CITY OF LOS ANGELES

2023 COMMUNITY GREENHOUSE GAS INVENTORY REPORT

lacitysan.org/climateaction

san.climateaction@lacity.org

(213) 485-3640

Table of Contents

List of Figures

List of Tables

Executive Summary

In 2023, Los Angeles achieved a significant milestone in its environmental efforts, with community-wide greenhouse gas (GHG) emissions falling 33% below the 1990 baseline, as depicted in Figure 1. The City is making progress towards its interim targets of a 50% reduction by 2025 and a 73% reduction by 2035. These efforts are part of a broader, ambitious plan encapsulated in Los Angeles' Green New Deal, which sets the ultimate goal of reaching carbon neutrality by 2050. This commitment reflects the City's proactive approach to combating climate change and fostering a sustainable future.

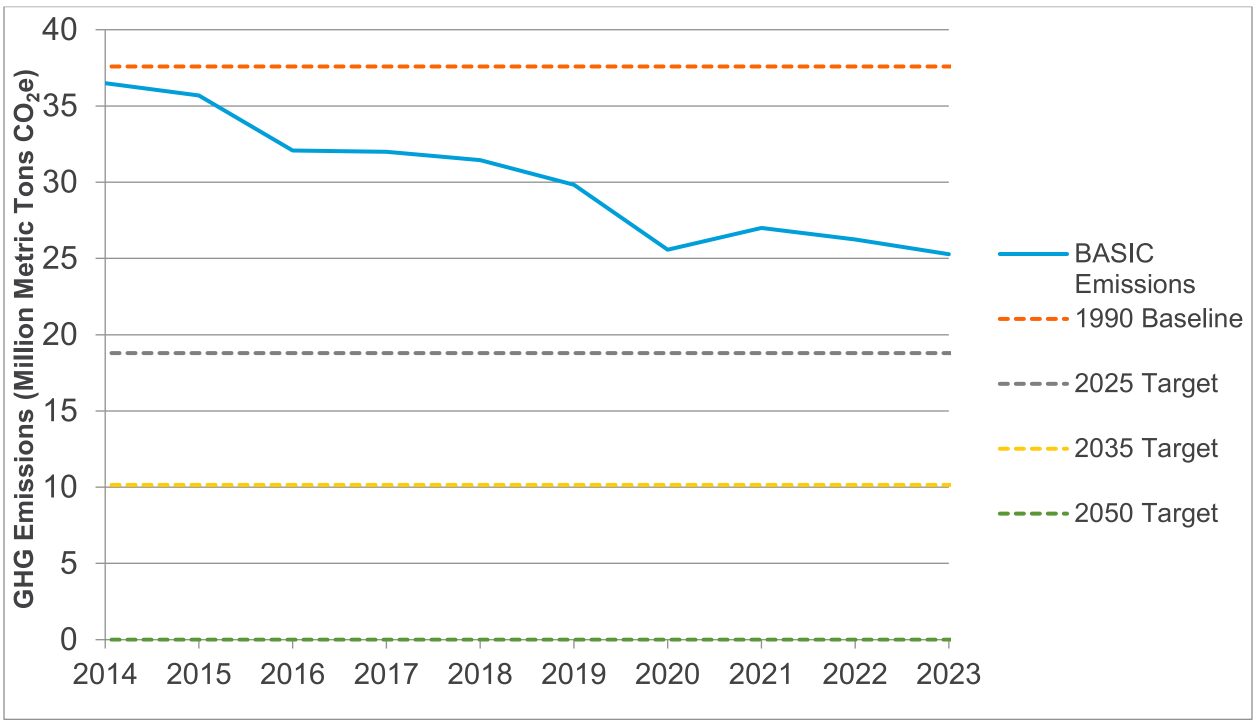

Figure 1. Emissions Progress Compared to Targets

In 2023, Los Angeles experienced a significant decline in community-wide greenhouse gas (GHG) emissions, spanning the stationary energy, transportation, and solid waste sectors. Total emissions for the year amounted to 25.2 million metric tons of carbon dioxide equivalent (MMT CO_2e), marking a reduction of about 1 million metric tons compared to the total in 2022. However, to achieve the target of reducing emissions to 50% below the 1990 baseline, it would require a reduction of 3.5 MMT annually in both 2024 and 2025.

Table 1. BASIC Emissions by Sector (Million Metric Tons CO_2e)

	1990	2018	2019	2020	2021	2022	2023	1990 vs 2023 Percent Change
Stationary Energy	26.0	19.0	17.7	16.8	16.8	15.6	14.6	**-44%**
Transportation	10.4	11.1	10.7	7.4	9.0	9.3	9.2	**-12%**
Waste	1.2	1.3	1.3	1.3	1.2	1.3	1.5	**25%**
Total Emissions	37.6	31.3	29.8	25.6	27.0	26.2	25.3	**-33%**

As detailed in Table 1, the stationary energy sector has seen a substantial decrease of 44% in emissions compared to the 1990 baseline, reducing to 14.6 MMT CO_2e in 2023. The transportation sector, which had 9.2 MMT CO_2e in 2023, has experienced a 12% decrease from 1990 levels. The waste sector showed an increase of 25% compared to 1990, settling at 1.5 MMT CO_2e but only accounts for 6% of the total BASIC emissions. Overall, these sectors contributed to a total decrease of 33% in GHG emissions compared to the 1990 baseline. This trend reflects the City's ongoing efforts to mitigate environmental impact and showcases a successful effort in reduction of emission levels while maintaining urban growth and development.

Figure 2 illustrates that despite an increase in gross domestic product (GDP) from 2022, the ratio of emissions per GDP unit has continued its downward trend. This ongoing reduction in emissions relative to economic output effectively demonstrates the decoupling of greenhouse gas (GHG) emissions from economic growth, indicating progress towards a more sustainable and less carbon-intensive economy.

