NEW YORK STATE | Department of Environmental Conservation

2025 Statewide GHG Emissions Report

SUMMARY REPORT

Kathy Hochul, Governor | Amanda Lefton, Commissioner

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Thanks go specifically to James Wilcox, and Macy Testani of the New York State Energy Research and Development Authority (NYSERDA) for much of the analytic work conducted for this report. The Department of Environmental Conservation (DEC) Office of Climate Change also worked with many other NYS agencies and offices to compile the information presented here. We also thank these partners:

- DEC’s Division of Air Resources
- DEC’s Division of Materials Management
- DEC’s Division of Mineral Resources
- DEC’s Division of Lands and Forests
- DEC’s Division of Water
- Department of Agriculture and Markets
- Department of Public Service

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DEC’s GHG Inventory Team

Office of Climate Change: Suzanne Hagell, Greg Mumby, Charlene Tarsa, Caitlin Frame, Olivia Novak, Matt Jenkins
Division of Air Resources: Nathan Putnam, Michael Caseiras
Division of Lands and Forests: Jason Drobnack

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Executive Summary

The New York State Statewide Greenhouse Gas Emissions Report is a foundational component of the State's strategy for addressing climate change. This emission inventory is designed to meet the requirements of the Climate Leadership and Community Protection Act (CLCPA),[1] measure progress at reducing greenhouse gas (GHG) emissions, and to make GHG information accessible to a broad audience. This report provides the most up-to-date estimation of annual GHG emissions from 1990 through 2023. The structure and content of this report is aligned with methodology from the Intergovernmental Panel on Climate Change (IPCC) for governmental greenhouse gas accounting as used in the U.S. national greenhouse gas emissions report (EPA 2025). Any deviations from these methodologies reflect available datasets and the requirements of New York State law.

Format of This Report

In total, this report includes one summary report, four sectoral reports, and two appendixes. One with emission factors based on the CLCPA GHG emission accounting requirements, and a second detailing energy sector data and methods. The *Summary Report* provides general background and economy-wide trends. The *Sectoral Reports* each review the data, methods, and results of analysis for specific sectors. The default format used throughout this report meets the requirements of the CLCPA, but this Summary Report also presents results in a conventional format developed for national parties to the United National Framework Convention on Climate Change (UNFCCC). The conventional format is comparable to emission information issued by other governments and organizations and is provided for informational purposes. As outlined in Table ES.1, the differences between the CLCPA and conventional accounting relate to the scope of emissions, the use of gross as well as net emission totals, and Global Warming Potential (GWP). Note that national governments previously used the GWP values from the IPCC's Fourth Assessment Report. Now both state and national accounting use values from the IPCC's Fifth Assessment Report.

Table ES.1: Comparison of GHG Emission Accounting Formats Used in This Report

	CLCPA Format	Conventional Format
Emissions Scope	In-state sources, imported electricity and fossil fuels, exported waste	In-state sources only
Gross versus Net	Gross and Net totals*	Net totals are used, but gross emissions are also reported
Global Warming Potential	20-Year GWP	100-Year GWP

*The Statewide GHG Emission Limits established by ECL § 75–0107 and reflected in 6 NYCRR Part 496 are measured in gross emissions and the CLCPA's zero emission goal established by ECL § 75–0103(11) refers to net emissions.

[1] Chapter 106 of the Laws of 2019; Environmental Conservation Law (ECL) Article 75 and as adopted in 6 NYCRR Part 496.

Current New York State Greenhouse Gas Emissions

In 2023, statewide gross GHG emissions were 354.06 million metric tons of carbon dioxide equivalent GHGs (mmt CO_2e) using CLCPA accounting. Total gross emissions in 2023 were 14.8% lower than the 1990 baseline in this report and 13.6% below the 1990 statewide emission baseline adopted in regulation in 2020.[2] Carbon dioxide (CO_2) and methane (CH_4) comprised the largest portion of emissions by gas, 58% and 35% respectively, and energy was the largest source of emissions (73%). Net emissions were 305.07 mmt CO_2e in 2023, which includes a net 37.48 mmt CO_2e removed.

Emissions in New York State in 2023 have mostly recovered from the effects of the 2020 COVID-19 pandemic. As noted in the two previous versions of this report, 2020 emissions were not considered representative and were expected to normalize to broader trends in future reports. Annual gross emissions in 2023 were less than 0.1% higher than in 2022 and 4% lower than the pre-pandemic levels in 2019. This trend is primarily the result of energy sector changes. Energy emissions in 2023 were 10% higher than in 2020, and 1% lower than in 2022. Within the energy sector, these trends were driven by the gradual recovery of energy sector subsectors such as transportation and a change in electricity generation sources. Some of the trends in energy emissions are also affected by seasonal weather patterns and interannual differences in the demand for heating or cooling.

Greenhouse gas emissions from the extraction, processing, and transmission of imported natural gas greatly decreased for years 2020-2022 relative to the 2024 Statewide GHG Emissions Report due to updated data and methodology. This report uses an updated fuel lifecycle analysis model made available by the National Energy Technology Laboratory (NETL 2025) that estimates GHG emissions from natural gas systems based on year 2020 operating conditions. Note that use of the updated model reduced statewide greenhouse gas emission totals for years 2020-2022 compared to the totals included in the 2024 Statewide GHG Emissions Report. More details about the changes to the data and methodology underlying imported natural gas emissions are included in Sectoral Report #1: Energy.

This report provides information on emissions starting in 1990 through the most recent year of data, or 2023, with a focus on trends observed from 2019 through 2023. Minor differences in the emission values included in this report as compared to the 2024 Statewide GHG Emissions Report and the 6 NYCRR Part 496 regulation are the result of continual updates and improvements to the methodology and data used to calculate emissions.

[2] 6 NYCRR Part 496.

Table ES.2: 2023 New York State GHG Emissions, by IPCC Sector

New York State 2025 Statewide GHG Emissions Report

CLCPA Format ($mmtCO_2e$ GWP20)	**CO_2**[a]	**CH_4**	**N_2O**	**PFC**	**HFC**	**SF_6**	**NF_3**	**Total**	*% of Total*	UNFCCC Total[b]
Energy	197.35	61.21	1.06	-	-	0.12	-	259.74	73%	159.94
Fuel Combustion	161.17	1.72	0.92	-	-	-	-	163.82	46%	154.39
Electric Power	26.19	0.04	0.04	-	-	-	-	26.28	7%	26.10
Residential	34.13	0.89	0.05	-	-	-	-	35.08	10%	32.18
Commercial	20.78	0.29	0.02	-	-	-	-	21.10	6%	20.49
Industrial	8.36	0.07	0.03	-	-	-	-	8.45	2%	6.63
Transportation	71.71	0.44	0.78	-	-	-	-	72.92	21%	68.99
Fugitive Emissions	0.13	13.25	+	-	-	-	-	13.38	4%	4.55
Electricity T&D	-	-	-	-	-	0.12	-	0.12	+	0.16
Other Use of Fuels	0.84	-	-	-	-	-	-	0.84	+	0.84
Out of State Emissions	35.21	46.24	0.13	-	-	-	-	81.58	23%	-
Imported Electricity	9.50	0.02	0.02	-	-	-	-	9.54	3%	-
Imported Fossil Fuels	25.71	46.23	0.11	-	-	-	-	72.04	20%	-
Industrial Processes and Product Use	1.94	+	0.24	0.08	21.42	+	0.02	23.71	7%	11.83
Metals	0.31	+	-	0.02	-	-	-	0.33	+	0.33
Minerals	1.63	-	-	-	-	-	-	1.63	+	1.63
Electronics	-	-	0.02	0.07	+	+	0.02	0.11	+	0.14
Product Use	-	-	0.22	-	21.42	-	-	21.64	6%	9.73
Agriculture, Forestry, and Other Land Use	0.17	19.78	2.18	-	-	-	-	22.13	6%	8.95
Livestock	-	19.78	0.40	-	-	-	-	20.19	6%	7.00
Soil Management	0.17	-	1.78	-	-	-	-	1.95	1%	1.95
Waste	4.80	43.12	0.56	-	-	-	-	48.47	14%	10.44
Solid Waste Management	0.69	23.20	-	-	-	-	-	23.89	7%	7.73
Waste Combustion	3.37	0.10	0.04	-	-	-	-	3.51	1%	1.36
Wastewater	-	2.51	0.51	-	-	-	-	3.02	1%	1.35
Exported Waste (c)	0.73	17.31	0.01	-	-	-	-	18.05	5%	-
Gross Total	204.26	124.11	4.03	0.08	21.42	0.13	0.02	354.06		191.17
% Gross Total	58%	35%	1%	+	6%	+	+			
Net Emission Removals [d]	(37.48)							(37.48)		(39.13)
Net Total	155.27	124.11	4.03	0.08	21.42	0.13	0.02	305.07		152.04
% Net Total	53%	39%	1%	+	7%	+	+			

"-" Not Applicable. "+" less than 0.01mmt or less than 0.1%. Totals may not sum due to independent rounding.

(a) Gross CO_2 emission estimates include biogenic CO_2.

(b) UNFCCC Total refers to conventional accounting used by other governments, applies a 100-year GWP (IPCC 2014), omits biogenic CO_2, and does not include emissions outside of New York State.

(c) Exported waste refers to emissions generated from waste sent to landfills and combustors outside of New York State.

(d) Net Emission Removals include a small amount of methane and nitrous oxide from forest fire.

