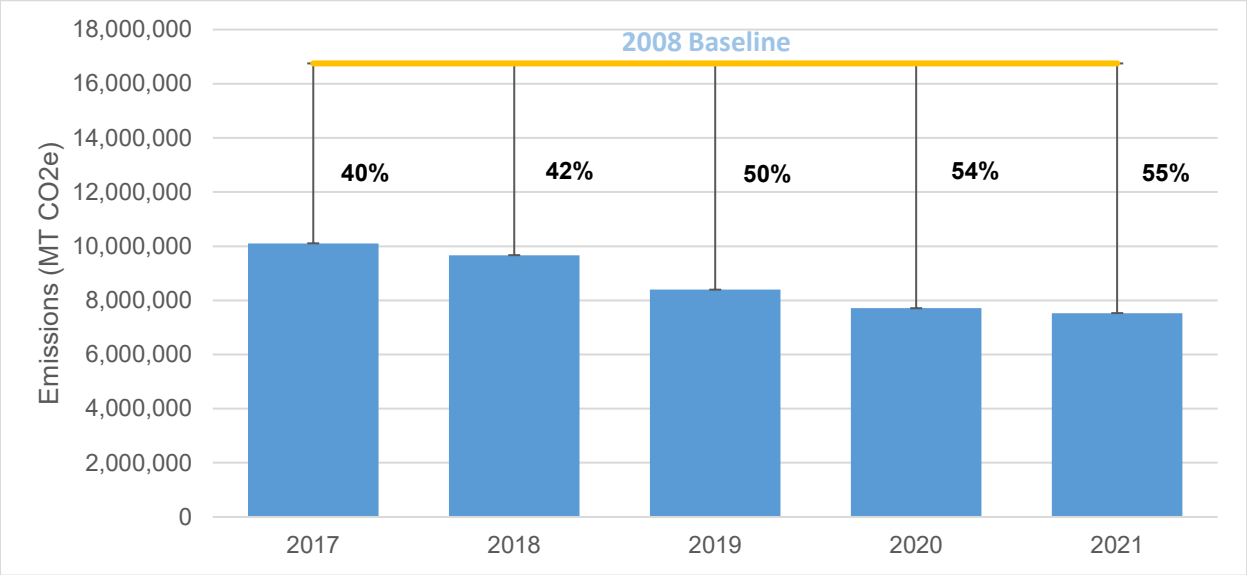

Figure 3. Overall Emissions Reductions

The primary driver of the City's overall emission reductions is the continued effort to decarbonize the electricity grid.

3.1 Power Generation

The power generation sector accounts for emissions associated with power either generated or purchased by the Los Angeles Department of Water and Power (LADWP) for consumption by its customers.

Table 4. Power Generation Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	16,206,619	9,616,772	9,179,050	7,931,835	7,263,656	7,078,694
Total	**16,206,619**	**9,616,772**	**9,179,050**	**7,931,835**	**7,263,656**	**7,078,694**
Biogenic CO_2[4]	-	102,616	8,667	-	-	-

Power generation is the largest source of emissions, generally accounting for over 90% of overall emissions. As of 2021, power generation emissions have decreased by 56% compared to the 2008 baseline, as illustrated by Table 4 and Figure 4.

[4] CO_2 emissions from biogenic material (e.g. biofuel) are reported separately for informational purposes and not counted in the emission totals. Carbon from biogenic sources already exist in the natural carbon cycle so biogenic CO_2 emissions are not an addition to the environment. CH_4 and N_2O emissions are included in the emissions totals.

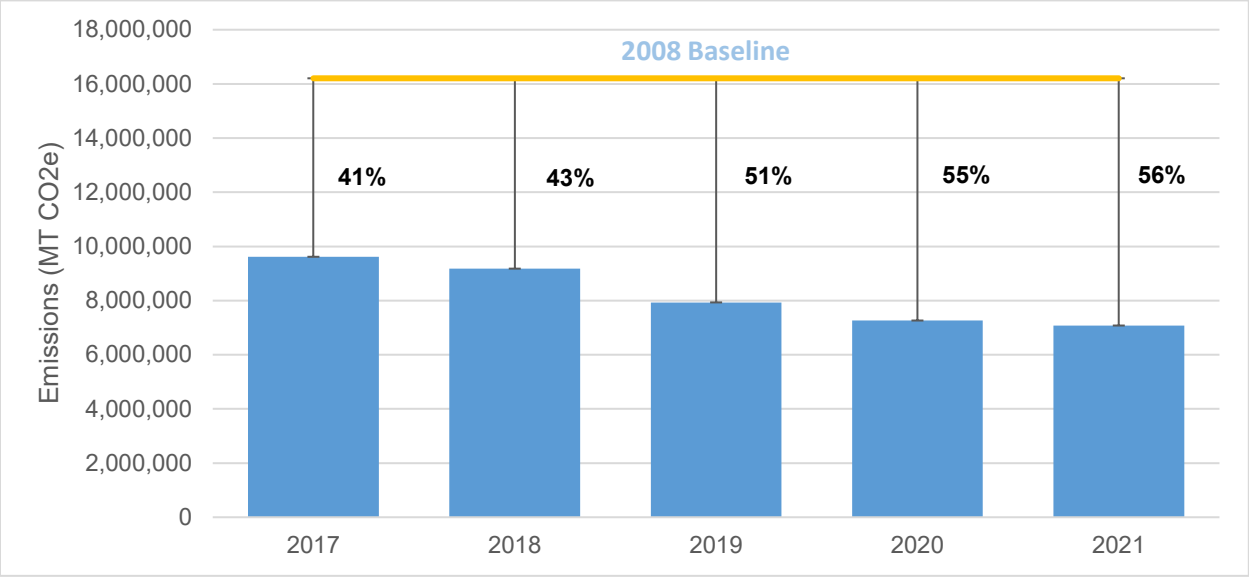

Figure 4. Power Generation Emissions Reduction from Baseline

The emission decrease associated with power generation is a result of lower carbon intensity of the electricity that LADWP supplies to the grid. This means that the amount of GHGs released on average per unit of electricity generated has gone down due to a decreased use of carbon-intensive fuels and an increased reliance on renewable energy. A LADWP-specific emission factor is used to calculate Scope 2 purchased electricity emissions, and therefore changes in Los Angeles' power generation emissions will also impact the City's overall Scope 2 emissions.