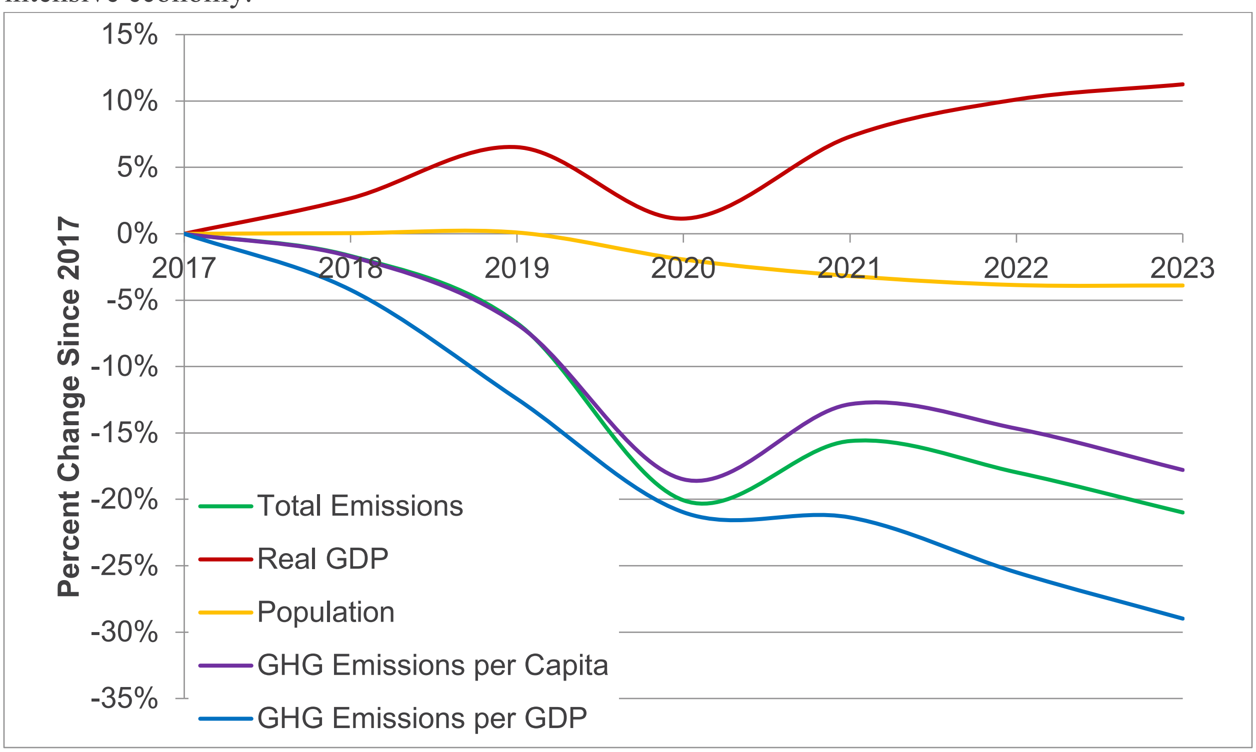

Figure 2. Emissions Trends and Metrics

1. Introduction

Climate change, a critical global challenge, requires decisive local actions. The City of Los Angeles is at the forefront of this battle, implementing robust measures to curb greenhouse gas (GHG) emissions and mitigate climate impacts. LA Sanitation and Environment (LASAN) plays a vital role in the City's climate strategy. Understanding the quantity, sources, and trends of Los Angeles' GHG emissions is crucial for effective climate action. This knowledge enables policymakers and stakeholders to take targeted and adaptive measures against climate change. LASAN's annual, detailed community GHG inventories are instrumental in gaining this insight and tracking the City's progress toward its ambitious climate objectives.

Since 2019, as originally requested by the Mayor's Office of Sustainability (MOS), LASAN has been responsible for preparing the City of Los Angeles' annual Community GHG Inventory. This task included enhancing the previously prepared inventories from a BASIC to a BASIC+ rating, a change necessitated by the availability of more comprehensive data sources. The BASIC+ inventory offers a deeper understanding of Los Angeles' emissions scenario because it includes industrial processes, product use, agriculture, forestry, and other land uses, along with Scope 3 emissions from stationary sources and transportation sectors.

To date, LASAN has compiled community-wide inventories for the years 2014-2023, in addition to the baseline year of 1990, as established in the City's Sustainable City pLAn. This report presents the 2023 Community GHG Inventory values alongside the updated values for the City's prior inventories, offering insights into the City's emission trends over time and using the 1990 figures as the benchmark for all reduction percentages.

2. Methodology

LASAN compiles the City of Los Angeles' Community Greenhouse Gas (GHG) Inventory adhering to the standards set by C40's Global Protocol for Community-Scale Greenhouse Gas Emissions (GPC), a globally recognized framework. This approach integrates two key methods: the scopes framework and the city-induced framework, accommodating emissions generated both inside and outside the City's borders. The inventory accounts for five GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs), each with a specific Global Warming Potential (GWP). GWP measures a gas's heat-trapping ability relative to CO_2. For a consistent assessment, emissions of these gases are converted to CO_2 equivalents (CO_2e) throughout this report.

Table 2. Greenhouse Gas Global Warming Potential Factors

Greenhouse Gas	Formula	GWP*
Carbon Dioxide	CO_2	1
Methane	CH_4	25
Nitrous Oxide	N_2O	298
Hydrofluorocarbons	HFCs	124-14,800
Perfluorocarbons	PFCs	7,390-12,200
*100-year time horizon.		

This inventory employs the Intergovernmental Panel on Climate Change's (IPCC) AR4 GWP values, aligning with the California Air Resources Board's (CARB) methodology for the statewide California Greenhouse Gas Emissions Inventory (see Table 2).

2.1 Scopes

Scope 1 emissions are from sources located within the City boundary (in-boundary activities). These can also be considered "territorial" emissions because they are all produced within the geographic boundary. Scope 2 emissions occur from the use of grid-supplied electricity, heat, steam, and/or cooling within the city boundary. Scope 3 emissions are from sources outside the city boundary because of actions occurring within the city boundary (out-of-boundary activities).

2.2 BASIC vs BASIC+

The GPC categorizes two levels, BASIC and BASIC+ (see Figure 3). BASIC encompasses Scopes 1 and 2 emissions from stationary energy and transportation, and Scopes 1 and 3 from waste. BASIC+ extends this to include industrial processes and product use (IPPU), and agriculture, forestry, and other land use (AFOLU), plus Scope 3 emissions from stationary energy and transportation sectors. Although BASIC+ provides a more comprehensive view of emissions, the City has limited direct control over some of these sectors. However, tracking BASIC+ emissions is essential for understanding the scope of emissions within the community and identifying indirect mitigation opportunities through policy incentives, regional partnerships, and state-level regulatory efforts. This report discusses all sectors under BASIC+, but tracks progress towards L.A.'s Green New Deal goals using BASIC emissions.

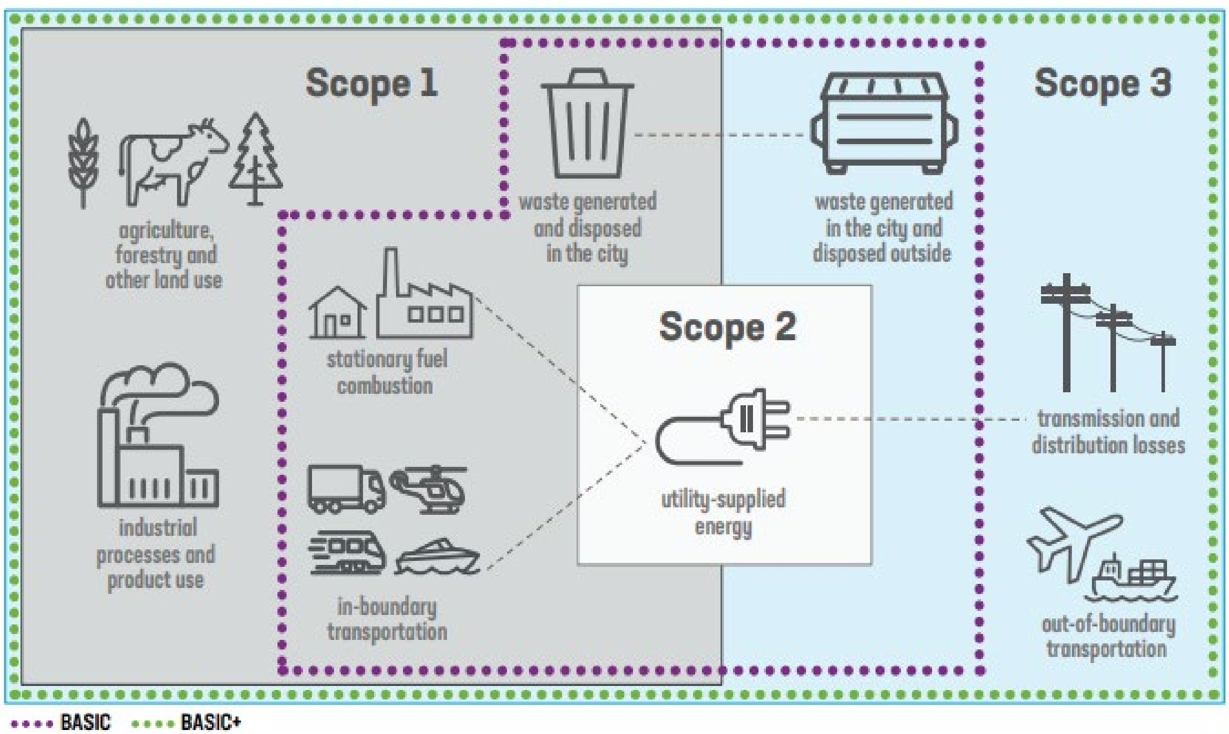

Figure 3. Sources Included in BASIC and BASIC+

2.3 Data Collection and Providers

LASAN's inventory preparation involves collaboration with multiple departments and agencies, ensuring a comprehensive data collection process. Table 3 summarizes these data contributors.