Table ES.3: 2023 New York State GHG Emissions, by Economic Sector

New York State 2025 Statewide GHG Emissions Report

CLCPA Format ($mmtCO_2e$ GWP20)	**CO_2**[(a)]	**CH_4**	**N_2O**	**PFC**	**HFC**	**SF_6**	**NF_3**	**Total**	% of Total	UNFCCC Total[(b)]
Electricity	38.79	14.98	0.08	-	-	0.12	-	53.97	15%	26.27
Fuel Combustion	26.19	0.04	0.04	-	-	-	-	26.28	7%	26.10
Electricity T&D	-	-	-	-	-	0.12	-	0.12	+	0.16
Imported Fuels	2.46	11.05	+	-	-	-	-	13.52	4%	-
Imported Electricity	10.13	3.89	0.03	-	-	-	-	14.05	4%	-
Transportation	84.68	9.63	0.84	-	3.17	-	-	98.32	28%	68.03
Fuel Combustion	69.63	0.43	0.77	-	-	-	-	70.84	20%	66.91
Product Use	-	-	-	-	3.17	-	-	3.17	1%	1.13
Imported Fuels	15.05	9.20	0.07	-	-	-	-	24.32	7%	-
Buildings	61.16	19.57	0.10	-	18.25	-	-	99.08	28%	61.05
Residential Fuel Comb.	34.13	0.89	0.05	-	-	-	-	35.08	10%	32.18
Commercial Fuel Comb.	20.78	0.29	0.02	-	-	-	-	21.10	6%	20.49
Product Use	-	-	-	-	18.25	-	-	18.25	5%	8.38
Imported Fuels	6.24	18.40	0.02	-	-	-	-	24.66	7%	-
Industry	14.67	17.03	0.27	0.08	+	+	0.02	32.08	9%	16.43
Industrial Processes†	1.94	+	0.24	0.08	+	+	0.02	2.29	1%	2.33
Oil and Gas Industry††	2.41	14.14	+	-	-	-	-	16.55	5%	6.63
Fuel Combustion	8.36	0.07	0.03	-	-	-	-	8.45	2%	6.63
Other Uses of Fuels	0.84	-	-	-	-	-	-	0.84	+	0.84
Imported Fuels	1.12	2.82	+	-	-	-	-	3.95	1%	-
Waste†	4.80	43.12	0.56	-	-	-	-	48.47	14%	10.44
Waste	4.06	25.81	0.55	-	-	-	-	30.42	9%	10.44
Exported Waste [(c)]	0.73	17.31	+	-	-	-	-	18.05	5%	-
Agriculture†	0.17	19.78	2.18	-	-	-	-	22.13	6%	8.95
Gross Total	**204.26**	**124.11**	**4.03**	**0.08**	**21.42**	**0.13**	**0.02**	**354.06**		**191.17**
% Gross	*58%*	*35%*	*1%*	*+*	*6%*	*+*	*+*			
Net Emission Removals [(d)]	*(37.48)*									(39.13)
Net Total	166.78	124.11	4.03	0.08	21.42	0.13	0.02	**316.58**		152.04
% Net	*53%*	*39%*	*1%*	*+*	*7%*	*+*	*+*			

"-" Not Applicable. "+" less than 0.01mmt or less than 0.1%. Totals may not sum due to independent rounding.

(a) Gross CO_2 emission estimates include biogenic CO_2.

(b) UNFCCC Total refers to conventional accounting used by other governments, applies a 100-year GWP (IPCC 2014), omits biogenic CO_2, and does not include emissions outside of New York State.

(c) Exported waste refers to emissions generated from waste sent to landfills and combustors outside of New York State.

(d) Net Emission Removals include a small amount of methane and nitrous oxide from forest fire.

†See previous table for sources within these emission categories.

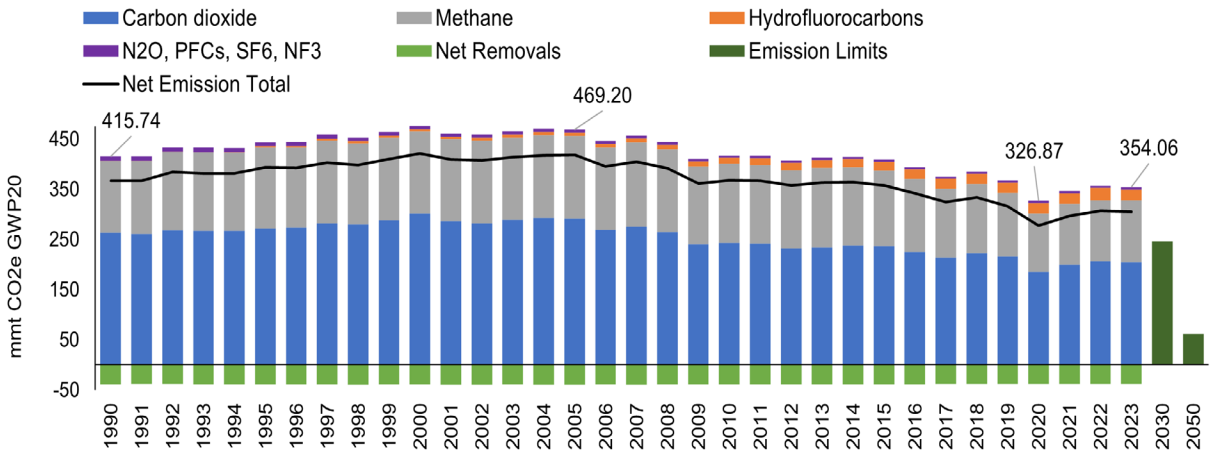
††Oil and Gas Industry includes fuel use in pipelines and fugitive emissions within New York.

Trends in Greenhouse Gas Emissions, 1990-2023

Total statewide gross emissions in 2023 were 14.8% below 1990 and 24.5% below 2005 levels, when assessed using CLCPA accounting and the most up-to-date methodologies. Figure ES.1 shows overall trends in statewide emissions by gas on an annual basis, including gross and net emission totals, as well as the emission limits for 2030 and 2050 pursuant to ECL § 75-0107 and 6 NYCRR Part 496. Statewide emissions are 13.6% below the 1990 baseline used in the Part 496 regulation. Statewide emissions for 2020 are also described in this report but are not representative of historic nor current conditions due to the impacts of the COVID-19 pandemic.

Annual emissions of CO_2 declined 22.6%, or 59.81 mmt CO_2, from 1990 to 2023, but this was coupled with an increase in hydrofluorocarbon emissions of over 21mmt CO_2e. Methane emissions declined 12.7%, or 18.09 mmt CO_2e, from 1990 to 2023. Emission rates for the other gases (N_2O, PFCs, SF_6, and NF_3) remain at relatively low rates in terms of carbon dioxide equivalence and declined 54.7% since 1990, or 5.1mmt CO_2e. Annual, net emission removals of CO_2 declined 0.8% from 1990 to 2023, or from -38.54 mmt to -37.48 mmt CO_2e. The estimates of annual CO_2 removal are higher in this report as a result of recent updates to national forest carbon datasets. This results in a lower net emission total compared to previous reports. However, the increased removal rate was applied through the time series. As a result, the overall trend, a reduction in annual CO_2 removal from 1990 to current, remains the same as in previous reports.

Figure ES.1: NYS Statewide Greenhouse Gas Emissions by Gas, 1990-2023 (mmt CO_2e GWP20)



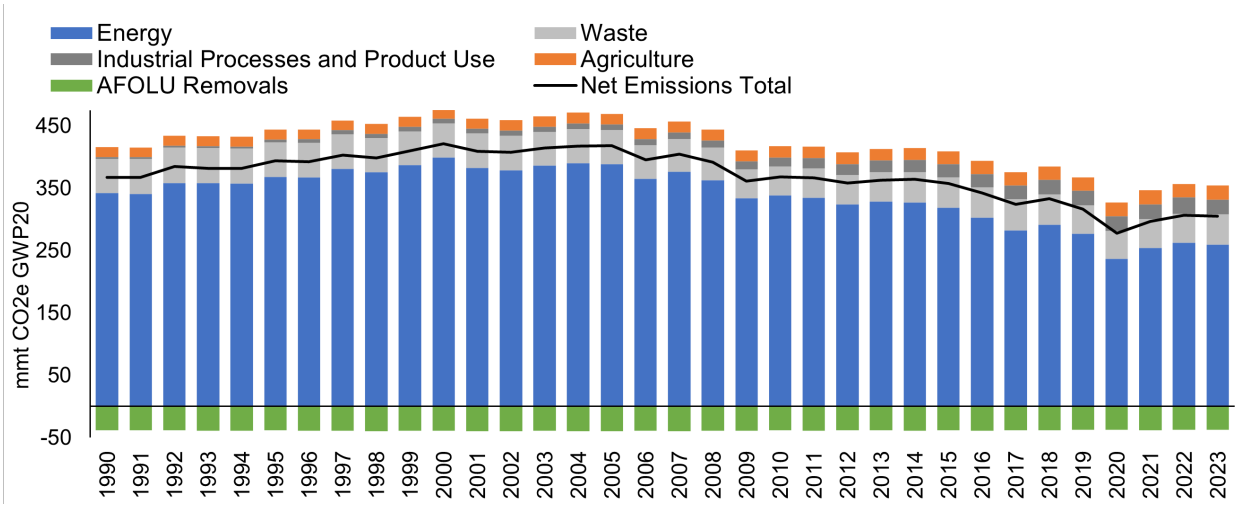
As a point of comparison, when applying the conventional, or UNFCCC, format for governmental accounting, emissions declined 24% percent from 1990 to 2023 in New York State. Importantly, this accounting format does not meet CLCPA requirements.

Trends in IPCC Emission Sectors, 1990-2023

In Figure ES.2, emissions are organized into the sectors described in IPCC approach (IPCC 2006). The Energy sector encompasses emissions associated with the energy system, including electricity, transportation, and building/industrial heating. The Industrial Process and Product Use (or IPPU) sector covers emissions associated with manufacturing and manufactured products. The Waste sector encompasses any activities to manage human wastes. Finally, the Agriculture, Forest, and Other Land Use (or AFOLU) sector encompasses emissions from the management of lands and livestock as well as net emission removals from land management and the long-term storage of carbon in durable goods.

The Energy sector represents the majority of emissions (73%), but energy emissions in 2023 were 24.1% lower than in 1990 (Figure ES.2). The overall reduction in energy emissions was offset by increases in AFOLU and IPPU sectors and by a 2.8% decline in net emission removals. The largest increases occurred in IPPU due to the increasing use of hydrofluorocarbons (20.69 mmt CO_2e) and in AFOLU resulting from changes in agricultural practices (6.47 CO_2e). Waste sector emissions declined by 6.17 mmt CO_2e over the period, primarily due to implementation of landfill gas capture systems.