Power generation emissions will continue to decrease as the City works to implement the LA100 plan and achieve its 100% clean energy goal of sourcing electricity from renewable sources by 2045 as outlined by the Green New Deal, or potentially as early as 2035.

3.2 Buildings and Facilities

The building and facilities sector covers emissions associated with natural gas and electricity consumption from all City facilities that are used for municipal operations. This sector excludes facility energy used at landfill, seaport, airport, power generation, potable water, and water reclamation operations, as those emissions are covered in their respective sectors.

Table 5. Building and Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	26,543	25,636	29,780	31,061	34,425	32,472
Scope 2: Purchased Electricity	240,252	133,908	140,848	124,038	102,183	108,598
Total	**266,795**	**159,544**	**170,628**	**155,099**	**136,609**	**141,070**

Electricity consumption, which accounts for the largest portion of this sector's emissions, has generally decreased since 2008, but increased slightly in 2021, as shown in Table 5. On the other hand, natural gas consumption and the associated Scope 1 emissions have generally increased since 2008, but slightly declined in 2021.

In 2021, total emissions from the building and facilities sector were 47% below 2008 baseline levels, marking a small increase from last year's emissions, as illustrated by Figure 5.

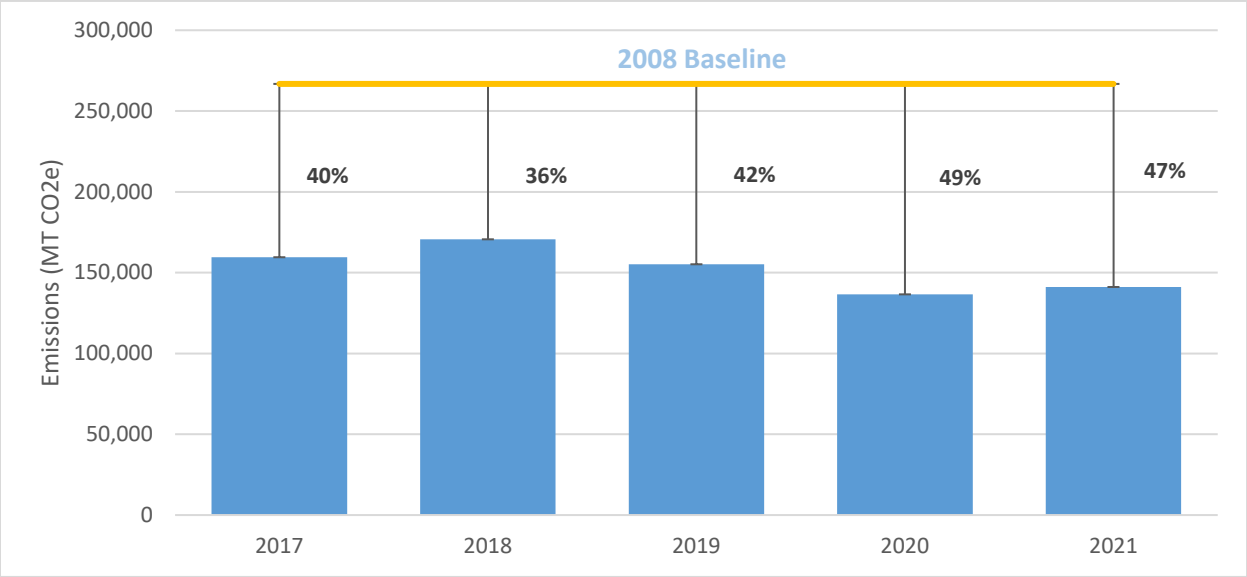

Figure 5. Building and Facilities Emissions Reductions from Baseline

While building heating is a contributor to the general increase in natural gas combustion, increased consumption at the City's asphalt plants as well as using pipeline natural gas that is converted to compressed natural gas (CNG) for heavy duty truck and bus vehicle fueling are also a factor in the increasing Scope 1 emissions. While most CNG fuel usage is accounted for in the Vehicle Fleet sector, there are some facilities that compress pipeline natural gas on-site for fueling purposes. As such, this is reflected as increased natural gas consumption at the facilities over the past five years.

The overall reduction in this sector's emissions from the baseline is driven by both the reduction in electricity consumption, as well as a reduction in the carbon intensity of the electrical grid.

L.A.'s Green New Deal includes a goal of ensuring all new municipally owned buildings and major renovations will be all-electric. While this may result in an electricity consumption increase, overall building emissions are expected to decrease as LADWP electricity's carbon intensity decreases.

3.3 Streetlights and Traffic Signals

Emissions reported in the streetlights and traffic signals sector consists of only Scope 2 purchased electricity emissions related to the operations of streetlights and traffic signals.

Table 6. Streetlights and Traffic Signals Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 2: Purchased Electricity	153,247	36,793	45,203	38,865	30,654	32,453
Total	**153,247**	**36,793**	**45,203**	**38,865**	**30,654**	**32,453**

On average, about 85% of emissions in this subsector are from streetlights. In 2018, electricity consumption associated with streetlights increased by approximately 25%, however consumption has generally been decreasing since.