Table 3. Community GHG Inventory Data Providers

Data Provider	Data
City Department	
LASAN	Solid waste characterization; compost tonnage; biosolids; wastewater treatment
LADWP	Residential, commercial, institutional, and industrial electricity consumption; transmission and distribution losses; water services-related electricity consumption, power generation fuel consumption, EV charging electricity consumption
LAWA	Commercial jet fuel usage
POLA	Local harbor craft fuel usage
LA Animal Services Department	Livestock estimates
Regulatory Agency	
California Air Resources Board (CARB)	EMFAC2021 Model for vehicle fuel efficiency; off-road transportation emissions estimate; fuel estimate for vessel bunkering; industrial facilities involved with mineral, chemical, or metal production; ODS usage
South Coast Air Quality Management District (SCAQMD)	Industrial fuel consumption, landfill flaring
EPA	Refinery feed flaring; industrial facilities involved with mineral, chemical, or metal production
California Geologic Energy Management (CalGEM)	Oil and gas wells
FAA	Local aircraft fuel usage
CalRecycle	Solid waste disposal tonnage
CDFA	Fertilizer usage
Other	
Energy Information Administration (EIA)	Residential, commercial, and industrial wood and ethanol consumption
SoCal Gas	Residential, commercial, and industrial natural gas consumption
SCE	Utility's electricity emission factor
Google Environmental Insights Explorer	On-road VMTs
Amtrak	Annual trips estimate
Metrolink	Annual trips estimate
Burlington Northern Santa Fe (BNSF) Railway	Fuel usage
Union Pacific	Fuel usage
LA Metro	Rail propulsion electricity usage
International Council for Local Environmental Initiatives (ICLEI)	Land use change emissions estimate

3. Findings by Sector

The following sections present findings from the City's 2014-2023 Community GHG Inventories. Every year, LASAN continues to update the community GHG inventory to incorporate new procedures, as well as make improvements to data collection processes, methodologies, emissions 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. Therefore, the new inventory may report different emission levels than previous inventory reports.

As shown in Figure 4, the largest sector in Los Angeles' Community GHG Inventory (at the BASIC level) is the stationary energy sector, accounting for 58% of total emissions, followed by the transportation sector and the waste sector.

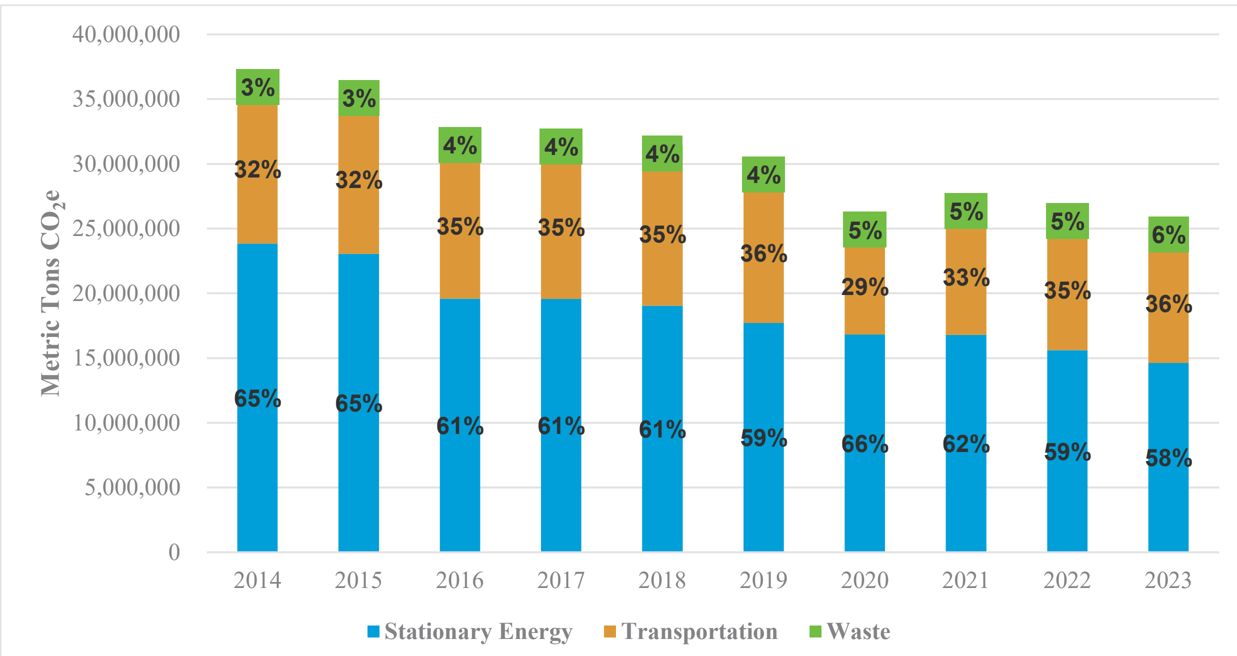

Figure 4. Basic Emissions by Sector

Between 2014 and 2023, Los Angeles saw significant changes in greenhouse gas (GHG) emissions in key sectors. In the stationary energy sector, emissions decreased from 23.8 million metric tons in 2014 to 14.6 million in 2023, a substantial reduction reflecting the City's energy efficiency and sustainable energy initiatives. The transportation sector, identified as the second-largest contributor to emissions, has shown a gradual decline compared to the 1990 baseline. Waste sector emissions, while a smaller portion of the total, increased slightly from the following year, accounting for about 6% of the City's emissions throughout this period. These trends demonstrate Los Angeles' effective strategies in reducing its environmental impact in major emission-generating sectors.

3.1 Stationary Energy

The stationary energy sector includes fuel combustion and fugitive emissions that occur while generating, delivering, and consuming useful forms of energy (such as electricity or heat). The five main subsectors are residential buildings, commercial and institutional buildings and facilities, manufacturing industries and construction, energy industries, and fugitive emissions from oil and natural gas systems.