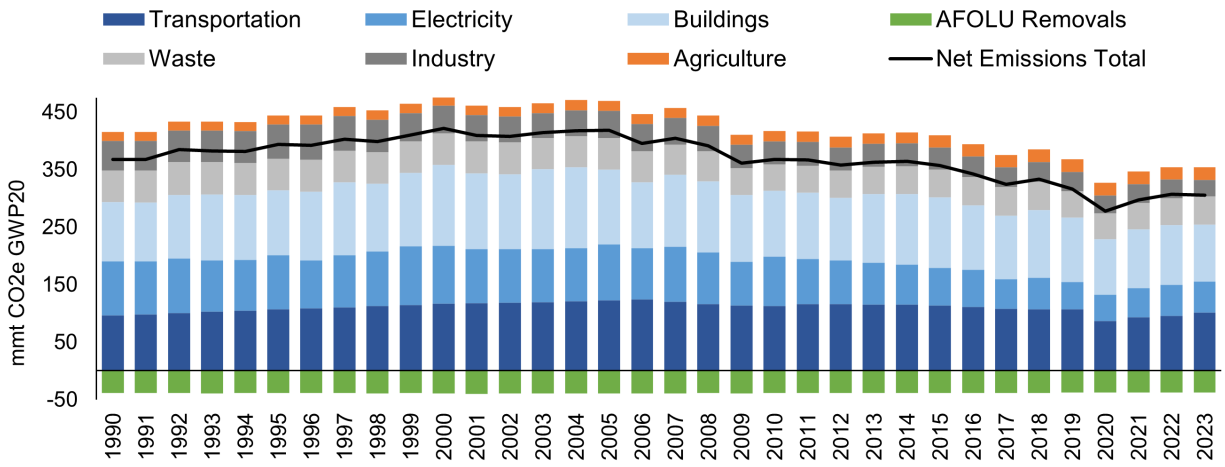
Figure ES.2: NYS Statewide Greenhouse Gas Emissions by Sector, 1990-2023 (mmt CO_2e GWP20)



Emission Trends by Economic Sectors and CLCPA Scoping Plan

Emissions can also be organized into sectors that reflect economic drivers and policy. Table ES.3 and Figure ES.3 organizes emissions as sectors described in the New York State Climate Action Council Scoping Plan. For example, energy fuels were assigned to the sector where those fuels were used, such as in the transportation system or for electricity generation. Similarly, products that contain hydrofluorocarbons, such as air-conditioning equipment, were assigned to the transportation or buildings sectors. The most significant decreases between 1990 and 2023 are a 43% decrease in electricity emissions and a 44% decrease in industrial emissions (39.97mmt and 23.12mmt CO_2e reduction, respectively). These reductions were offset by increases in other sectors. Emissions were 5% higher in the transportation sector and 41% higher in the agricultural sector in 2023 compared to 1990 (4.74mmt and 6.47mmt increases, respectively). The primary impacts of the COVID-19 pandemic in 2020 were to lower emissions in energy-related sectors, but this effect was temporary. Emissions in the transportation, buildings, and electricity sectors were a combined 25.74mmt higher in 2023 compared to 2020.

Figure ES.3: NYS Statewide Emissions by Economic Sector, 1990-2023 (mmt CO_2e GWP20)



2025 Statewide Greenhouse Gas Emissions Report

I. Introduction to the Report

This annual report on statewide greenhouse gas (GHG) emissions provides a summary of emissions for the years 1990-2023 and includes information on the relative contribution of each gas and emission source specified in the Climate Leadership and Community Protection Act.[3] This includes all anthropogenic GHG emissions from each sector of the economy for each year.

In producing this report, DEC used the approach provided by the Intergovernmental Panel on Climate Change (IPCC) Taskforce on National Inventories, referred to here as the "IPCC approach" (IPCC 2006, 2019). The IPCC approach is intended for use by national parties to the United Nations Framework Convention on Climate Change (UNFCCC) and represent a rigorous set of procedures for producing a full assessment of anthropogenic emission sources within a jurisdiction. The U.S. national greenhouse gas inventory applies this approach and is the primary model used for this state report (EPA 2025).

The emission information provided in this report is intended to provide information in a way that is useful to the public and to policymakers. This includes summaries by gas, by IPCC sectors, and by the economic sectors used in the New York State Climate Action Council Scoping Plan. DEC welcomes feedback on additional ways to present this information in future reports. DEC also makes the emission estimates available on Open Data NY so that users can produce their own summaries.

Organization of the Report

The annual report is provided in a set of stand-alone documents to enable users to locate the information most relevant to their needs. This *Summary Report* compares trends among all emission sectors and provides general information about the reporting process and the legal requirements of this report. For informational purposes, the Summary Report provides emission results in a conventional format for ease of comparison to reports by other governments (see "Greenhouse Gas Accounting Used in This Report"). The four *Sectoral Reports* provide more technical detail and a review of data, methods, and results for each of the IPCC sectors: Energy, Industrial Processes and Product Use (IPPU), Agriculture Forestry and Other Land Use (AFOLU), and Waste. The Sectoral Reports also provide information on subcategories of emission sources that are not described in the Summary Report. Finally, two appendixes are provided with supplemental data. Appendix A is a reference document with emission factors that align with the data and methods used in this report, and Appendix B provides more specific details regarding Energy sector data and methodology.

- Summary Report (this document)
- Sectoral Report #1: Energy

[3] ECL § 75-0105(1).

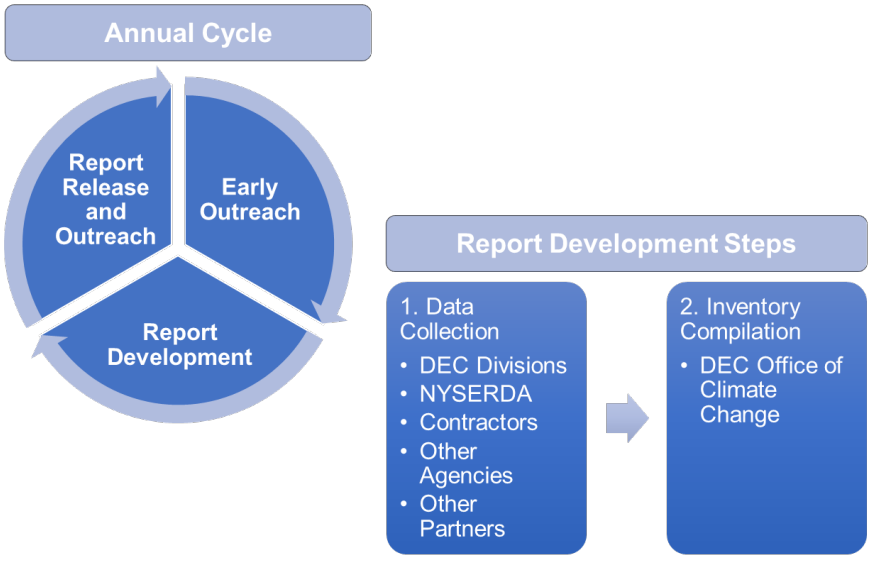
- Sectoral Report #2: Industrial Processes and Product Use
- Sectoral Report #3: Agriculture, Forestry, and Other Land Use
- Sectoral Report #4: Waste
- Appendix A: Emission Factors for Use by State Agencies and Applicants
- Appendix B: Energy Sector Data and Methods

Annual Inventory Process

This report is updated annually as required by the CLCPA, following the release of the U.S. national greenhouse gas inventory and related datasets. DEC updates the emission estimation methodology as appropriate in order to incorporate the most recent data and best available methods. Wherever possible, the new methods will be applied to the full historical timeseries. As such, results provided in the 2025 report for 1990-2023 have been updated in this report.

DEC applies the same general process for each annual report, consistent with the requirements of the CLCPA (Figure 1). First, DEC invites early input on the scope of emissions to be covered in the report, the organization of the report, and the data and methods used to develop the emission estimates. Where needed, DEC may hold public meetings to collect feedback. DEC also consults early with partners such as the U.S. EPA. Once this phase is completed and the relevant national datasets are made available, DEC develops the written report in collaboration with other State entities, contractors, and partners. Feedback received after the release of each report may be considered in the development of the following year's report. DEC accepts feedback on the annual reports on an ongoing basis in order to continually improve the data and methods.

Figure 1: New York State Greenhouse Gas Inventory Process Diagram



This report collates information from many sources including national datasets, published academic research, and analyses conducted by private and public entities on behalf of New York State. Certain sources are indicated below (Table 1); details on these and other sources

are provided in the Sectoral Reports. While this report uses the best information available at the time of development, DEC will continue to seek improvements wherever possible as it develops future reports. DEC welcomes input on how best to integrate new data into this report as well as other State policies and programs.

Table 1: Example Resources Used in This Report

Energy	Industrial Processes and Product Use	Waste	Agriculture, Forests, and Other Land Use
USEIA State Energy Data System	EPA Greenhouse Gas Reporting Program	DEC Solid Waste Information Management System	USDA Forest Service Inventory and Analysis
Motor Vehicle Emission Simulator (MOVES)	USGS Minerals Information Center		USDA National Agricultural Statistics Service
NYSERDA Oil and Gas Methane Inventory	NYSERDA HFC Inventory		NOAA Coastal Change Analysis Program
USEPA US National Greenhouse Gas Inventory (EPA 2025), submissions to the UNFCCC, and Inventory of U.S. Greenhouse Gas Emissions and Sinks by State			
USEPA State Inventory Tool (EPA 2025a)			

Greenhouse Gas Accounting Used in This Report

This report uses metrics and an organizational scheme that meets the requirements of the CLCPA while also considering other goals, including alignment with the accounting used by other governments, consistency with other State policies, and providing a familiar format to the public and stakeholders.

Bottom-up versus Top-down Accounting

As with all governmental emission accounting, this inventory is largely based on “bottom-up” estimates of greenhouse gas emission sources and sinks. Bottom-up methods attempt to estimate emissions from the individual source level, whereas “top-down” methods measure total emissions from multiple potential sources. Governmental emission inventories must look at the individual source level in order to identify and address emission sources. Fortunately, bottom-up estimates can be refined by comparing them to top-down measurements (see the *Sectoral Report #1: Energy* for an example). As the IPCC (2021) describes it, bottom-up emission inventories use empirical upscaling of point measurements, emission inventories, and dynamical model simulations, along with the summation across these to provide total emissions estimates for a region. In contrast, top-down estimates are those constrained by atmospheric measurements and chemistry-transport models in inversion systems. Intercomparison of top-down and bottom-up estimates is useful because discrepancies can point to emission sources that might be unidentified or as yet unaccounted for in bottom-up inventories. Top-down measurements can also provide a cross-check on how closely the scaling and models used in bottom-up estimates actually reflect the atmospheric reality. On the other hand, bottom-up estimates can help break down the total regional emissions provided by top-down

measurements by providing local and sector-specific information about emitting activities and nearby facilities.

Emission Scope: In-state, Out-of-state, and Lifecycle Emissions

Governmental greenhouse gas emission inventories that follow the IPCC approach are intended to monitor activities that occurred within that government's jurisdictional boundaries. Unlike other governmental inventories, due to the requirements of the CLCPA, this report includes certain emission sources that are outside of New York State's borders. Specifically, this report follows the definition of "statewide greenhouse gas emissions" provided in the CLCPA and includes sources within the state plus emissions associated with imported electricity and fossil fuels. [4] This report also includes emissions associated with wastes that have been exported outside of New York, per regulation. In this report, these emissions may be referred to as imported, exported, or out-of-state. There are other types of accounting that go beyond jurisdictional boundaries, such as consumption and lifecycle accounting. As described in *Sectoral Report #1: Energy*, lifecycle models were used in the analysis of imported fuels. However, lifecycle accounting is not intended to produce annualized or historical inventories as is needed for this report.