This decrease is likely attributed to the Bureau of Street Services' efforts to convert all streetlights and LA tunnel lights to 100% LED lights and integrate smart nodes to enhance energy efficiency.

Table 6, above, indicates emissions were higher than last year's emissions as a result of increased electricity consumption. Emissions are expected to decrease hereafter as the grid's carbon intensity decreases.

In 2021, overall emissions for this sector were 79% below the 2008 baseline, as seen in Figure 6.

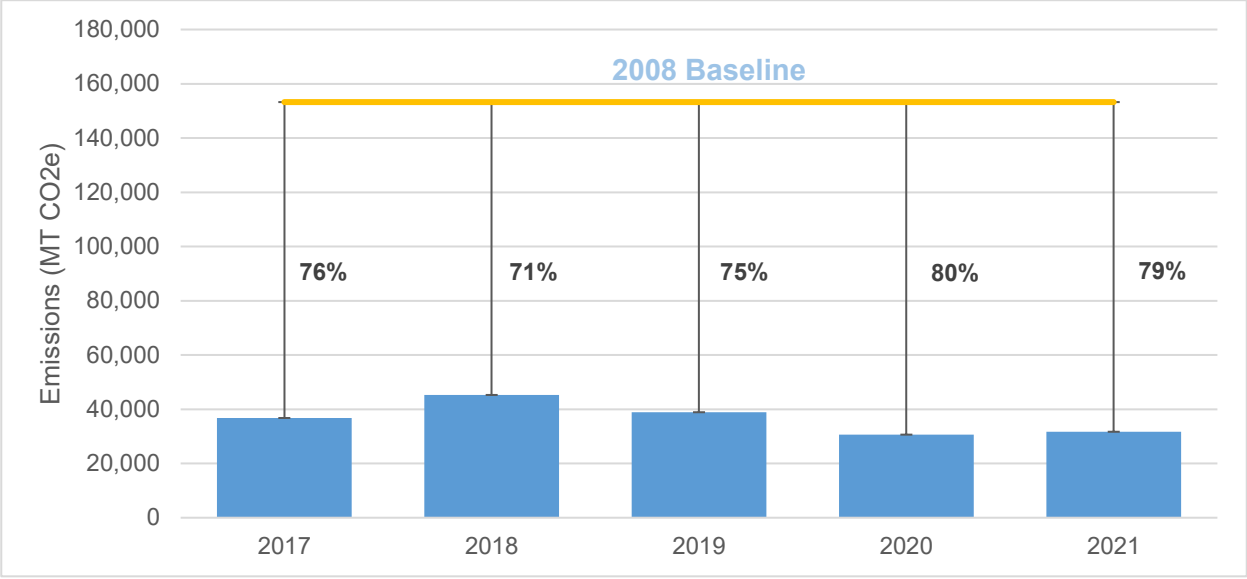

Figure 6. Streetlights and Traffic Signals Emissions Reductions from Baseline

3.4 Water Delivery

The water delivery sector accounts for GHG emissions associated with LADWP's potable water operations. This includes emissions associated with obtaining and transporting water to the City from the Los Angeles Aqueduct, since it is operated by LADWP, but not emissions associated with projects such as the Colorado River Aqueduct and State Water Project since those operations are not under the jurisdiction of the City. Those emissions are captured in the City of Los Angeles' Community Greenhouse Gas inventories.

Table 7. Water Delivery Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	245	225	202	250	212	191
Scope 2: Purchased Electricity	67,518	38,988	41,518	34,863	28,634	34,757
Total	**67,763**	**39,213**	**41,720**	**35,113**	**28,845**	**34,948**

Table 7 shows emissions in this sector increased in 2021. Water delivery emissions tend to have a degree of annual variability due to changes in operations from factors such as variance in precipitation or water availability from different sources.

Overall water delivery emissions in 2021 were 48% below 2008 baseline emissions, as seen in Figure 7.

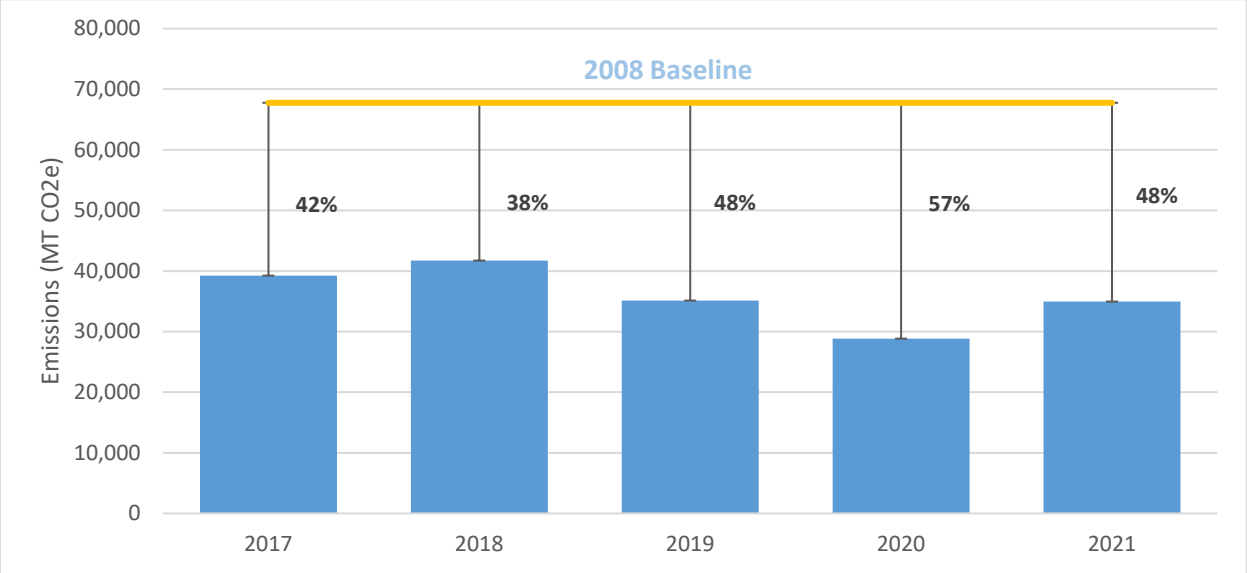

Figure 7. Water Delivery Emissions Reductions from Baseline

The City is reducing water demand through conservation and water efficiency as well as increasing local water supply through water recycling and stormwater capture projects. These

efforts are expected to reduce emissions associated with the water delivery sector in the long-term.