Table 4. BASIC Stationary Energy Emissions by Subsector (MT CO_2e)

	Residential buildings	Commercial and institutional buildings and facilities	Manufacturing industries and construction	Energy industries	Fugitive emissions from oil and natural gas systems	Total Stationary Energy Emissions
1990	7,188,792	9,903,709	4,297,840	4,146,575	437,185	25,974,102
2014	6,585,035	8,460,163	3,995,230	4,587,057	214,610	23,842,094
2015	6,543,251	8,218,274	3,918,539	4,161,174	213,396	23,054,634
2016	5,394,410	6,226,515	3,446,961	4,294,149	216,983	19,579,017
2017	5,212,031	5,885,760	3,817,250	4,437,001	215,680	19,567,722
2018	5,099,756	5,902,502	3,324,850	4,494,205	216,611	19,037,923
2019	5,023,171	5,536,819	2,724,736	4,219,939	216,173	17,720,837
2020	5,039,695	4,700,410	2,660,925	4,201,503	211,973	16,814,505
2021	4,848,815	4,896,054	2,706,020	4,131,840	208,662	16,791,392
2022	4,641,986	4,856,690	1,840,049	4,061,659	207,544	15,607,928
2023	4,526,202	4,650,203	997,187	4,247,210	202,996	14,623,798

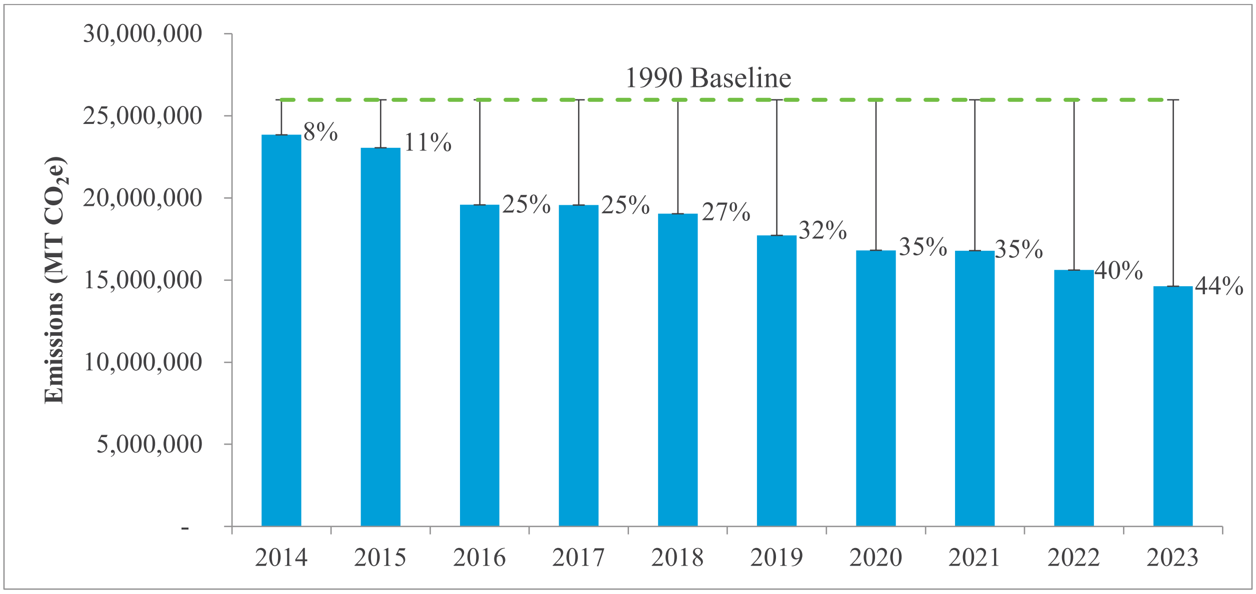

Figure 5. BASIC Stationary Energy Sector Emissions Reductions from Baseline

While Figure 5 shows a 4% decrease in emissions between 2022 and 2023, overall emissions in this sector have decreased by 44% since 1990 (Figure 5) with reductions primarily driven by decarbonization of the electricity grid.

Between 2014 and 2023, the ratio of MWh generated to the GHG emissions of the City's electricity has decreased by 52% (Figure 6).

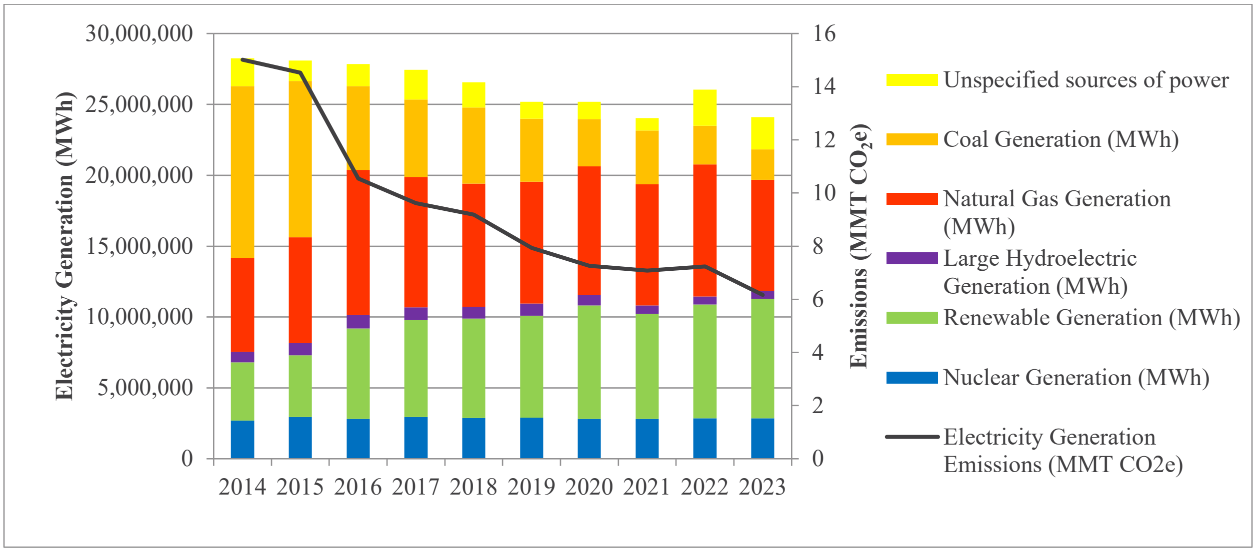

Figure 6. Electricity Generation Portfolio vs Emissions[1]

LADWP progresses towards supplying 100% renewable energy by 2045, as outlined in the LA100 plan and the Los Angeles Green New Deal. The City remains steadfast in advancing its ambitious clean energy targets, with the potential to achieve its objectives as early as 2035. While significant progress has been made, reaching these goals will require further action to decarbonize buildings, improve energy efficiency across all sectors, and reduce fuel combustion in industrial activities. Notably, the increased emissions observed between the BASIC level in Table 4 and the BASIC+ level in Table 5 are largely attributed to electricity transmission and distribution losses. Including both BASIC and BASIC+ metrics allows us to track emissions within the City's direct influence while also gaining a broader understanding of indirect impacts, such as transmission losses and industrial activities.

In 2023, the stationary energy sector experienced notable trends. Emissions from residential and commercial buildings continued their steady decline. However, emissions from energy industries saw a slight increase, highlighting ongoing challenges in decarbonizing this subsector, while fugitive emissions from oil and natural gas systems showed only a modest decrease.

It is important to emphasize that the reported data, particularly the dramatic decline in manufacturing and construction emissions, has not yet been verified with the South Coast Air Quality Management District (AQMD). A verification process is essential to confirm whether reductions stem from actual emissions reductions, shifts in industrial activity, or data limitations. This verification step is critical to ensure the accuracy of these findings and to identify the

[1] Power generation and emissions data provided by LADWP.

factors driving these trends, whether through policy interventions, technological advancements, or operational shifts.