Gross versus Net Greenhouse Gas Emissions

Governmental greenhouse gas inventories that follow the IPCC approach typically report emissions and emission removals (otherwise known as sources and sinks) that occurred within the government's jurisdictional borders over the course of a year. Removals refer to CO_2 taken out of the atmosphere, such as by plants that absorb and store carbon during growth. A net emission total refers to emissions minus removals. Gross emission totals refer to emissions only, with no consideration of carbon removal from the atmosphere. In other words, "gross" emissions are actual emissions and "net" emissions are a component of the IPCC approach that also considers emission removals.

Unless stated otherwise, emission totals in this report are provided as gross emissions and include all sources of emissions except from the Land Use sector. The Land Use sector is reported in terms of net emission removals over the annual period. For example, total CO_2 associated with forests in a given year could include all of the CO_2 sequestered by trees as well as any gases emitted during forest fires. Consistent with the IPCC approach, biogenic CO_2 is a form of gross emissions, but it is treated as zero net emissions in net emission totals. This is a simplified assumption used in the IPCC approach that considers the balance of emissions (such as from plant-based fuels) with removals (from the growth of such fuel feedstocks on croplands or forest). Ultimately, this assumes that the annual, net amount of CO_2 in the atmosphere from biogenic sources will be reflected in the global accounting of the Land Use sector.[5] Put another way, this report follows IPCC approach and treats biogenic CO_2 as an anthropogenic emission

[4] ECL § 75-0101(13). See also ECL § 75-0105(3).

[5] E.g., IPCC Taskforce on National GHG Inventories (2021) Frequently Asked Questions #Q2-10, available at: https://www.ipcc-nggip.iges.or.jp/faq/faq.html (last visited November 4, 2021).

source that is omitted from net emission totals to avoid double counting CO_2 sources across the Energy and Land Use sectors.

Global Warming Potentials

Greenhouse gases warm the atmosphere as a function of their atmospheric abundances, atmospheric lifetimes, specific warming power per molecule, and their influence on the physical and chemical dynamics of the atmosphere. The impact of a specific greenhouse gas emission on the current and future climate is dependent on this combination of factors as well as the response of the earth system to the emission. The IPCC developed the Global Warming Potential (GWP) metric as one method to compare the impact of a pulse emission of a particular greenhouse gas to a pulse emission of an equal amount of CO_2, integrated over a time horizon that is chosen based on the specific goals that policy makers are trying to achieve. The GWP is reported in units of carbon dioxide equivalence, or "CO_2e". In previous years, national governments that report emissions to the UNFCCC applied a GWP integrated over a 100-year time horizon from IPCC's Fourth Assessment Report (IPCC 2007). Recently, national governments, like the United States, have begun using the IPCC's Fifth Assessment Report (IPCC 2013) and this has become the conventional approach.

The CLCPA requires that this report apply a GWP that is integrated over a 20-year time horizon. Shortening the time horizon over which the GWP is integrated increases the GWP of gases that are shorter-lived than CO_2, such as methane (CH_4; Table 2). In 2020, DEC adopted 20-year GWP values from the IPCC Fifth Assessment Report into the Part 496 regulation, which were the most up-to-date values at the time.[6] For the purposes of this report, greenhouse gas emissions are reported according to that regulation, unless otherwise noted. Newer GWP values are now available and may be adopted in future updates (IPCC 2021). Because different gases have different atmospheric lifetimes, and GWP is integrated over a finite time horizon, there is a range of possible temperature responses to apparently equivalent emissions as quantified by CO_2e (Tanaka and O'Neill 2018). The raw, unweighted tonnage of each emission estimate provided in this report can be determined by dividing by the GWP.

[6] 6 NYCCR Part 496.

Table 2: Global Warming Potential Values

Gas	**Conventional** AR5 GWP100 (IPCC 2013)	**CLCPA**[(a)] AR5 GWP20 (IPCC 2013)	AR6 GWP 100 (IPCC 2021)	AR6 GWP 20 (IPCC 2021)
CO_2	1	1	1	1
CH_4	28	84	27.9	81.2
N_2O	265	264	273	273
HFC-23	12,400	10,800	14,600	12,400
HFC-32	677	2430	771	2690
HFC-41	116	427	135	485
HFC-125	3170	6090	3740	6740
HFC-134a	1300	3580	1530	4140
HFC-143a	4800	6940	5810	7840
HFC-152a	138	506	164	591
HFC-227ea	3350	5360	3600	5850
HFC-236fa	8060	6940	8690	7450
HFC-43-10mee	1650	4310	1600	3960
HFC-245fa	858	2920	962	3170
HFC-365mfc	804	2660	914	2920
PFC-14	6630	4880	7380	5300
PFC-116	11,100	8210	12,400	8940
PFC-218	8900	6640	9290	6770
PFC-318	9540	7110	10,200	7400
PFC-3-1-10	9200	6870	10,000	7300
PFC-5-1-14	7910	5890	8620	6260
SF_6	23,500	17,500	25,200	18,300
NF_3	16,100	12,800	17,400	13,400

(a) 6 NYCRR Part 496; Source: IPCC (2013, 2021)

Greenhouse Gases and Other Pollutants

Many of the references cited in this report provide additional information on the pollutants that are driving climate change, including the IPCC Assessment Report (IPCC 2021) and the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2023 (EPA 2025). This report provides information on seven types of well-mixed greenhouse gases subject to the CLCPA and that are commonly reported by governments. However, there are other types of pollutants that also affect climate change as well as pollutants that may be associated with greenhouse gas sources that are harmful for human health and the environment.

Carbon dioxide

Carbon dioxide (CO_2) is the major anthropogenic climate forcer. The current atmospheric abundance of CO_2 has risen to 423.9 +/- 0.2 ppm from a preindustrial abundance of 278.3 ppm (WMO 2025), mainly due to fossil fuel combustion. Carbon cycle processes redistribute the CO_2

that is emitted to the atmosphere to terrestrial ecosystems and ocean carbon reservoirs. These CO_2 sinks take up roughly half of anthropogenic CO_2 emissions annually. But these sinks are responsive to changes in the atmospheric abundance of CO_2, and any deliberate net removal of CO_2 in the future will be partially offset by outgassing of CO_2 from the ocean and land sinks (IPCC 2021). The processes that remove CO_2 from the atmosphere act over different timescales that range from decades (e.g., incorporation into forest biomass, afforestation and reforestation processes) to centuries (dissolution and circulation in the deep ocean) to millennia (uplift and weathering of silicate minerals). These timescales mean that CO_2 is a long-lived greenhouse gas, and its present-day emissions will impact the climate long into the future (IPCC 2018).

Methane

Like CO_2, the atmospheric abundance of methane (CH_4) has been driven upwards by anthropogenic emissions. Atmospheric CH_4 is now 266% higher than preindustrial levels, and the rate of annual increase is higher now than any other period; CH_4 increased 8ppb to reach 1942ppb +/- 2 in 2024 (WMO 2025). Due to its abundance, CH_4 is often grouped with CO_2 and other long-lived greenhouse gases, but its atmospheric lifetime is actually only 11.8 years (IPCC 2021). In contrast to CO_2, whose long atmospheric lifetime and high atmospheric abundance drive its climate impact, it is CH_4's radiative efficiency, or heat-trapping ability, that makes it an important climate forcer over the short term. CH_4 that is emitted now will cause warming that peaks and largely dissipates after about a decade, because atmospheric reactions remove it relatively quickly. As a consequence, the GWP20 of CH_4 is much higher than its GWP100 (Table 2). It also means that a steady ongoing release of CH_4, rather than a pulse emission, is most similar to a pulse CO_2 emission in terms of their respective long-term climate impacts.

Nitrous oxide

Nitrous oxide (N_2O) is long-lived like CO_2, and like CH_4, it is also particularly effective at trapping heat in the atmosphere. Its atmospheric lifetime is estimated to be 109 years (IPCC 2021) and the only major removal processes are stratospheric chemical reactions. N_2O takes centuries to achieve equilibrium between emissions and removals and therefore, like CO_2, N_2O emissions impact climate cumulatively (IPCC 2021). N_2O sources are natural (60%) and anthropogenic (40%). Like CH_4, N_2O is produced both biologically through the activity of microorganisms, and through combustion. Biological N_2O is produced by microbial action on certain nitrogen compounds in soil and water. Anthropogenic activity in the agricultural and waste management sectors enhance biological N_2O emission rates. Combustion sources of N_2O include motor vehicles and point sources. The global atmospheric abundance of N_2O has risen to 338.0+/-0.1 ppb from a preindustrial value of 270.1 ppb (WMO 2024). Even after global emissions of N_2O are stabilized, its long atmospheric lifetime means that it will take more than a century before atmospheric abundances stabilize. N_2O is also of concern because it is the most significant anthropogenic destroyer of stratospheric ozone (Ravishankara, Daniel, and Portmann 2009).

Fluorinated or High GWP Gases

In addition to the naturally occurring greenhouse gases above, certain human-made compounds also contribute to climate change. Following IPCC approach, the following types of gases should be included in greenhouse gas accounting. These gases all contain fluorine and are emitted at a lower rate globally than the other well-mixed greenhouse gases but have much higher global warming potentials.

Hydrofluorocarbons (HFCs) are a group of different compounds primarily manufactured as replacements for ozone-depleting substances in a variety of end-uses such as refrigeration and foam blowing. The growth of HFCs corresponds to the adoption of the Montreal Protocol in 1987, which called for the phase down in the production and trade of chlorofluorocarbons (CFCs) and other ozone-depleting substances. Use of HFCs had therefore just begun around 1990, the UNFCCC's baseline year for reporting GHG emissions. Over the past thirty years, HFC use grew to replace the ozone-depleting substances and to meet an accelerated, global demand for refrigeration equipment. For this reason, HFC emissions started very close to zero in 1990 but have continued to grow exponentially through today. For example, HFC-134a was introduced early in the 1990s, reached an atmospheric abundance of 57.5 ppt by 2010, and doubled to 107.6 ppt by 2019 (IPCC 2021, Annex III). Some, but not all, HFCs are relatively short-lived; estimated atmospheric lifetimes are 14.0 +/- 2.8 years for HFC-134a, 5.4 +/- 1.1 years for rapidly increasing HFC-32, and 228 years for the high-GWP HFC-23 (IPCC 2021; Hodnebrog et al. 2020).