Additionally, although water delivery operations associated with the Colorado River Aqueduct and State Water Project are outside the City's control and not included in this sector, importing water from these sources is still energy intensive. Reducing water demand is key to reducing these indirect emissions associated with water delivery that are outside the operational control of the City.

3.5 Water Reclamation

The water reclamation sector accounts for emissions associated with the City's four water reclamation facilities: Hyperion Water Reclamation Plant (HWRP), Terminal Island Water Reclamation Plant (TIWRP), Donald C. Tillman Water Reclamation Plant (DCTWRP), and Los Angeles-Glendale Water Reclamation Plant (LAGWRP). This includes emissions from wastewater processes and effluent discharge, as well as energy consumed for plant operations. CH_4 and N_2O emissions resulting from the combustion of digester gas are also included under stationary combustion. In accordance with LGOP protocols, the CO_2 emitted as a result of digester gas combustion is considered biogenic and is not counted in the City's inventory.

Table 8. Water Reclamation Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	1,605	33,786	35,289	32,233	31,823	32,054
Scope 1: Process Emissions	47,652	44,056	44,678	46,225	42,725	42,650
Scope 2: Purchased Electricity	139,881	40,537	22,437	19,694	18,157	26,501
Total	**189,137**	**118,379**	**102,404**	**98,152**	**92,705**	**101,205**
Biogenic CO_2[5]	3,062	62,676	74,673	78,605	70,025	64,183

Since 2008, emissions from purchased electricity have decreased significantly due to the installation of the Hyperion BioEnergy Facility (HBEF) at HWRP in 2017. HBEF utilizes digester gas produced during the wastewater treatment process to generate power to run the facility which has greatly reduced the amount of electricity procured from the grid. However, this has resulted in more stationary combustion of digester gas and supplemental natural gas to generate the electricity when compared to 2008.

There are variations year to year in how much electricity is generated on-site by HBEF, which results in variations in the amount of digester gas and natural gas consumed and electricity procured from the grid. For example, 2020 saw a reduction in stationary combustion emissions for power generation and increase in electricity procured from the grid, potentially due to reduced wastewater flow through HWRP in 2020.

[5] CO_2 emissions from biogenic material (e.g. digester gas combustion) are reported separately for informational purposes and not counted in the emission totals. Carbon from biogenic sources already exist in the natural carbon cycle so biogenic CO_2 emissions are not an addition to the environment. CH_4 and N_2O emissions are included in the emissions totals.

In 2021, Scope 1 emissions in this sector saw little change, but emissions from Scope 2 purchased electricity increased by 46% from 2020 (see Table 8 above). This is likely due to the HWRP spill on July 11, 2021 which limited the use of DGUP to generate power.

Overall, emissions from this sector reduced by 46% compared to the 2008 baseline as seen in Figure 8.

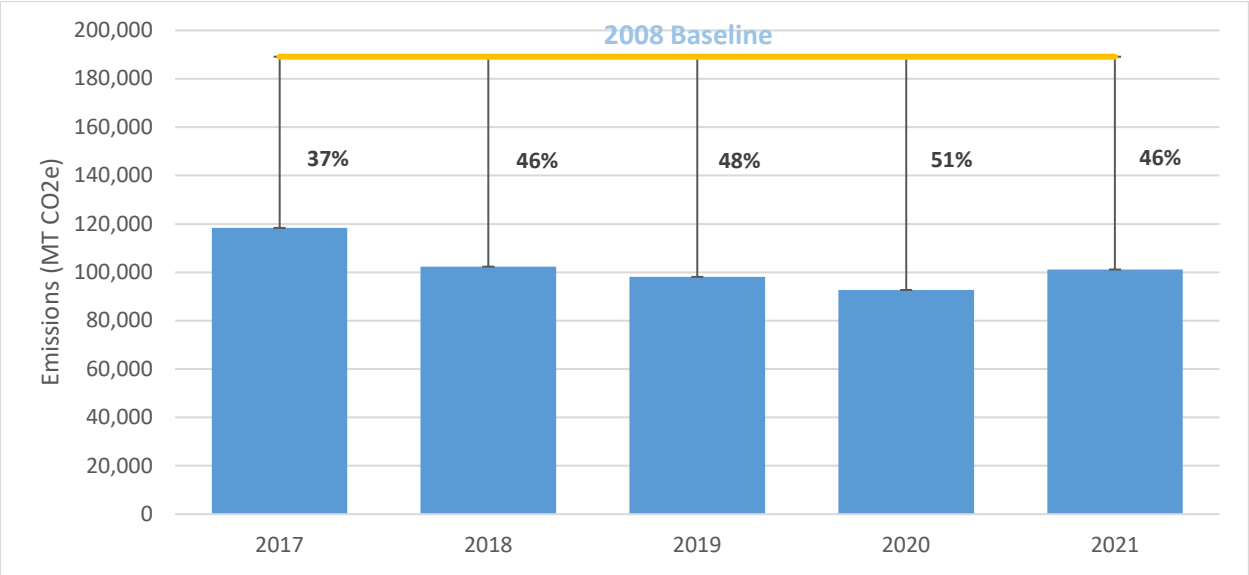

Figure 8. Water Reclamation Facilities Emissions Reductions from Baseline

The City's push to expand to 100% water recycling under the Green New Deal will likely increase energy demand at the water reclamation facilities, which may require more electricity to be obtained from the grid. However, efforts to decarbonize the electrical grid will help in reducing emissions associated with purchased electricity.