Table 5. BASIC+ Stationary Energy Emissions by Subsector (MT CO_2e)

	Residential buildings	Commercial and institutional buildings and facilities	Manufacturing industries and construction	Energy industries	Fugitive emissions from oil and natural gas systems	Total Stationary Energy Emissions
1990	7,636,543	11,105,676	4,508,456	4,146,575	437,185	27,834,436
2014	7,199,130	9,659,486	4,132,757	4,587,057	214,610	25,793,040
2015	7,100,858	9,311,586	4,031,961	4,161,174	213,396	24,818,912
2016	5,774,009	6,971,781	3,522,091	4,294,149	216,983	20,779,013
2017	5,559,937	6,440,128	3,886,707	4,437,001	215,680	20,539,454
2018	5,428,269	6,564,167	3,379,549	4,494,205	216,611	20,082,800
2019	5,316,558	6,079,030	2,770,620	4,219,939	216,173	18,602,319
2020	5,334,948	4,851,102	2,701,097	4,201,503	211,973	17,300,622
2021	5,130,246	5,454,444	2,744,493	4,131,840	208,662	17,669,685
2022	4,913,838	5,483,767	1,879,337	4,061,659	207,544	16,546,145
2023	4,762,585	5,077,534	1,030,098	4,247,210	202,996	15,320,422

3.2 Transportation

The transportation sector includes GHG emissions from fuel combustion and electricity used for transportation activities. The sector covers five subsectors: on-road transportation, railways, waterborne navigation, aviation, and off-road transportation.

Table 6. BASIC Transportation Emissions by Subsector (MT CO_2e)

	On-road transportation	Railways	Waterborne navigation	Aviation	Off-road transportation	Total Transportation Emissions
1990	10,197,626	24,508	36,204	11,833	160,255	10,430,427
2014	11,128,431	98,421	55,892	17,336	239,507	11,539,586
2015	10,980,018	99,356	61,013	16,792	300,569	11,457,748
2016	10,827,904	82,100	58,348	14,906	276,693	11,259,952
2017	10,750,193	83,800	62,331	17,959	224,603	11,138,885
2018	10,605,673	85,269	66,092	16,828	321,258	11,095,119
2019	10,296,705	86,196	60,884	16,157	328,534	10,788,476
2020	6,961,453	76,900	60,734	14,068	327,406	7,440,562
2021	8,486,904	68,835	53,521	15,565	336,063	8,960,887
2022	8,836,599	66,992	50,811	15,116	342,143	9,311,662
2023	8,688,602	67,635	51,808	15,007	349,552	9,172,605

Overall, transportation sector emissions have decreased by 12% since 1990 (Figure 7), primarily driven by reductions in on-road transportation emissions. The data in Table 6, spanning 2014 to 2023, highlights key trends. Railways have seen a slight increase in emissions between 2022 and 2023, reflecting the City's mission to expand public transportation, while waterborne navigation emissions experienced a minor rise from 2022. Harbor craft emissions for particulate matter (PM) and nitrogen oxides (NO_x) decreased in 2023 compared to 2022, primarily due to the adoption of renewable diesel. However, increases in sulfur oxides (SO_x), hydrocarbons (HC), and CO_2e emissions were linked to higher activity among other vessel types, offsetting gains from reduced tugboat and fishing vessel emissions.[2] The Port of Los Angeles continues to partner with tenants and technology providers to develop and implement zero-emission technologies for new and retrofitted harbor craft vessels to reduce emissions associated with waterborne navigation.

Off-road transportation emissions, which originate from equipment and vehicles operating off public roads—such as construction machinery, agricultural equipment, and recreational vehicles—continue to rise in Los Angeles. Addressing these emissions requires targeted strategies, including transitioning to electric off-road equipment, decarbonizing the grid, and implementing policies that promote cleaner technologies in these sectors. Complementary efforts

[2] Port of Los Angeles. *2023 Air Emissions Inventory*. 2023, https://kentico.portoflosangeles.org/getmedia/3fad9979-f2cb-4b3d-bf82-687434cbd628/2023-Air-Emissions-Inventory.

to reduce on-road vehicle miles traveled (VMTs) through investments in public transportation and walkable, people-centric infrastructure remain critical to achieving broader emission reduction goals.

The BASIC+ transportation emissions, shown in Table 7, reflect the inclusion of harbor and airport tenant commercial cargo ship and aircraft fuel usage, leading to higher totals. This broader scope ensures a comprehensive understanding of transportation emissions, balancing the focus on areas the City can influence directly while addressing the global impact of indirect sources. Despite this, the City of Los Angeles is making significant progress in reducing overall transportation emissions, with a 25% decrease since 1990. Efforts to address emissions from aviation and waterborne navigation, such as Los Angeles World Airports' (LAWA) promotion of sustainable aviation fuels and the Port of Los Angeles' (POLA) shore-side electricity program, highlight the City's commitment to tackling emissions even in sectors outside its direct control. These initiatives, combined with ongoing investments in clean transportation and infrastructure, demonstrate the City's dedication to achieving its climate goals.

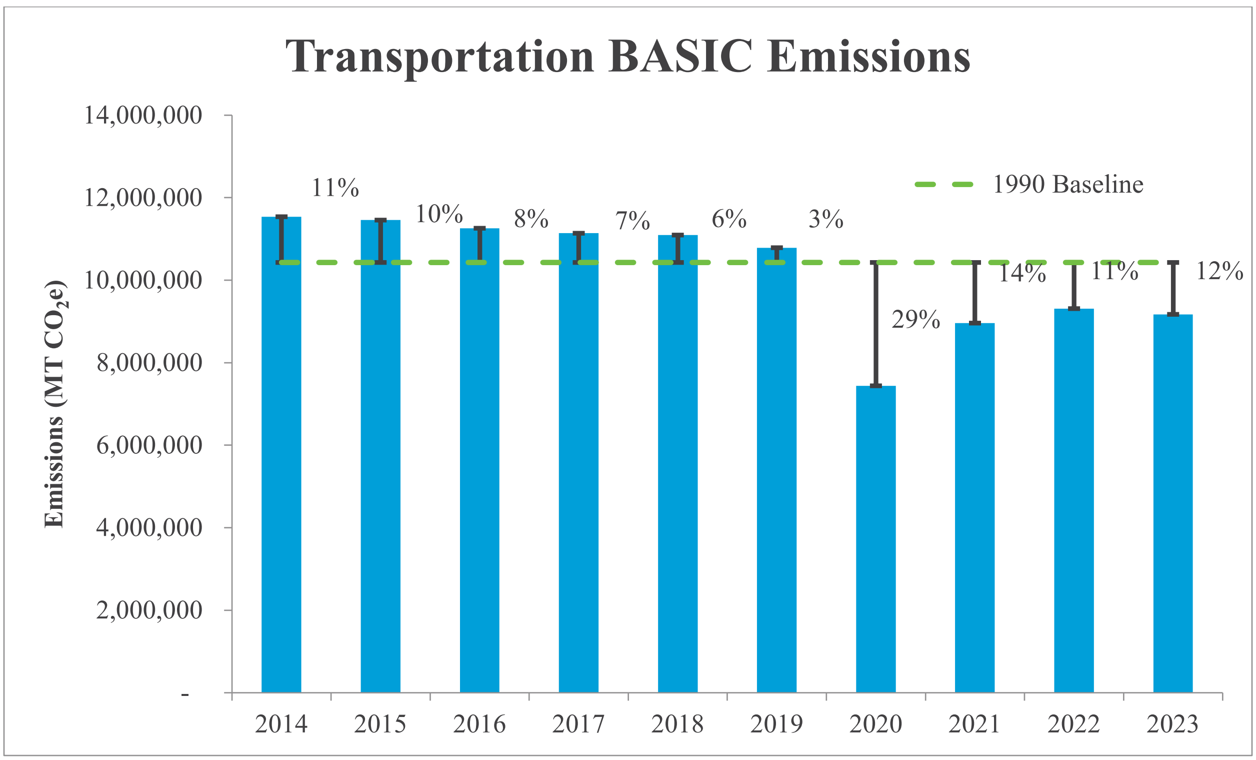

Figure 7. BASIC Transportation Sector Emissions Reductions from Baseline

Table 7. BASIC+ Transportation Emissions by Subsector (MT CO_2e)

