

Data from Table ES-2 in <https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf>

Note: inputted data for most analyzed years reflect EPA's latest adjustments as of June 2022.

| Recent Trends in US Greenhouse Gas Emissions and Sinks (MMTCO ₂ e) | | | | | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| (These are 100 Year GWPs) | | | | | | | | | | |
| Gas/Source | 1990 | 2005 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % Share 2019 |
| CO ₂ | 5,122.5 | 6,137.6 | 5,561.7 | 5,412.4 | 5,251.8 | 5,211.0 | 5,376.7 | 5,259.1 | 4,715.7 | 80% |
| Methane | 780.8 | 697.5 | 639.0 | 638.5 | 657.6 | 663.8 | 671.1 | 668.8 | 650.4 | 10% |
| Nitrous Oxide | 450.5 | 453.3 | 449.3 | 443.8 | 449.2 | 444.6 | 457.7 | 456.8 | 426.1 | 7% |
| HFCs | 46.5 | 127.4 | 166.3 | 170.5 | 168.3 | 171.1 | 171.0 | 175.9 | 178.8 | 2.7% |
| PFCs (Perfluorocarbons) | 24.3 | 6.7 | 5.6 | 5.1 | 4.4 | 4.2 | 4.8 | 4.6 | 4.4 | 0% |
| SF ₆ (Sulfur Hexafluoride) | 28.8 | 11.8 | 6.5 | 5.5 | 6.0 | 5.9 | 5.7 | 5.9 | 5.4 | 0% |
| NF ₃ (Nitrogen Trifluoride) | + | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0% |
| Total Emissions | 6,453.4 | 7,434.8 | 6,828.9 | 6,676.4 | 6,537.9 | 6,501.2 | 6,687.6 | 6,571.7 | 5,981.4 | |

| Recent Trends in US Greenhouse Gas Emissions and Sinks (MMTCO ₂ e, GWP-20) | | | | | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| GWP-20: For this conversion to 20-year GWP for the group of HFCs, I used a conversion factor of 2.24, based on proportions used in the NYS GHG Inventory for 2019 emissions data. See calculations in "NYS Emissions" tab. For the PFC conversion to GWP-20, I used a combined average for all PFCs; this is minute portion of the GHGs, so the calculation is trivial. | | | | | | | | | | |
| Gas/Source | 1990 | 2005 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % Share 2019 |
| CO ₂ | 5,122.5 | 6,137.6 | 5,561.7 | 5,412.4 | 5,251.8 | 5,211.0 | 5,376.7 | 5,259.1 | 4,715.7 | 65.5% |
| Methane | 2,248.7 | 2,008.8 | 1,840.3 | 1,838.9 | 1,893.9 | 1,911.7 | 1,932.8 | 1,926.1 | 1,873.2 | 24.0% |
| Nitrous Oxide | 436.9 | 439.6 | 435.7 | 430.4 | 435.6 | 431.2 | 443.9 | 443.0 | 413.2 | 5.5% |
| HFCs | 104.2 | 285.4 | 372.5 | 381.9 | 377.0 | 383.3 | 383.0 | 394.0 | 400.5 | 4.9% |
| PFCs (Perfluorocarbons) | 20.7 | 5.7 | 4.8 | 4.3 | 3.7 | 3.6 | 4.1 | 3.9 | 3.7 | 0.0% |
| SF ₆ (Sulfur Hexafluoride) | 20.6 | 8.4 | 4.6 | 3.9 | 4.3 | 4.2 | 4.1 | 4.2 | 3.9 | 0.1% |
| NF ₃ (Nitrogen Trifluoride) | + | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.0% |
| Total Emissions | 7,953.5 | 8,885.9 | 8,220.0 | 8,072.3 | 7,966.8 | 7,945.4 | 8,145.0 | 8,030.8 | 7,410.6 | |

GWP References List GWP-100, GWP-20, GWP-500)

Page 420 of this document <https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-annexes.pdf>

Table A-248: IPCC AR4 GWPs and Atmospheric Lifetimes of Gases used in US GHG Inventory (2017)

| Gas | Atmospheric Lifetime | GWP-100 | GWP-20 | GWP-500 |
|--|----------------------|---------|--------|---------|
| CO ₂ | | 1 | 1 | 1 |
| Methane | 12 | 25 | 72 | 7.6 |
| Nitrous Oxide | 114 | 298 | 289 | 153 |
| HFC-23 | 270 | 14,800 | 12,000 | 12,200 |
| HFC-32 | 4.9 | 675 | 2,330 | 205 |
| HFC-125 | 29 | 3,500 | 6,350 | 110 |
| HFC-134a | 14 | 1,430 | 3,830 | 435 |
| HFC-143a | 52 | 4,470 | 5,890 | 1,590 |
| HFC-152a | 1.4 | 124 | 437 | 38 |
| HFC-227ea | 34 | 3,220 | 5,310 | 1,040 |
| HFC-236fa | 240 | 9,810 | 8,100 | 7,660 |
| HFC-43-10mee | 15.9 | 1,640 | 4,140 | 500 |
| CF ₄ | 50,000 | 7,390 | 5,210 | 11,200 |
| C ₂ F ₆ | 10,000 | 1,220 | 8,630 | 18,200 |
| C ₃ F ₆ | 2,600 | 8,830 | 6,310 | 12,500 |
| C ₄ F ₁₀ | 2,600 | 8,860 | 6,330 | 12,500 |
| C-C ₄ F ₈ | 3,200 | 10,300 | 7,310 | 14,700 |
| C ₅ F ₁₂ | 4,100 | 9,160 | 6,510 | 13,300 |
| C ₆ F ₁₄ | 3,200 | 9,300 | 6,600 | 13,300 |
| PFC (averages) | 10,814 | 7,866 | 6,700 | 13,671 |
| SF ₆ (Sulfur Hexafluoride) | 3,200 | 22,800 | 16,300 | 32,600 |
| NF ₃ (Nitrogen Trifluoride) | 740 | 17,200 | 12,300 | 20,700 |

Emissions of ODS Chemicals, USA (kt)

Sources

<https://www.epa.gov/system> Table A-247.