3.6 Port

The port sector accounts for emissions associated with the Port of Los Angeles (POLA), specifically from energy used by port-operated facilities. Emissions from Port-operated vehicles are included in the vehicle fleet sector (see section 3.9 Vehicle Fleet). This sector also does not include emissions from ships, vehicles, or facilities that are operated by third parties at POLA. Those emissions are captured in the City of Los Angeles' Community Greenhouse Gas inventories.

Table 9. Port Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	409	346	362	473	287	280
Scope 2: Purchased Electricity	7,245	6,120	6,460	5,907	4,726	4,425
Total	**7,654**	**6,466**	**6,822**	**6,380**	**5,013**	**4,705**

In 2021, although emissions from stationary combustion by port equipment increased, Scope 1 and Scope 2 emissions both declined in 2021 (see Table 9 above).

Overall emissions from this sector continued to decrease to 37% below the 2008 baseline, as shown in Figure 9.

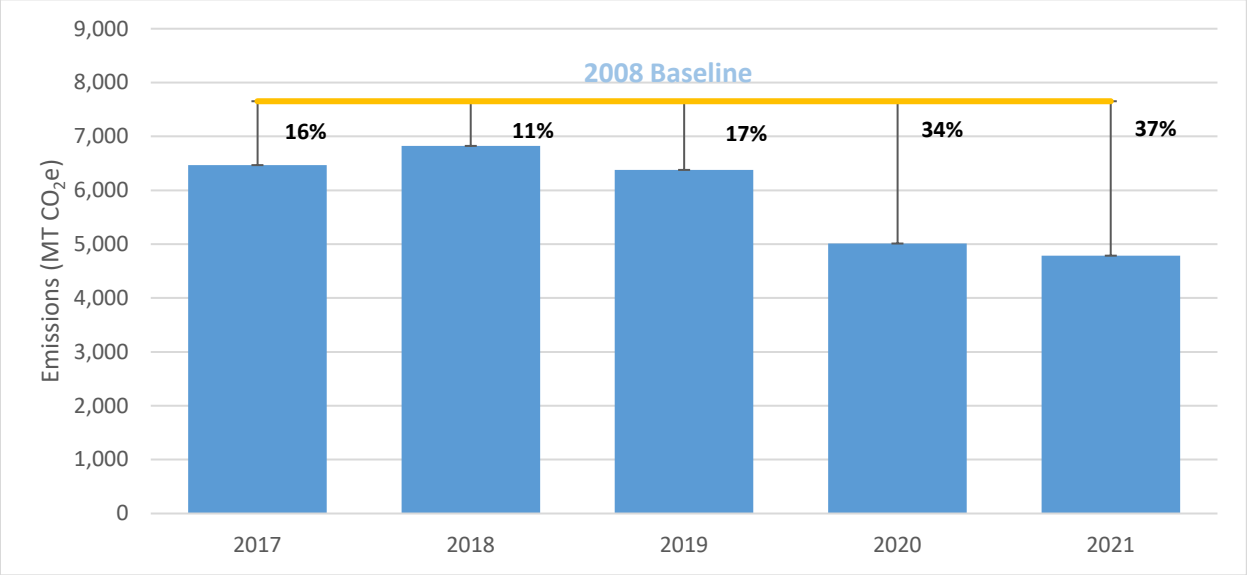

Figure 9. Port Facilities Emissions Reductions from Baseline

3.7 Airport

The airport sector includes emissions related to Los Angeles International Airport (LAX) and Van Nuys Airport (VNY), specifically from energy consumed at airport-operated facilities. Emissions associated with the airport-operated vehicle fleet are included in the vehicle fleet sector (see section 3.9 Vehicle Fleet). This does not include emissions from aircraft operated by third parties. Those emissions are however captured in the City of Los Angeles' Community Greenhouse Gas inventories.

Table 10. Airport Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	44,457	25,102	27,013	29,159	29,762	30,204
Scope 2: Purchased Electricity	90,931	61,788	63,788	62,447	48,619	48,886
Total	**135,388**	**86,889**	**90,801**	**91,605**	**78,381**	**79,089**

Last year, emissions from the airport sector decreased by 42% below the 2008 baseline, marking a 14% decrease in total emissions from the previous year due to a drop in purchased electricity (see Table 10), likely a result of the pandemic. This reduction was correctly predicted

not to continue as airport services recovered. Airport GHG emissions increased slightly in 2021 with emissions remaining at about 42% below 2008 baseline levels as illustrated in Figure 10.