Perfluorocarbons (PFCs) are a group of compounds used in refrigerants, electronics manufacturing, and aluminum smelting that are chemically stable and long-lived in the atmosphere. For example, PFC-14 (perfluoromethane or CF_4) has an estimated atmospheric lifetime of 50,000 years. The atmospheric abundance of PFCs has risen steadily since the 1970s, though not at the accelerating rate seen among HFCs. Certain PFCs like CF_4 also have natural sources that contribute significantly to their atmospheric abundance (IPCC 2021).

Sulfur hexafluoride (SF_6) is a synthetic fluorinated compound that is the most potent greenhouse gas currently known, with a GWP20 of 17,500 (Table 2). It is also an extremely stable, long-lived molecule, with an atmospheric lifetime estimated to be 1,000 years (IPCC 2021). It therefore has a cumulative impact on climate, like CO_2 and N_2O, and a relatively small amount of SF_6 can have a significant long-term impact. The atmospheric SF_6 abundance was estimated to be 10.0 ppt in 2019, up from 7.0 ppt in 2011 (IPCC 2021). The current abundance of SF6 in the atmosphere is more than twice that in the mid-1990's (WMO 2024). SF_6 has been used in a variety of applications, including electronics manufacturing and in medical applications. Electric utilities rely on SF_6 in electric power systems for voltage electrical insulation, current interruption, and arc quenching in the transmission and distribution of electricity.

Nitrogen trifluoride (NF_3) is emitted during electronics manufacturing. Its atmospheric abundance is still low but steadily increasing, rising from 0.7 ppt in 2010 to 2.1 ppt in 2019 (IPCC 2021, Annex III). Its high GWP (Table ES1.2) is second only to that of SF_6, and its long

atmospheric lifetime of 569 years (Hodnebrog et al. 2020) means that today's NF_3 emissions will have a long-lasting impact on climate.

Although not currently subject to the CLCPA accounting requirements per 6 NYCRR Part 496, sulfuryl fluoride (SO_2F_2) is another well-mixed GHG of potential concern. The IPCC identifies this fluorinated gas as a greenhouse gas and therefore emissions of this pollutant are included in this report as an informational item only. Sulfuryl fluoride is primarily used in pest control and is a New York State registered pesticide subject to environmental control and reporting requirements.

Other Pollutants

The sources of greenhouse gas emissions are often also sources of co-pollutants that impact air quality and public health in ways that are highly variable in space and time. These co-pollutants tend to have short atmospheric lifetimes and highly heterogeneous sources and sinks. Examples include tropospheric ozone, carbon monoxide, particulate matter less than 2.5 microns in width (PM 2.5), and nitrogen oxides (or NOx) such as nitrogen dioxide. Both vehicles and stationary sources of greenhouse gases emit these co-pollutants. Under the Clean Air Act, states are required to meet national emission standards for co-pollutants. DEC collects information on emissions from sources that include power plants and vehicles, among others, and submits them to EPA be incorporated into the U.S. National Emissions Inventory (NEI), which is updated every three years (EPA 2021). The CLCPA addresses greenhouse gases and co-pollutants to ensure reductions of both particularly in disadvantaged communities.

DEC continues to seek feedback on how to integrate reporting on black carbon into this annual statewide greenhouse gas emissions report. Black carbon is a component of PM 2.5 and a type of carbonaceous aerosol, or soot that is mostly made of carbon. Although it is already monitored as part of air quality reporting, it is also an important climate pollutant that absorbs solar radiation and emits heat, contributing radiative forcing that warms the atmosphere. However, it is not a greenhouse gas, and it has a very short atmospheric lifetime (an estimated 5.5 +/-2.0 days; IPCC 2021), so that it cannot be easily compared to the well-mixed greenhouse gases using a Global Warming Potential metric. The major sources of black carbon in New York State include diesel engine emissions and residential wood stoves.

Finally, other pollutants of concern are greenhouse gases that are ozone-depleting substances. Under the UNFCCC, emissions of stratospheric ozone-depleting substances are not reported in national greenhouse gas inventories because they are already controlled under the 1987 Montreal Protocol (IPCC 2006). For example, the production and trade in chlorofluorocarbons (CFCs) was phased down under this international agreement. As a result, estimated atmospheric abundances of CFC-12 and CFC-11 have declined from their respective peak concentrations of 542.3 ppt (c. 2000) and 259.3 ppt (c. 1995), to 2019 abundances of 503.1 ppt and 226.2 ppt, respectively (IPCC 2021, Annex III). However, both chemicals have relatively long atmospheric lifetimes; 102 years for CFC-12 and 52 years for CFC-11. Although reported production of CFC-11 has stopped, emissions are still occurring (IPCC 2021).

II. Trends in New York State Greenhouse Gas Emissions, 1990-2023

In 2023, statewide gross GHG emissions were 354.06 million metric tons of carbon dioxide equivalent (mmt CO_2e) using CLCPA accounting and net emissions were 305.07mmt CO_2e. Total gross emissions in 2023 were 14.8% lower than 1990 baseline based on the most up-to-date methodologies used in this report, and 13.6% below the 1990 statewide emission baseline adopted in regulation in 2020.

Based on the current analysis, the decrease in emissions from 1990 to 2023 reflects large-scale and long-term trends in population, economic factors including changes in the types of industries that are active in the state, and land-cover changes including those that affect forests. One key trend has been a reduction in CO_2 emissions associated with the electricity system, but these emissions increased between 2019 and 2023 as a result of a change in energy sources. However, there is a national as well as strong New York-specific trend in the reduction of electricity emissions since 1990 associated with various regulations, increased application of energy efficiency measures, and fuel switching. Nationally, emissions from the electric power industry declined 22.7% from 1990-2023 (EPA, 2025b).

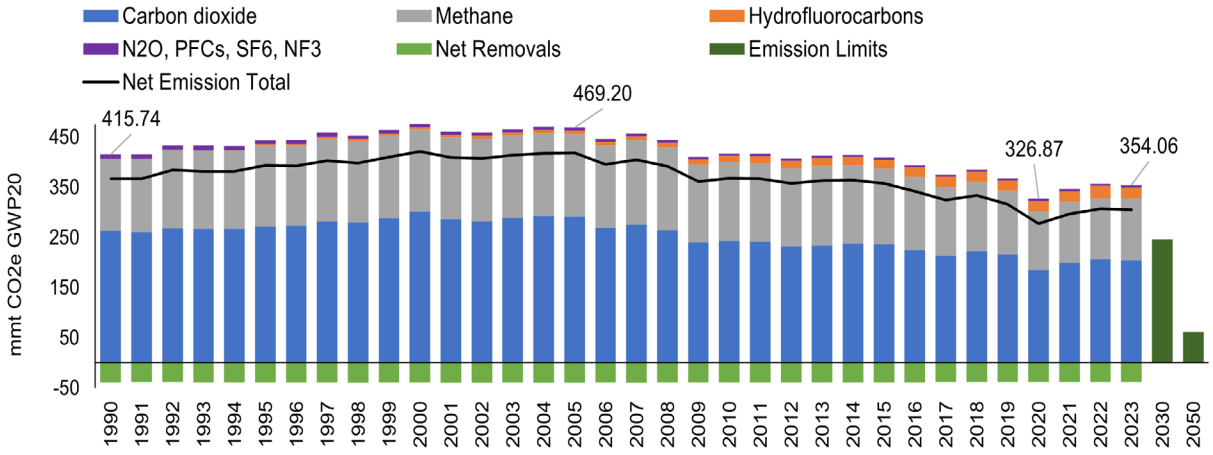
Figure 2 shows the relative contribution of each greenhouse gas to total statewide gross emissions and net removals over 1990-2023 in terms of carbon dioxide equivalence integrated over the 20-year timeframe. In New York State, CO_2 remains the primary greenhouse gas emitted by human activity (or 58% of emissions in 2023) and fossil fuel combustion is the primary source of CO_2. The land-use sector is an important CO_2 sink and removed roughly 11% of the State's total annual greenhouse gas emissions, primarily into forest biomass and soil organic carbon. Over time, there has been a significant reduction in CO_2 emissions, as discussed above, but also a reduction in CO_2 removals.

The second most important greenhouse gas in New York State, in terms of carbon dioxide equivalent emissions, is methane (35% of emissions; Figure 2). Major anthropogenic sources of CH_4 are fossil fuel infrastructure, waste, and agriculture. This includes CH_4 emissions from fuel infrastructure and waste management facilities outside of New York State. The majority of methane emissions are the result of leaks or other irregular releases from equipment or facilities, often referred to as fugitive emissions. Fugitive emissions often contain poorly understood release pathways which can make it difficult to estimate such emissions. One area of ongoing research is to reconcile bottom-up and top-down estimates of methane from the natural gas system, which may result in both a higher emission factor (Appendix A) and higher statewide emission estimate in future reports. For example, CH_4 emitted through incomplete natural gas combustion at the appliance level is an area of planned improvements discussed in *Sectoral Report #1: Energy*. Finally, DEC is evaluating data on CH_4 emissions from freshwater wetlands and other water bodies to better understand the carbon storage potential of these land use types and how they factor into net emission calculations. As with all aspects of net accounting, DEC seeks feedback on this approach (*Sectoral Report #3: AFOLU*).

Almost all of the remaining statewide greenhouse gas emissions in 2023 were HFCs (6%), an emission source that was almost nonexistent in 1990. While the emissions of N_2O, PFCs, and

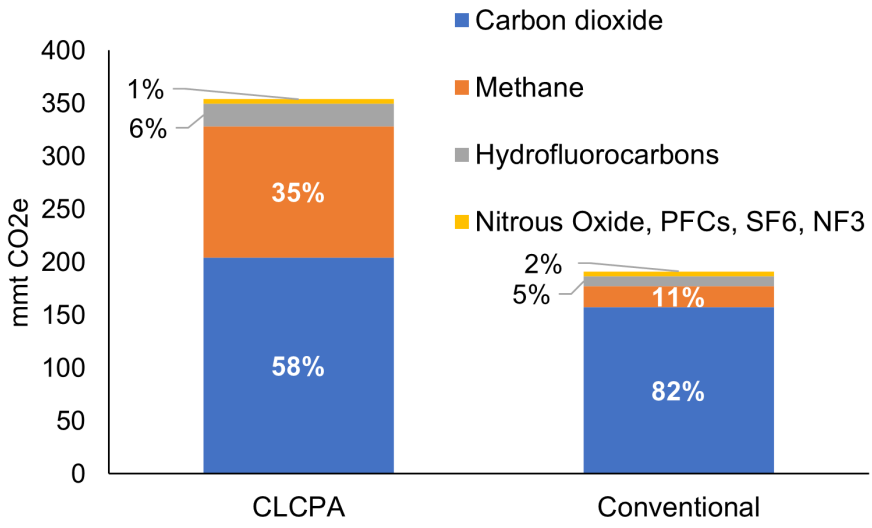
SF_6 all declined as a result of technological and economic change in New York State, HFC emissions continue to grow. Importantly, all these pollutants are more powerful than CO_2 per ton and most are much longer lived.