	On-road transportation	Railways	Waterborne navigation	Aviation	Off-road transportation	Total Transportation Emissions
1990	10,197,626	74,287	8,786,351	14,431,582	160,255	33,650,100
2014	11,130,442	205,088	2,866,564	15,837,678	162,034	30,201,806
2015	10,983,242	201,855	3,494,079	17,009,219	220,511	31,908,906
2016	10,834,837	181,741	4,479,269	18,323,514	276,693	34,096,055
2017	10,757,820	188,836	3,043,868	19,147,217	224,603	33,362,344
2018	10,615,057	197,677	2,311,149	19,559,534	321,258	33,004,676
2019	10,306,160	212,229	3,044,750	19,401,839	328,534	33,293,511
2020	6,969,168	187,003	1,898,903	11,451,145	327,406	20,833,625
2021	8,496,451	175,178	2,230,736	13,987,150	336,063	25,225,578
2022	8,847,752	175,258	2,082,060	15,219,042	342,143	26,666,254
2023	8,701,565	163,387	2,546,545	13,328,490	349,552	25,089,538

3.3 Waste

The waste sector is responsible for emissions stemming from the disposal and treatment of both solid waste and wastewater, with processes such as decomposition and incineration as primary contributors.

Table 8. Waste Emissions by Subsector (MT CO_2e)[3]

	Solid waste generated in the city	Biological waste generated in the city	Incinerated and burned waste generated in the city	Wastewater generated in the city	Total Waste Emissions
1990	1,120,499	3,642	11,183	47,775	1,183,101
2014	1,046,584	5,798	14,670	44,841	1,111,893
2015	1,111,432	6,871	13,314	46,839	1,178,456
2016	1,157,181	11,692	15,581	44,471	1,228,924
2017	1,228,286	5,189	3,890	49,616	1,286,980
2018	1,262,352	9,454	2,596	51,317	1,325,719
2019	1,267,111	8,363	2,262	53,344	1,331,079
2020	1,256,478	6,650	3,451	49,154	1,315,733
2021	1,186,929	8,213	3,158	48,453	1,246,753
2022	1,250,175	6,672	19,202	49,859	1,325,907
2023	1,413,797	5,626	11,896	49,873	1,481,192

Landfill disposal, primarily from solid waste, remains the largest contributor to emissions within the waste sector, accounting for over 95% of the total (see Table 8). In 2023, solid waste generation in the city increased by 25% compared to 1990, reflecting a rise in consumer activity and shopping trends among Angelenos. However, waste emissions require additional context to avoid misinterpretation. While waste emissions in 2023 may be 25% higher than the 1990 baseline, they represent only 6% of the City's total BASIC emissions. This underscores the relatively minor contribution of waste compared to other sectors, such as stationary energy and transportation, which together account for 94% of emissions.

It is also important to note that population is greater than it was in 1990 and consumption has grown significantly since 1990. Despite this, current waste emissions remain below what would have occurred under a business-as-usual scenario, highlighting the success of the City's recycling and diversion programs. Framing waste emissions within the context of the City's total reduction goals is essential to prevent an overemphasis on the 25% increase, which could unintentionally suggest a failure in waste management. Instead, this sector offers significant potential for further reductions through robust public education campaigns, behavioral changes, and continued community engagement.

[3] For the waste sector, BASIC and BASIC+ emissions are the same (see Figure 3).

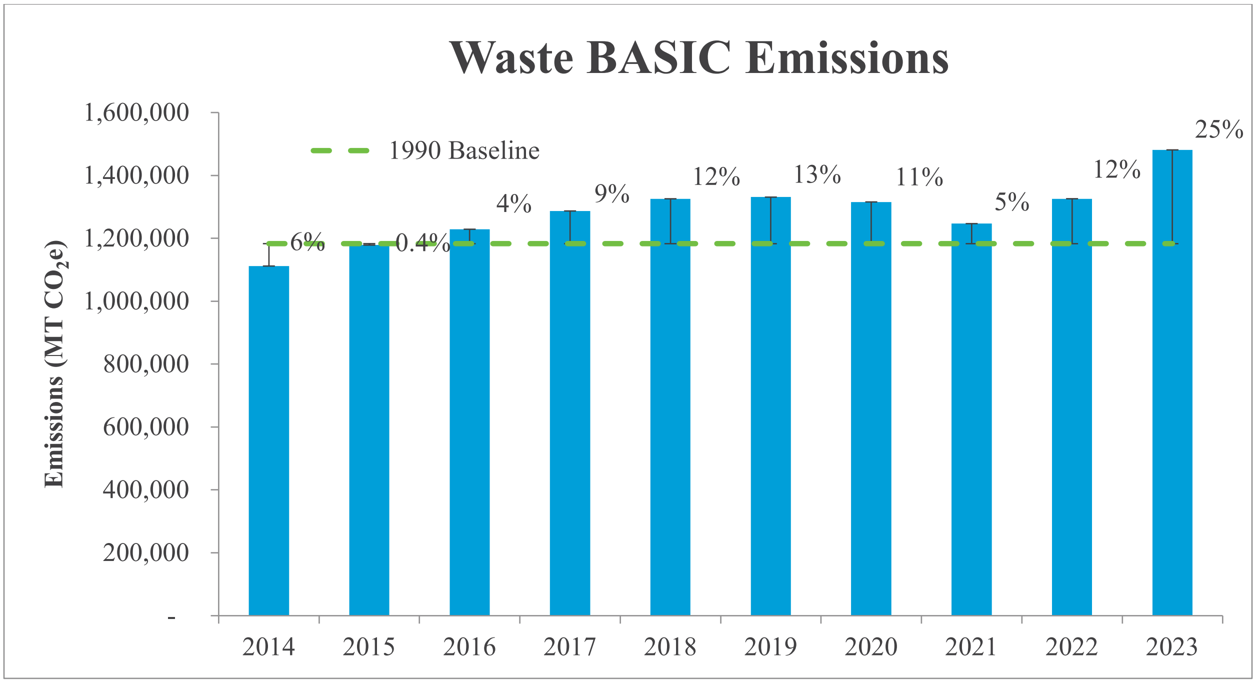

Figure 8. BASIC Waste Sector Emissions Reductions from Baseline

Figure 9 shows how waste composition significantly affects emissions levels; the different materials have varying organic content that decomposes at different rates. Paper and cardboard make up 23% of the City's waste by volume, yet they contribute to 53% of emissions from landfilled waste. Organic waste, while constituting 26% of the waste stream, accounts for 37% of emissions. These two categories alone represent 90% of emissions from landfilled waste, underscoring the importance of targeted waste reduction in these areas.[4]

[4] Waste characterization obtained from *Sunshine Canyon Landfill Comprehensive Waste Characterization Study,* May 2016.