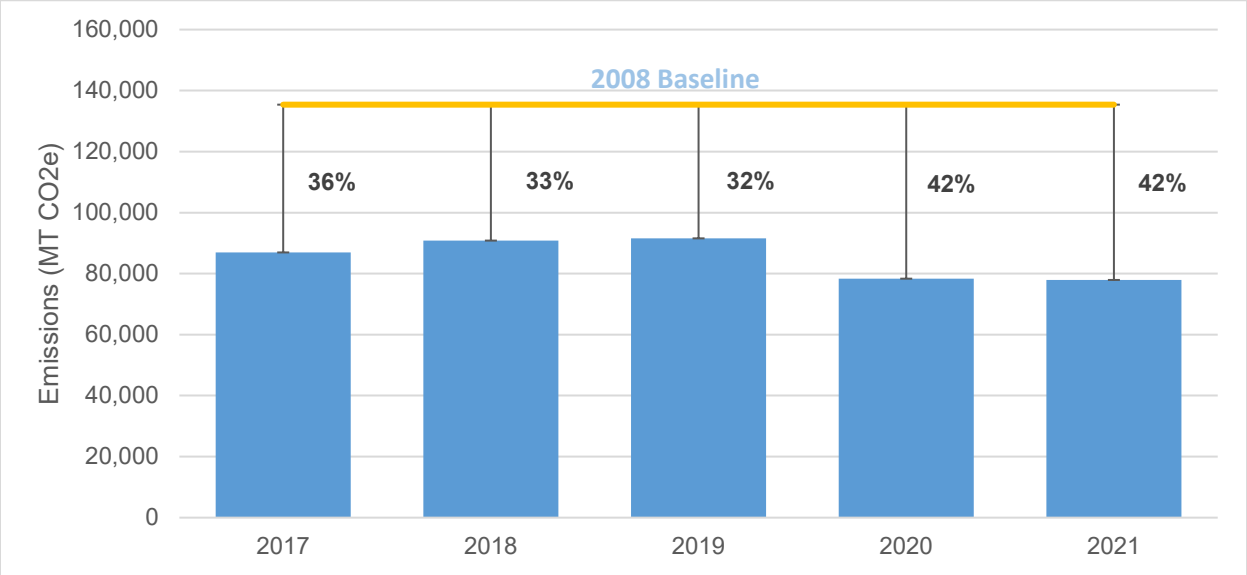

Figure 10. Airport Facilities Emissions Reductions from Baseline

3.8 Vehicle Fleet

The vehicle fleet sector accounts for emissions from on-road and off-road vehicles operated by the City, excluding the Los Angeles Department of Transportation's (LADOT) public transit fleet. Public transit fleet emissions are accounted for in their own sector (see section 3.10 Transit Fleet).

Table 11. Vehicle Fleet Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: On- and Off-Road Mobile Combustion	191,292	171,349	161,986	145,038	132,047	137,959
Total	**191,292**	**171,349**	**161,986**	**145,038**	**132,047**	**137,959**
Biogenic CO_2[6]	-	13,678	13,754	13,741	11,865	8,736

Table 11 indicates that the City has continued its efforts to reduce emissions from its mobile fleet. A major part of this reduction comes from decreasing consumption of traditional fuel sources, such as gasoline and diesel, and switching to more low-carbon fuels such as compressed natural gas. This includes the use of renewable natural gas (RNG), as shown in Figure 11.

[6] CO_2 emissions from biogenic material (e.g. RNG) are reported separately for informational purposes and not counted in the emission totals. Carbon from biogenic sources already exist in the natural carbon cycle so biogenic CO_2 emissions are not an addition to the environment. CH_4 and N_2O emissions are included in the emissions totals.

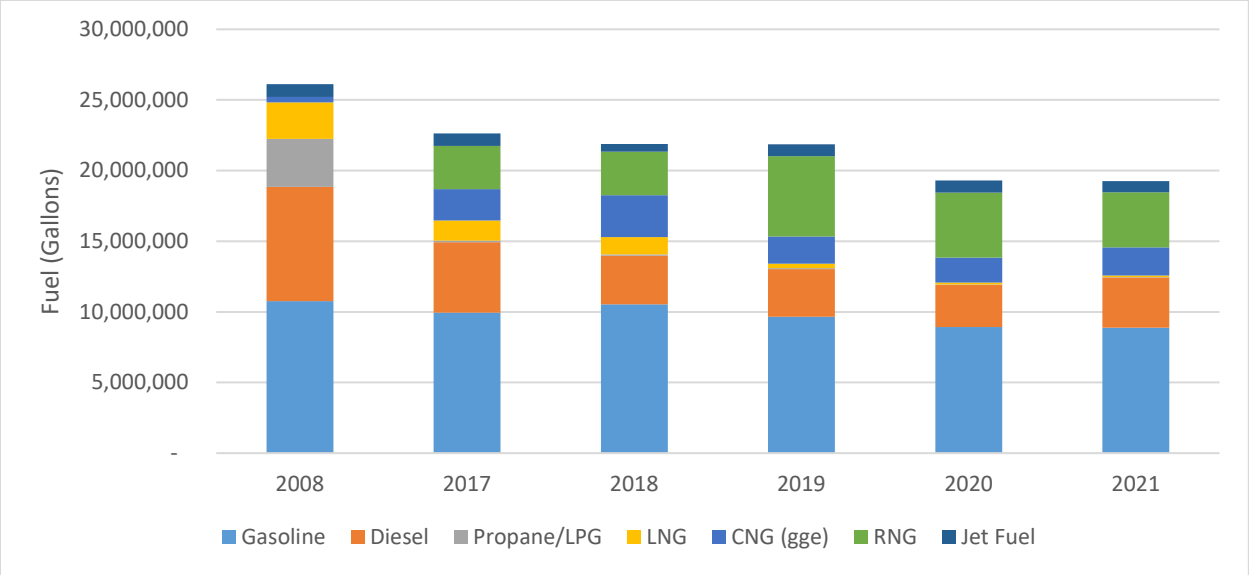

Figure 11. Fleet Fuel Consumption

In 2021, emissions from the vehicle fleet sector were 28% below the City's 2008 baseline (see Figure 12), rebounding somewhat from last year as diesel usage experienced a notable uptick.

These emissions are expected to decrease as the City strives to achieve the Green New Deal goal of converting all City fleet vehicles to zero emissions where technically feasible by 2028.