Figure 2: NYS Statewide Greenhouse Gas Emissions by Gas, 1990-2023 (mmt CO_2e GWP20)



When considering emission sources only within New York State and using a GWP100, CO_2 is a much greater component of total emissions (Figure 3). The main difference is the CLCPA's focus on shorter-lived methane and HFCs, which appear much larger using the 20-year GWP, although the actual mass of these emissions has not changed. The other key difference between the accounting frameworks is out-of-state emissions. Over time, New York State has imported more natural gas and has exported more waste. Methane is a major source of emissions for both the natural gas system and waste management.

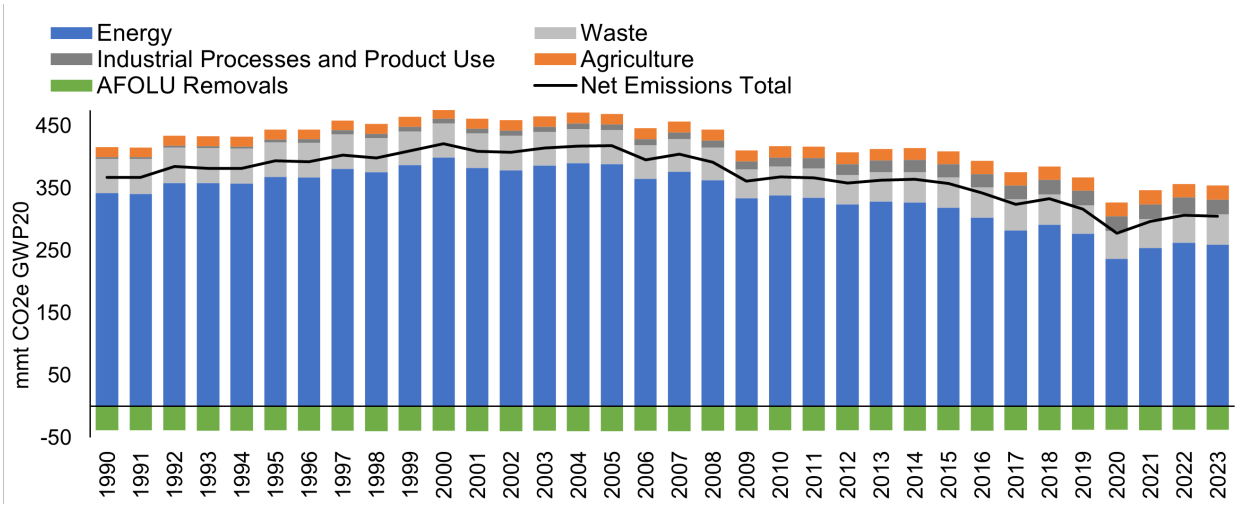
Figure 3: Comparison of 2023 Emissions, CLCPA and Standard Format



III. Trends in Greenhouse Gas Emission Sectors, 1990-2023

Figure 4 organizes emissions and removals into the sectors used by the IPCC and all national governments: “Energy,” “Industrial Processes and Product Use,” “Waste,” and “Agriculture, Forestry, and Other Land Use” (or AFOLU). A condensed explanation of each sector is provided below, and a detailed explanation of data sources, methods, and trends are provided in the sectoral reports.

Figure 4: NYS Statewide Greenhouse Gas Emissions by Sector, 1990-2023 (mmt CO_2e GWP20)



New York State’s report makes slight changes to the IPCC approach as it is used in the national greenhouse gas inventory (EPA 2025b). There are two additional sources of emissions associated with the Energy sector (imported electricity and imported fossil fuels) as well as new sources added to the Waste sector (for out-of-state or exported waste management). Waste combustion emissions have also been included in Waste sector emissions, rather than treated as a source of Energy sector emissions. Conversely, emissions associated with the electricity system and the oil and gas industry have been assigned to the Energy sector, rather than being assigned fully or partially to Industrial Process and Product Use. Finally, this report refers to the AFOLU sector, but the national inventory reports some emission removals as “Land Use, Land Use Change, and Forestry” (LULUCF).

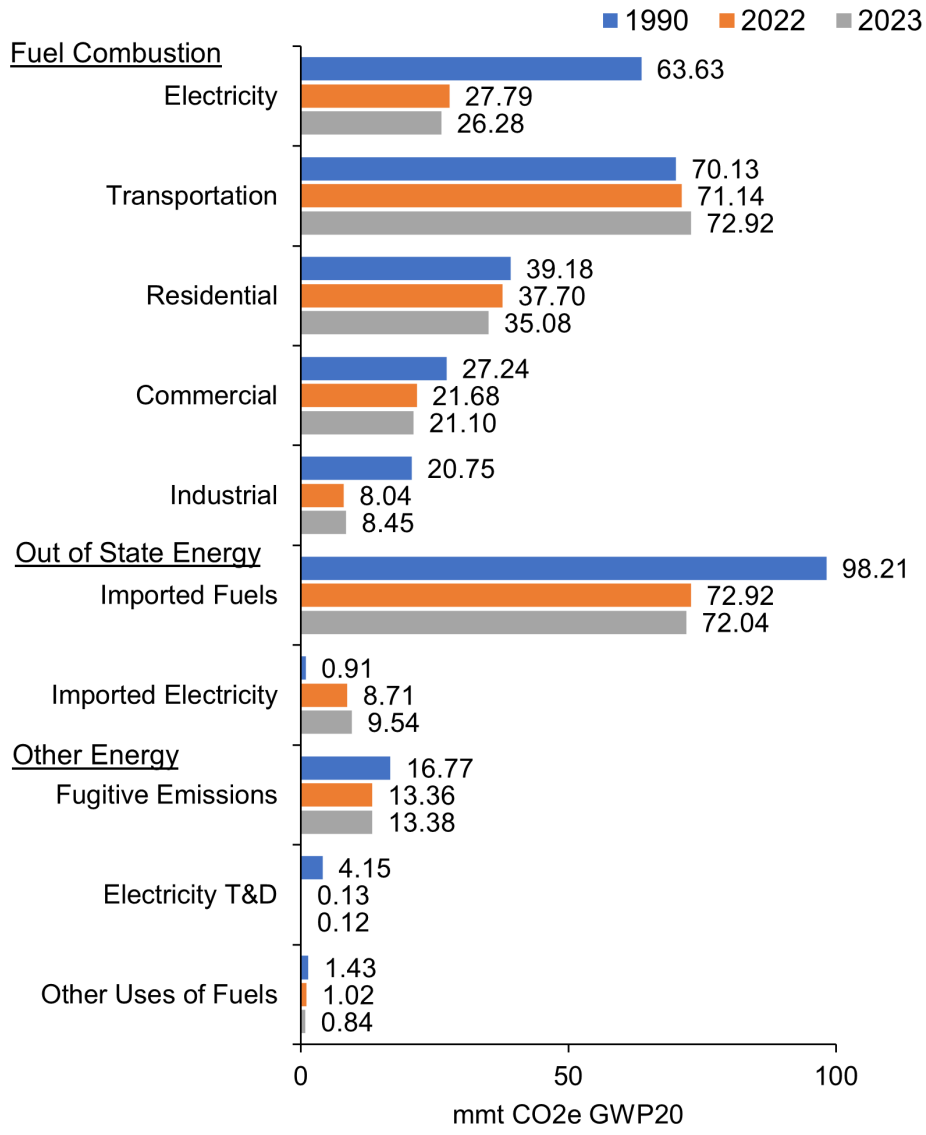
Energy

The Energy sector includes all emissions associated with the generation and use of energy, including for electricity, on-road transportation, non-road transportation (aviation, boating, and lawn and garden equipment), and on-site fuel use in buildings such as to heat buildings or for manufacturing. The Energy sector encompassed the largest portion of emissions every year from 1990 through 2023. These emissions are explained in detail in *Sectoral Report #1: Energy*.

The Energy sector is a major source of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and sulfur hexafluoride (SF_6) emissions. SF_6 in the Energy sector is exclusively associated with equipment used in electricity transmission. The remaining gases are associated

with the production, transport, and combustion of fuels. For fossil fuels, this includes intentional and unintentional emissions at the point of extraction, during processing, in the transmission and distribution system, and during combustion.

Figure 5: Trends in Energy Sector Emissions



Since 1990, there has been a substantial decrease in emissions associated with fuel combustion for electricity generation as well as a decrease in fuels combusted for industrial purposes (Figure 5). Emissions in all other energy sources were slightly lower in 2023 compared to 1990 and higher than during the 2020 pandemic. The largest source of emissions under CLCPA accounting is the imported fossil fuel system, or emissions associated with the extraction, processing, transmission, and distribution of the fossil fuels used in New York.

For plant and waste-based fuels, Energy emissions are associated only with the combustion of the fuels, and this includes biogenic CO_2. There may be additional emissions associated with

these fuels, such as from the growing of fuel feedstocks in New York State (*Sectoral Report #3: AFOLU*).

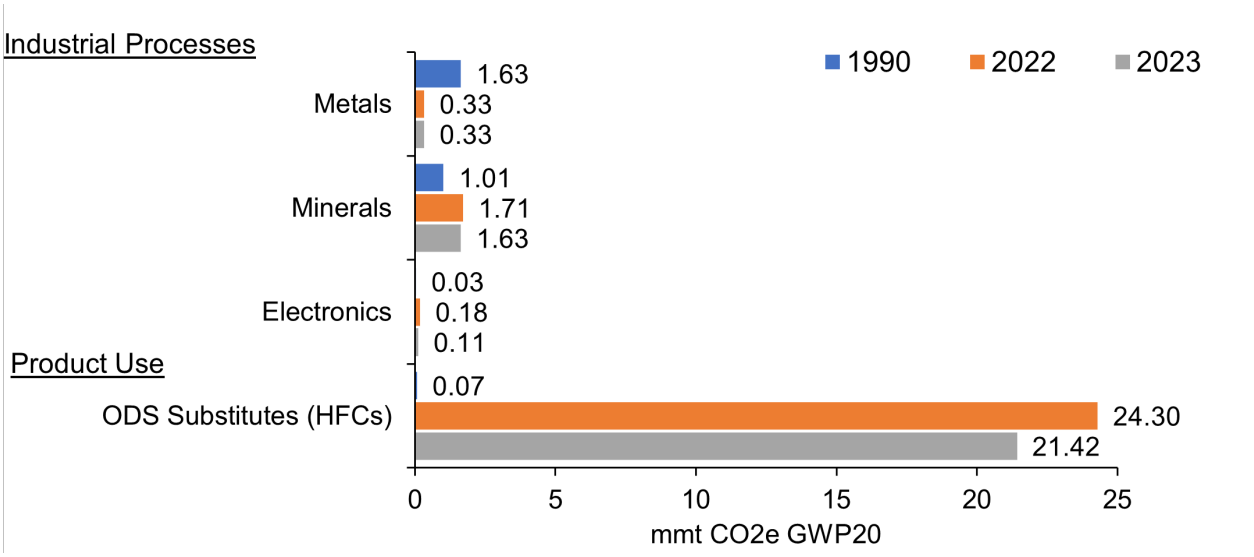
Industrial Processes and Product Use (IPPU)

The Industrial Processes and Product Use sector, or IPPU, encompasses emissions associated with manufacturing as well as the use of manufactured products. The majority of IPPU emissions in New York relate to the use of products rather than process emissions from industrial facilities. These emissions are explained in detail in the IPPU report (see *Sectoral Report #2: Industrial Processes and Product Use*).