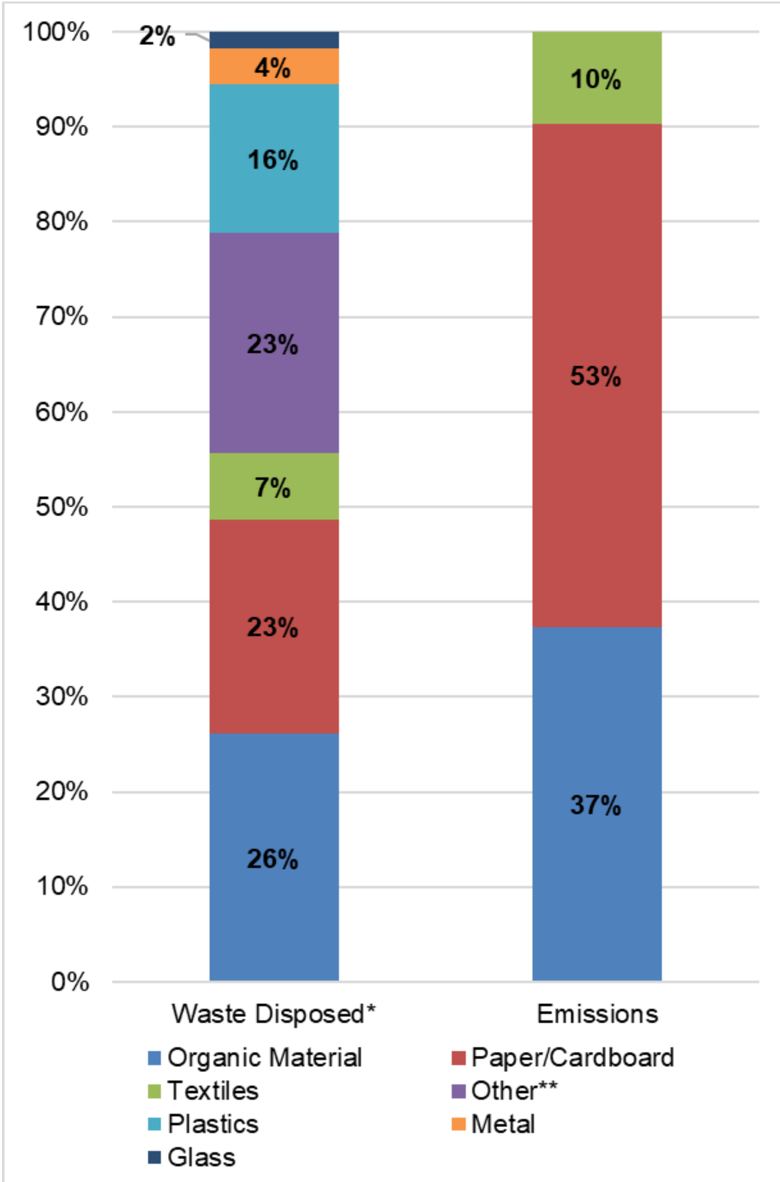

Figure 9. Landfilled Waste Characterization vs. Emissions

*Percentages may not total to 100 percent due to rounding.
**Other includes rubber and leather, electronics, gypsum board, inert material, household hazardous waste, special waste, and mixed residue.

3.4 Agriculture, Forestry, and Other Land Use

The AFOLU sector is characterized by GHG emissions from several sources, including land-use changes, enteric fermentation in livestock, and agricultural nutrient management. In the City's emissions framework, these emissions are detailed only in the BASIC+ inventory, not the BASIC total. While carbon sequestration data is captured for reference, it isn't factored into the net emissions for BASIC+.

Table 9. AFOLU Emissions by Subsector (MT CO_2e)

	Livestock	Land		Aggregate Emission Sources		Total (sources)
	Sources	Sources	Sinks	Sources	Sinks	
1990	4,418	13,981	(112,441)	9,144	(48,556)	27,543
2014	4,418	12,165	(112,706)	5,616	(79,865)	22,198
2015	4,418	12,165	(112,736)	5,689	(80,407)	22,271
2016	4,418	12,165	(112,541)	5,506	(63,510)	22,089
2017	4,418	11,581	(112,797)	6,018	(34,888)	22,016
2018	4,418	11,492	(112,827)	7,517	(45,678)	23,427
2019	4,418	11,344	(112,523)	32,810	(72,411)	48,572
2020	4,418	11,286	(112,729)	8,681	(76,818)	24,384
2021	4,275	11,224	(112,609)	12,144	(66,524)	27,643
2022	4,275	11,115	(112,716)	28,211	(58,158)	43,601
2023	4,275	16,546	(108,509)	3,684	(62,130)	24,505

The primary emissions source in this sector is synthetic fertilizer use, with a notable increase in 2019 and 2022 emissions driven by greater application of synthetic fertilizers (Figure 10). Preliminary data for 2023 suggests a significant decrease in overall emissions, which may be partially attributed to the expansion of the City's organic waste recycling and healthy soils programs. These initiatives have likely contributed to increased compost production and application, potentially reducing reliance on synthetic fertilizers and promoting soil carbon sequestration. Beyond reducing emissions, composting offers co-benefits such as water conservation, improved soil microbial health, erosion control, and air quality improvements. This progress highlights the critical role of sustainable waste management practices in mitigating climate impacts and fostering healthier ecosystems.

In 2023, while emissions from land sources increased—potentially due to shifts in land use or reduced sequestration capacity—the City's efforts to scale composting and soil health improvements underscore the potential for targeted programs to drive meaningful reductions in greenhouse gas emissions. It is also important to note that aggregate emission source values differ due to updates to emission factors in the 2019 IPCC refinement.

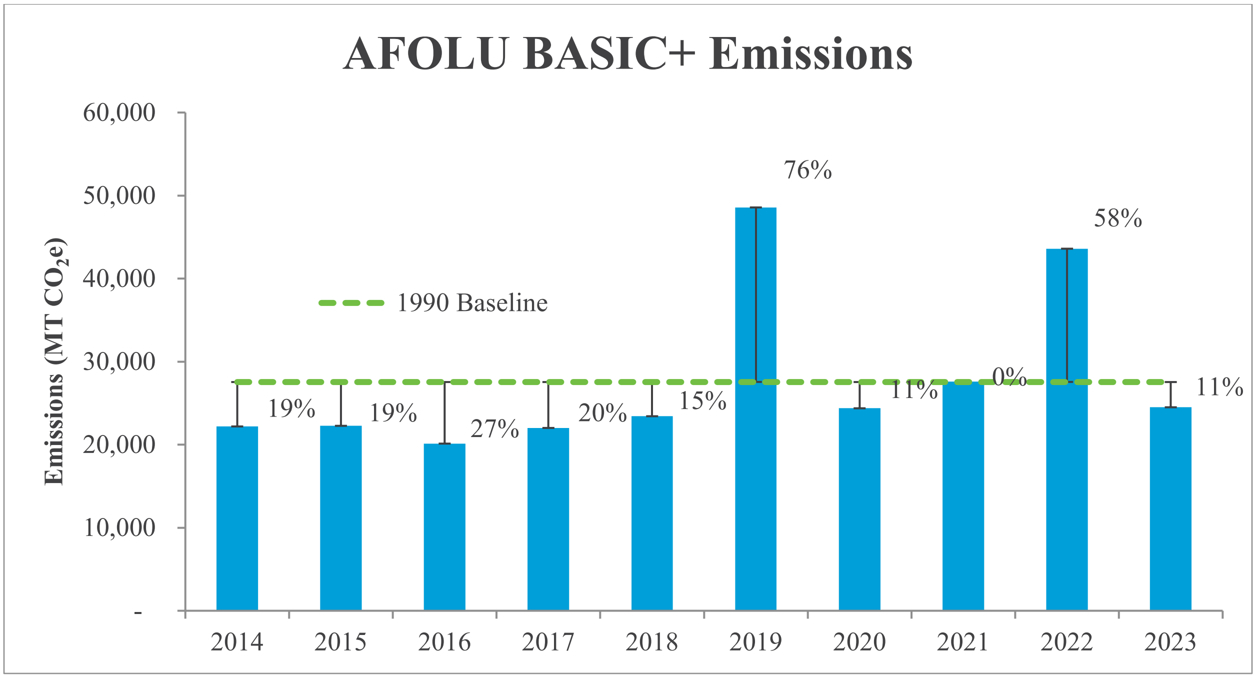

Figure 10. AFOLU Sector Emissions Reductions from Baseline

3.5 Industrial Processes and Product Use

The IPPU sector captures emissions from non-energy related industrial processes[5] and the use of products not related to energy generation. This includes emissions from substitutes for ozone-depleting substances (ODS), such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). Both of these ODS substitutes replaced ozone-depleting Chlorofluorocarbons (CFCs) that were in use in 1990, and are now widely used in refrigeration, air conditioning, foam production, and fire suppression systems instead of CFCs. These emissions are part of the BASIC+ standard and thus are not included in the BASIC emissions tally.