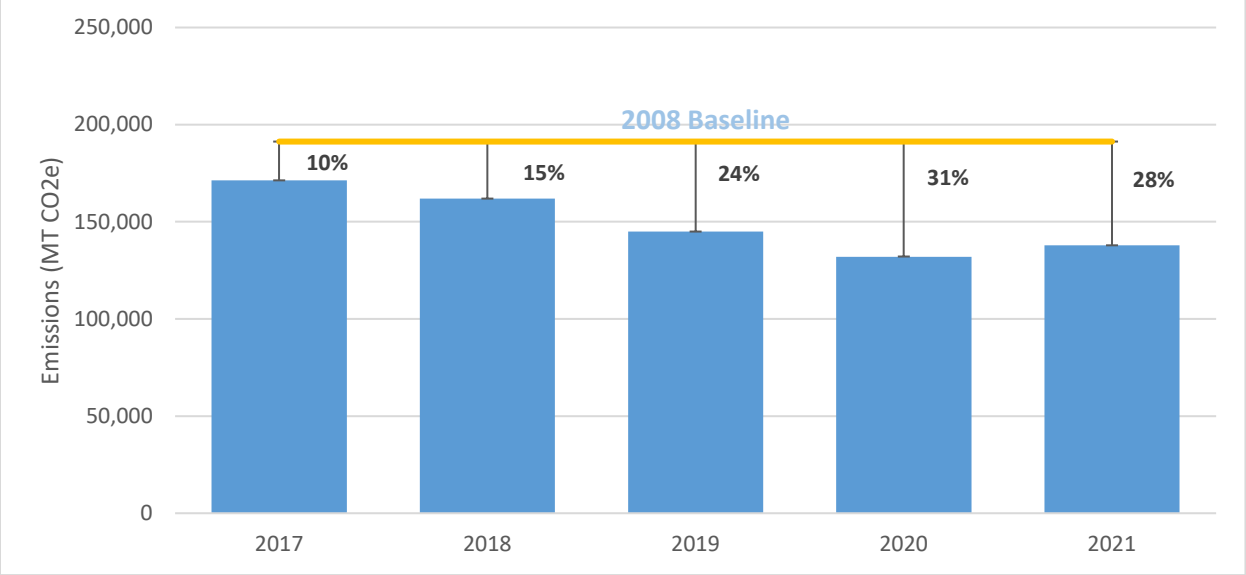

Figure 12. Vehicle Fleet Emissions Reductions from Baseline

3.9 Transit Fleet

The transit fleet sector accounts for emissions from Los Angeles' public transit fleet. This includes the City's DASH, Commuter Express, and Cityride services. This does not include emissions from the public transit fleet operated by the Los Angeles County Metropolitan Transportation Authority (Metro), which is outside the City's jurisdiction.

Table 12. Transit Fleet Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: On-Road Mobile Combustion	35,263	24,463	29,370	20,420	19,980	24,122
Total	**35,263**	**24,463**	**29,392**	**20,464**	**20,020**	**24,247**

The general downward trend over the past five years, seen in Table 12, is primarily due to the City's efforts to transition its fleet from traditional, carbon intensive fuels like gasoline and diesel to fuels with lower carbon content such as CNG and LNG. As of 2021, emissions related to the City's transit fleet have decreased by 35% when compared to the City's 2008 baseline emissions, but we note an increase in emissions over the 2019 total, as shown in Figure 13.

The City is also working to electrify its transit fleet, and has a goal in L.A's Green New Deal to achieve a 100% electrified fleet by 2028. As the transit fleet continues to electrify and the carbon intensity factor of electricity decreases, emissions will continue to decrease.

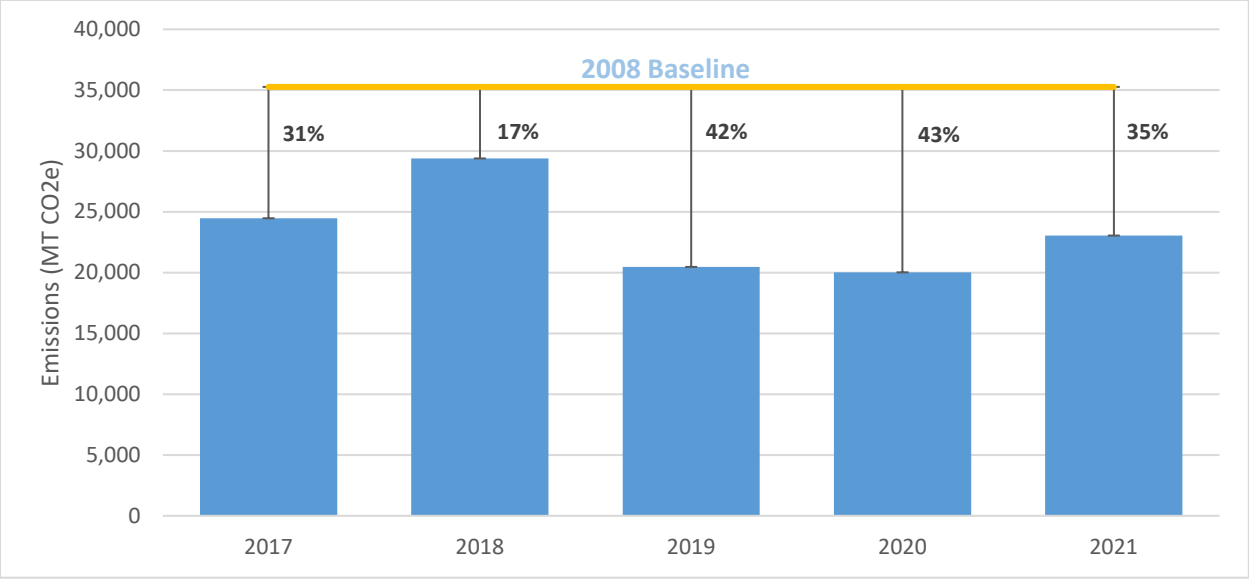

Figure 13. Transit Facilities Emissions Reductions from Baseline

3.10 Solid Waste Facilities

The solid waste sector includes emissions from the five closed landfills (Bishop Canyon, Gaffey Street, Lopez Canyon, Sheldon-Arleta, and Toyon Canyon) that are owned and operated by the

City of Los Angeles. These landfills are closed and no longer accept solid waste; however, they still release fugitive emissions from the landfill gas collection system as well as stationary combustion emissions from the portion of landfill gas that is captured and burned.