Many industrial processes have the potential to produce greenhouse gases, and these are in addition to emissions associated with fuel use (fuel combustion is captured in the Energy sector). Industrial processes are a large source of emissions globally, but they are a relatively small portion of emissions in New York State. Industrial process emissions in New York are primarily CO_2 associated with the manufacturing of cement, metals such as iron and steel, or the various products made with limestone or dolomite (carbonates) such as glass. This report also includes sources associated with aluminum (PFCs) and electronics manufacturing (N_2O, PFCs, HFCs, and SF_6).

The types of industrial products that are emission sources are almost entirely imported into New York State and will release emissions while in use or after disposal. Globally and in New York, the majority of product use emissions are associated with hydrofluorocarbons (HFCs) used as a replacement for ozone-depleting substances in refrigeration equipment, aerosol products, and foam insulation. An insignificant amount of PFCs and SF_6 may also have been used in products historically but in too small of a quantity to be estimated. Finally, the IPPU sectoral report also reports on nitrous oxide product use, such as in medical applications, but it is also at too small of a quantity to be comparable to other emission sources.

Figure 6: Trends in Industrial Process and Product Use Sector Emissions



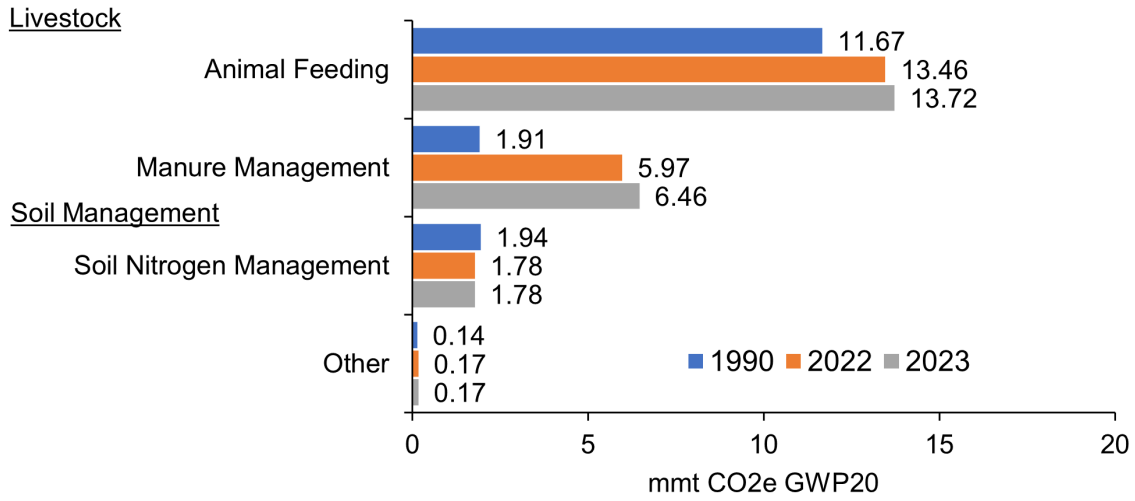
Agriculture, Forests, and Other Land Use (AFOLU)

The AFOLU sector captures emissions from agricultural operations as well as net emission removals, or carbon storage, in harvested wood products and from land management. The federal government considers all lands in the continental U.S. to be "managed" by humans and all emissions that result from the use of these lands as anthropogenic. This includes cropland and grasslands, forests, "wetlands" (which includes all modified water bodies), as well as emissions and removals associated with developed or "settlement" lands such as urban trees.

Agricultural livestock emissions are measured in much the same way as the sectors above and the largest source of emissions is methane (CH_4) from animal feeding (Figure 7). However, the largest growth in emissions is related to manure management (CH_4 and N_2O) as New York State policies regarding water quality went into effect and required certain livestock operations to store and manage manure in anaerobic, methane-generating systems. Finally, the use of different soil amendments is a consistent source of greenhouse gas emissions, particularly N_2O from nitrogen fertilizers.

Unlike the rest of the emission sectors described in this report, the AFOLU sector also includes emission sinks, or net emission removals (Figure 8). One consistent source of emission removals for the past 30 years has been the long-term storage of carbon in durable goods, or "Harvested Wood Products" (Figure 8). However, the major source of net emission removals comes from the Land Use category and particularly New York's nearly 19 million acres of forest land.

Figure 7: Trends in AFOLU Agriculture Sector Emissions



Land Use accounting reflects both how much net CO_2e is taken up on a given type of land as well as how much of that land type may have been converted to or from another land type. For example, net emission removals from forests have declined in part because some portion of forest area has been converted to croplands or development (referred to as "settlement lands").

In addition, a large amount of forest is forested wetlands. There are two notable updates to the AFOLU analysis for this report. The first is the increase in estimated forest carbon removals in every year following an update to national forest carbon datasets. Secondly, the AFOLU sectoral report provides new information on carbon removals in soils, specifically the loss or emission of carbon stored in histosols. Figure 8a shows the difference between 1990, 2022, and 2023 emission removals in forested lands, wetlands, and as carbon stored in harvested wood products. Figure 8b focuses in on the “other lands”, which represent net sources of carbon dioxide. Notably, this report includes EPA estimates for croplands and grasslands in which croplands were a net sink for CO_2 in 1990 but are now a significant source of emissions. This may be due to the conversion of forest land to cropland that results in both the loss of carbon stored in forests as well as additional sequestration by forests in subsequent years.

Figure 8a: Trends in AFOLU Net Emission Removals

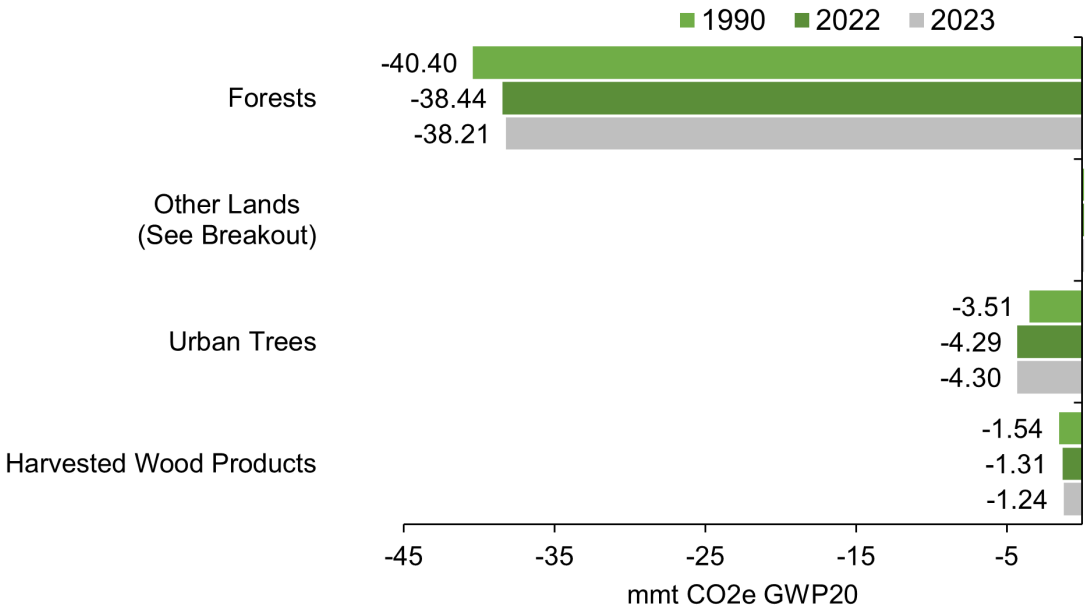
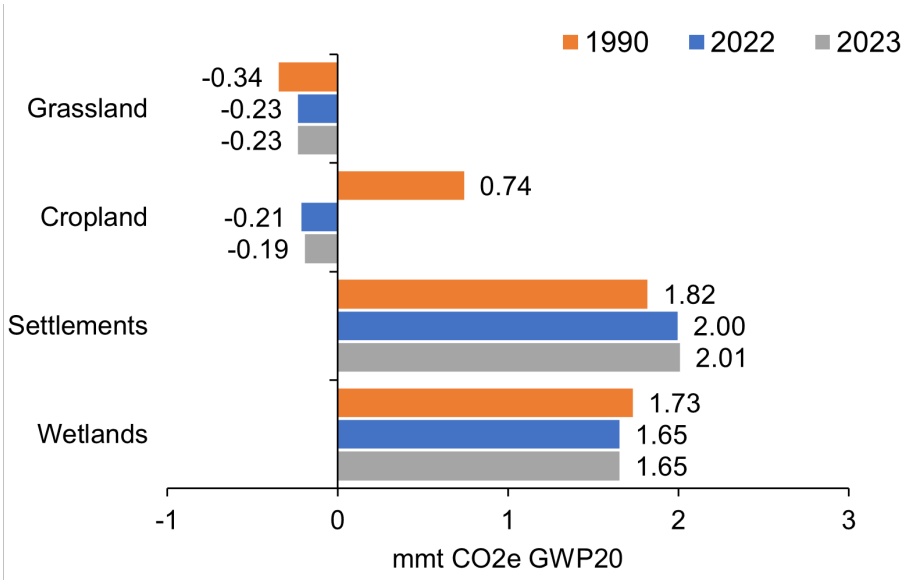