Table 10. IPPU Emissions by Subsector (MT CO_2e)

	Industrial Processes	Product Use	Total IPPU Emissions
1990	-	9,753	9,753
2014	-	1,790,652	1,790,652
2015	-	1,879,750	1,879,750
2016	-	1,947,186	1,947,186
2017	-	2,009,201	2,009,201
2018	-	2,050,501	2,050,501
2019	-	2,067,530	2,067,530
2020	-	2,071,863	2,071,863
2021	-	2,061,848	2,061,848
2022	-	2,058,893	2,058,893
2023	-	2,086,144	2,086,144

A substantial portion of the IPPU emissions stems from the use of HFCs and PFCs, which are potent greenhouse gases. To mitigate this, the City is exploring policy options to accelerate the phase-out of these chemicals in line with California Air Resources Board (CARB) regulations, while promoting alternative cooling technologies such as natural refrigerants and passive cooling strategies. CARB is proactive in this area, developing regulations that encourage the use of substances with a lower climate change potential.

Given the vast technological and industrial changes since, the baseline year for IPPU emissions provides limited insights for comparison. The sector has evolved, with new processes and technologies emerging that were not present three decades ago, which now contribute to GHG emissions. For instance, emissions from IPPU in 1990 were recorded at a mere 10,000 MT CO_2e, contrasting sharply with the over 2 million MT CO_2e reported in recent years.

Thus, while historical data offer context, the focus must be on current and future actions. Efforts to find alternatives to substitutes for ozone-depleting substances are paramount. This includes

[5] Industrial process facilities are in the mineral, chemical, and metal production industries. No industrial facilities within Los Angeles meet the thresholds for reporting to statewide and national regulatory agencies, including CARB and the US EPA. As a result, industrial process emissions are not in this inventory. This does not necessarily mean there are no industrial process emissions, only that there are no facilities that meet the reporting thresholds.

identifying new chemicals or methods that serve similar functions or devising innovative strategies to reduce the need for refrigerants and cooling agents altogether.

The IPPU sector's evolution underscores the necessity for a dynamic and responsive approach to environmental management, one that acknowledges past practices while aggressively pursuing current opportunities for emission reductions.

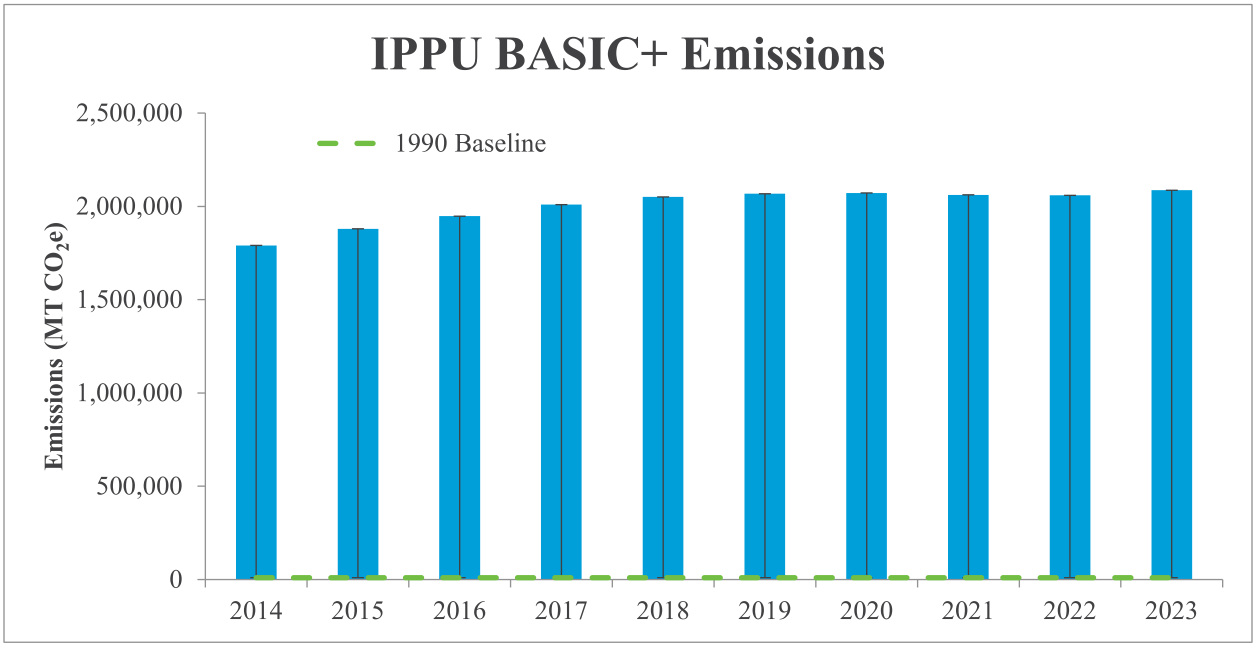

Figure 11. IPPU Sector Emissions Compared to Baseline

4. Conclusion

Los Angeles' unwavering determination and strategic action in addressing climate change are exemplified by the substantial greenhouse gas (GHG) emissions reductions recorded in the 2023 Community GHG Inventory. With emissions now 33% below the 1990 baseline, the City continues to demonstrate its commitment to a sustainable future while setting a global benchmark for urban climate leadership.

To meet the ambitious target of a 50% reduction by 2025, Los Angeles must achieve an additional 17% reduction in emissions over the next two years. This pressing challenge underscores the need for accelerated efforts across all sectors, including scaling clean energy adoption, electrifying transportation systems, enhancing waste reduction and recycling programs, and addressing fugitive emissions. Achieving this goal will require innovation, collaboration, and an unwavering focus on equity and sustainability.

Notable progress has already been made. The stationary energy sector achieved an impressive 44% reduction in emissions since 1990, driven by the decarbonization of the electricity grid and advances in energy efficiency. The transportation sector saw a 12% reduction compared to 1990 levels, bolstered by ongoing investments in electrification and sustainable transit initiatives. While emissions from the waste sector increased, targeted programs to enhance recycling, divert waste from landfills, and engage the public are poised to address these challenges.

This report further highlights the City's success in decoupling emissions from economic growth, with emissions per unit of GDP continuing to decline. This progress illustrates that environmental sustainability and economic prosperity are not only compatible, but mutually reinforcing, as Los Angeles advances toward a greener, more resilient economy.

Looking ahead, the City will continue to innovate and implement bold climate strategies, guided by the Green New Deal's vision for carbon neutrality by 2050. LASAN, in partnership with the Mayor’s Office of Energy and Sustainability, remains steadfast in refining the GHG inventory and developing policies that enable these ambitious goals. Los Angeles' journey toward sustainability is a testament to what can be accomplished through visionary leadership and collective action, serving as a beacon of environmental stewardship for cities worldwide.

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 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. LASAN 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.

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Management

Mas Dojiri

Doug Walters

Melissa Plamondon

Climate Action Program

Daniel Brehm

Laura McAlister