Table 13. Solid Waste Facilities Emissions (MT CO_2e)

	2008	2017	2018	2019	2020	2021
Scope 1: Stationary Combustion	198	166	162	159	156	153
Scope 1: Fugitive Emissions	196,242	163,914	160,699	157,533	154,375	151,332
Total	**196,440**	**164,080**	**160,861**	**157,692**	**154,531**	**151,485**
Biogenic CO_2[7]	55,029	45,955	45,056	44,168	43,282	42,430

Table 13 demonstrates a steady annual decrease of approximately 2% in solid waste sector emissions. In 2021, emissions from this sector were 23% below 2008 baseline levels, as illustrated by Figure 14.

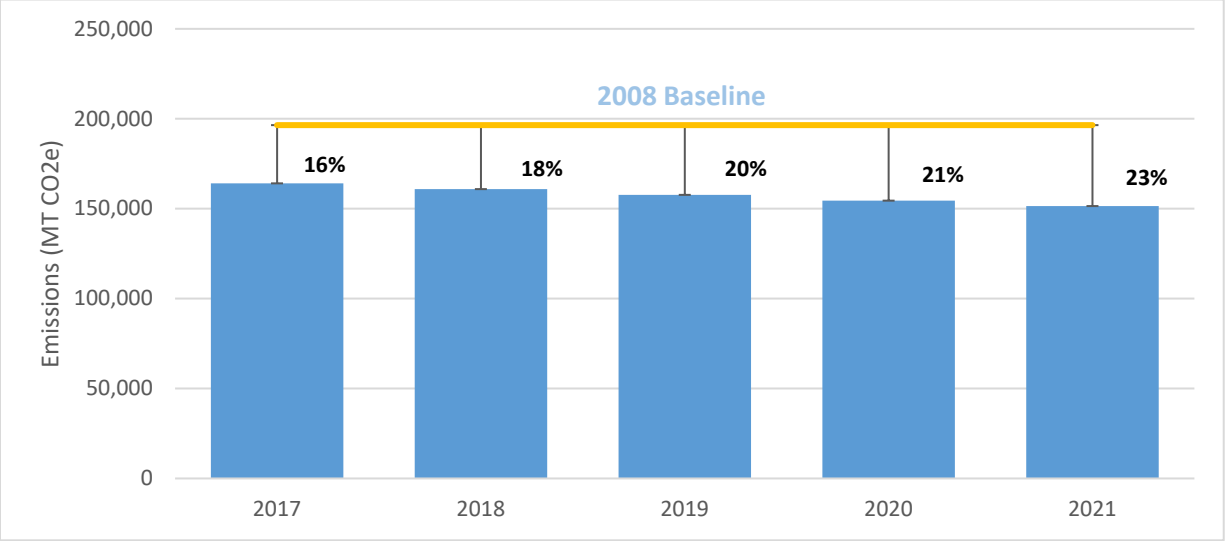

Figure 14. Solid Waste Facilities Emissions Reductions from Baseline

Since the City's landfills are closed and no longer accepting waste, emissions are expected to continue to decrease every year. Additionally, Lopez Canyon Landfill utilizes the landfill gas collected to generate renewable energy.

[7] CO_2 emissions from biogenic material (e.g. landfill gas combustion) are reported separately for informational purposes and not counted in the emission totals. Carbon from biogenic sources already exist in the natural carbon cycle so biogenic CO_2 emissions are not an addition to the environment. CH_4 and N_2O emissions are included in the emissions totals.

4. Conclusion

The City of Los Angeles' municipal greenhouse gas inventory helps measure and track our progress towards the City's climate goals. Overall, emissions have been decreasing from the 2008 baseline with a reduction of 55% in 2021, achieving the Green New Deal's 2025 emissions reduction target four years ahead of schedule. The power generation sector accounts for a majority of emissions and decarbonizing the grid is a key part of reaching carbon neutrality by 2045. It is important to continue efforts to reduce energy and fuel consumption across all sectors. Other actions include increasing energy and water efficiency, building electrification, and converting the City's vehicle fleet to electric vehicles.

In 2021, the COVID-19 pandemic continued to impact various aspects of the City's operations and played a role in some of the emissions reductions seen in the municipal inventory's sectors. On a larger scale however, since 94% of total municipal emissions in 2021 result from power generation, the overall reduction in City emissions can be attributed to grid decarbonization efforts.

5. Preparers

LA Sanitation & Environment (LASAN), recognized as a national leader in environmental services and programs, is a critical partner in the City's climate action and response and in advancing the path towards the City's climate goals. LASAN is committed to proactively addressing climate change and supporting climate action in line with our mission to protect public health and the environment.

Building on nearly a decade of experience, LASAN's Climate Action Program supports the City's path towards carbon neutrality as outlined by the Sustainable City pLAn. Housed within the Regulatory Affairs Division of LASAN, this program collaborates with City departments, policymakers, and outside agencies on climate-related reports and activities.

For more information about the Climate Action Program, please contact us at san.climateaction@lacity.org or (213) 485-3640 or visit us at www.lacitysan.org/climateaction.