Figure 8b: Breakout Other Land Trends in AFOLU Net Emission Removals



Waste

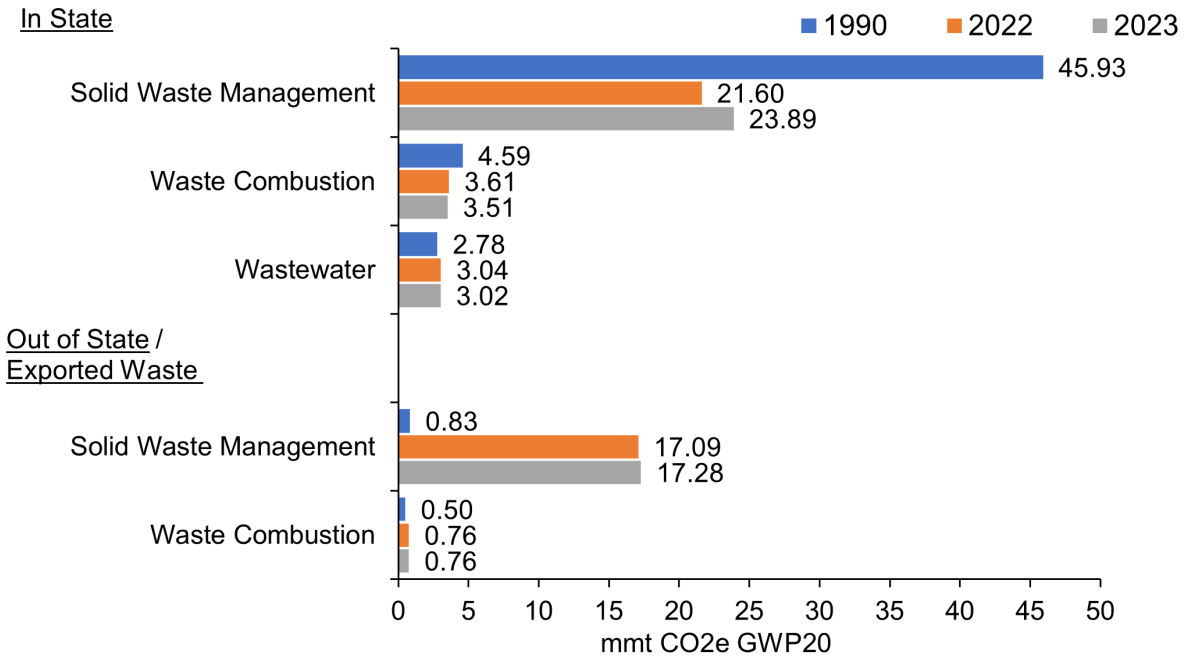
The IPCC's Waste sector specifically encompasses emissions associated with human-generated waste. The majority of waste emissions globally are associated with solid, organic wastes deposited in landfills (or "solid waste management", per the IPCC approach). Other sources of emissions include waste combustion, wastewater managed in septic systems or centralized systems, and the use of anaerobic digestion for either solid or liquid wastes.

The primary gas associated with the Waste Sector is methane (CH_4) because it is generated when organic materials decay in the type of anaerobic environment found in landfills.CO_2 is also a product of waste decay and the main component of waste combustion. Consistent with the Part 496 regulation, CO_2 emissions associated with composting or natural decay are not included in the State's greenhouse gas emissions reporting.[7]

From 1990 to 2023, emissions from solid waste facilities in New York declined significantly while an increasing volume of waste was exported, which resulted in emissions from facilities in other states (Figure 9). Additionally, emissions from waste combustion declined roughly while emissions from wastewater increased. As a result, total emissions from the waste sector decreased by roughly 6.17mmt CO_2e over this time period.

[7] 6 NYCRR Part 496, as explained in the Regulatory Impact Statement.

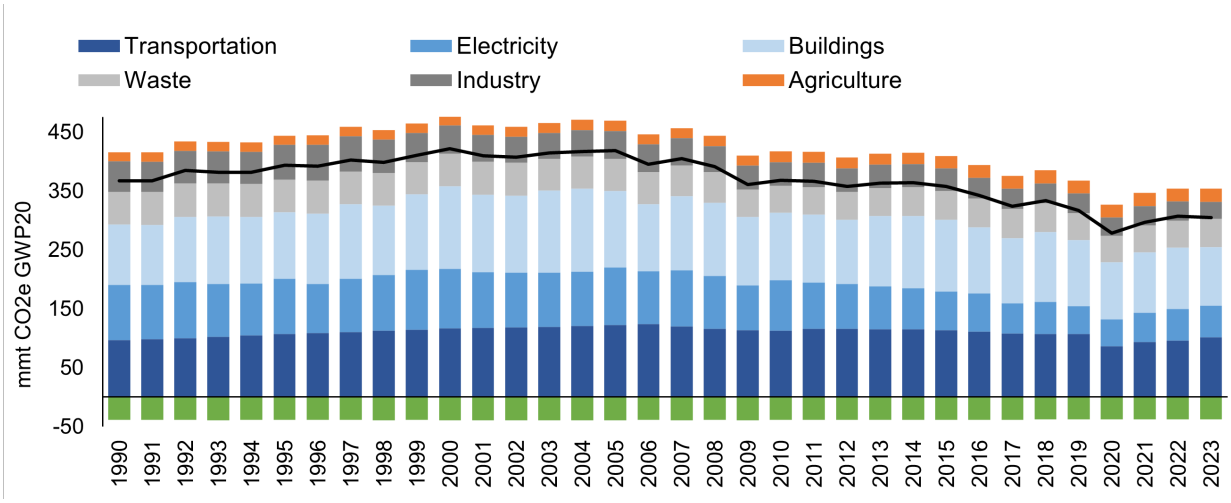
Figure 9: Trends in Waste Sector Emissions



Emissions by Economic Sector and CLCPA Scoping Plan

Emissions can also be organized according to economic sectors and the U.S. national greenhouse gas inventory provides such a breakdown into residential, commercial, industry, transportation, electric power, and agriculture sectors (EPA 2025b). Figure 10 and Table ES.3 assigns emissions and removals to the economic sectors as organized in the New York State Climate Action Council Scoping Plan. For example, HFC emissions from vehicle air-conditioning systems are assigned to the transportation sector as this is where the relevant equipment was used. Similarly, the emissions associated with imported fuels are also assigned based on the economic sector where these fuels where used. When using this organizational structure, the reduction in emissions from the electricity and industrial sectors in the state were offset by increasing emissions in buildings and transportation sectors, which are now the two largest emission sectors. The organization of agricultural and waste emission sources are the same as in the IPCC approach.

Figure 10: NYS Greenhouse Gas Emissions by Economic Sector (mmt CO_2e GWP20)



IV. Additional Information

The following information is provided to aid stakeholders and to address questions that are frequently received by DEC. DEC seeks feedback on what other sources of information related to statewide greenhouse gas accounting under the CLCPA may be useful and could be added to future reports.

Comparison with 1990 Baseline in Part 496

Prior to this report, DEC and NYSERDA conducted an analysis of statewide emissions in 1990 to establish a baseline for the “Statewide GHG Emission Limits” established by ECL 75-0107 and reflected in 6 NYCRR Part 496. The data and methods used in the current report are an improvement over those used for 6 NYCRR Part 496 and DEC will continue to make improvements in future annual reports. The 6 NYCRR Part 496 regulation may be revised at a later date using updated information. The table below provides a comparison and explanation of the differences between the estimate of gross statewide emissions in 1990 from the 6 NYCRR Part 496 rulemaking and in this report.

Table 3: Comparison of 1990 Statewide Greenhouse Gas Emission Totals

Emission Sector	Part 496*	This Report	Example Improvement
Energy	337.04	342.42	Refinement of fugitive emissions methods.
Industrial Processes and Product Use (IPPU)	2.72	3.02	Inclusion of N_2O product use.
Agriculture Forestry and Other Land Use (AFOLU)	17.13	15.66	Refinement of EPA SIT default inputs with NYS datasets.
Waste	52.88	54.63	Refinement of DOC values to NYS-specific value and corrections to wastewater factors.
Gross Total	**409.78**	**415.74**	

* As provided in the 6 NYCRR Part 496 Regulatory Impact Statement

CLCPA Informational Items

The CLCPA includes a list of informational items that are required to be included in this report.[8] These represent particular emission sources that are found in the IPCC approach and are commonly included in governmental greenhouse gas accounting, if relevant. The following table provides a list of these informational items along with the names of the corresponding IPCC sectoral category as it is found in this report. These sectoral categories largely match the organization of the IPCC approach and any deviations are explained in the text. For example, the IPCC approach places waste combustion in the Energy rather than in the Waste sector.

Table 4: Location of CLCPA Informational Items

Informational Item		**Sectoral Report:** Sections
a	The use of fossil fuels by sector, including for electricity generation, transportation, heating, and other combustion purposes	**SR1. Energy**: Fuel Combustion
b	Fugitive and vented emissions from systems associated with the production, processing, transport, distribution, storage, and consumption of fossil fuels, including natural gas	**SR1. Energy**: Fugitive Emissions, Imported Fossil Fuels
c	Emissions from non-fossil fuel sources, including but not limited to garbage incinerators, biomass combustion, landfills and landfill gas generators, and anaerobic digesters	**SR1. Energy**: Fuel Combustion **SR4. Waste**: All Sections
d	Emissions associated with manufacturing, chemical production, cement plants, and other processes that produce non-combustion emissions	**SR2. Industrial Processes and Product Use**: All Sections

[8] ECL § 75-0105(2).

Abbreviations

AFOLU	Agriculture, Forestry, and Other Land Use
AR5	IPCC Fifth Assessment Report
AR6	IPCC Sixth Assessment Report
Btu	British thermal unit
CCAP	Coastal Change Analysis Program
CH_4	Methane
CLCPA	NYS Climate Leadership and Community Protection Act
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DEC	NYS Department of Environmental Conservation
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global Warming Potential
GWP100	100-Year Global Warming Potential
GWP20	20-Year Global Warming Potential
HFC	Hydrofluorocarbon
HWP	Harvested Wood Products
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
LPG	Liquefied petroleum gas
LULUCF	Land Use, Land-Use Change, and Forestry
mmt	Million metric tons
MMBtu	Metric million British thermal unit
N_2O	Nitrous oxide
NA	Not applicable
NE	Not estimated
NEI	National Emissions Inventory
NF_3	Nitrogen trifluoride
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrogen oxides
NYCRR	New York Codes, Rules and Regulations
NYSERDA	NYS Energy Research and Development Authority
ODS	Ozone depleting substances
PFC	Perfluorocarbon
ppm, ppb, ppt	Parts per million, billion, trillion
RNG	Renewable natural gas
SF_6	Sulfur hexafluoride
SIT	EPA State Inventory Tool
UNFCCC	United Nations Framework Convention on Climate Change
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WMO	World Meteorological Organization

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