Table A-247: Emissions of Ozone Depleting Substances (kt), from US GHG Emissions and Sinks: 1990-2020

LAST UPDATED JUNE 2022

| Compound | GWP-100 | GWP-20 | 1990 | 2005 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------|---------|--------|------|------|------|------|------|------|------|------|------|------|
| CFC-11 | 4,750 | 6,730 | 29 | 12 | 24 | 24 | 25 | 6 | 6 | 6 | 6 | 6 |
| CFC-12 | 10,900 | 11,000 | 132 | 22 | 5 | 4 | 4 | 3 | 2 | 1 | 1 | 0 |
| CFC-113 | 6,130 | 6,540 | 59 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CFC-114 | | | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CFC-115 | | | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbon Tetrachloride | | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Methyl Chloroform | | | 223 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Halon-1211 | | | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Halon-1301 | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HCFC-22 | 1,810 | 5,160 | 30 | 72 | 64 | 60 | 56 | 54 | 51 | 47 | 43 | 40 |
| HCFC-123 | 77 | 273 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HCFC-124 | | | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| HCFC-141b | 725 | 2,250 | 1 | 4 | 10 | 10 | 9 | 8 | 7 | 7 | 7 | 7 |
| HCFC-142b | 2,310 | 5,490 | 1 | 4 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| *HCFC-225ca/cb | 122 | 729 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*US GHG inventory lumps 225ca and 225cb together, but they have greatly different GWPs; here, the lower GWPs were used for all of those gases

Recent Trends in US Greenhouse Gas Emissions and Sinks (MMTCO₂e), INCLUDES ODS

(These are 100 Year GWPs)

| Gas/Source | 1990 | 2005 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % Share 2019 | GWP-100 | CFC:HFC | HCFC:HFC |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|---------|---------|----------|
| CO ₂ | 5,122.5 | 6,137.6 | 5,561.7 | 5,412.4 | 5,251.8 | 5,211.0 | 5,376.7 | 5,259.1 | 4,715.7 | 78.4% | GWP-100 | 0.22 | 0.54 |
| Methane | 780.8 | 697.5 | 639.0 | 638.5 | 657.6 | 663.8 | 671.1 | 668.8 | 650.4 | 10.0% | GWP-20 | 0.13 | 0.67 |
| Nitrous Oxide | 450.5 | 453.3 | 449.3 | 443.8 | 449.2 | 444.6 | 457.7 | 456.8 | 426.1 | 6.8% | | | |
| HFCs | 46.5 | 127.4 | 166.3 | 170.5 | 168.3 | 171.1 | 171.0 | 175.9 | 178.8 | 2.6% | | | |
| HCFCs | | | | | | 104.4 | 99.5 | 94.5 | 89.1 | 1.4% | | | |
| CFCs | | | | | | 50.3 | 39.4 | 39.4 | 28.5 | 0.6% | | | |
| PFCs (Perfluorocarbons) | 24.3 | 6.7 | 5.6 | 5.1 | 4.4 | 4.2 | 4.8 | 4.6 | 4.4 | 0.1% | | | |
| SF ₆ (Sulfur Hexafluoride) | 28.8 | 11.8 | 6.5 | 5.5 | 6.0 | 5.9 | 5.7 | 5.9 | 5.4 | 0.1% | | | |
| NF ₃ (Nitrogen Trifluoride) | + | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0% | | | |
| Total Emissions | 6,453.4 | 7,434.8 | 6,828.9 | 6,676.4 | 6,537.9 | 6,655.9 | 6,826.5 | 6,705.6 | 6,099.0 | | | | |

Recent Trends in US Greenhouse Gas Emissions and Sinks (MMTCO₂e, GWP-20), INCLUDES ODS

| Gas/Source | 1990 | 2005 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % Share 2019 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|
| CO ₂ | 5,122.5 | 6,137.6 | 5,561.7 | 5,412.4 | 5,251.8 | 5,211.0 | 5,376.7 | 5,259.1 | 4,715.7 | 63.0% |
| Methane | 2,248.7 | 2,008.8 | 1,840.3 | 1,838.9 | 1,893.9 | 1,911.7 | 1,932.8 | 1,926.1 | 1,873.2 | 23.1% |
| Nitrous Oxide | 436.9 | 439.6 | 435.7 | 430.4 | 435.6 | 431.2 | 443.9 | 443.0 | 413.2 | 5.3% |
| HFCs | 104.2 | 285.4 | 372.5 | 381.9 | 377.0 | 383.3 | 383.0 | 394.0 | 400.5 | 4.7% |
| HCFCs | | | | | | 295.7 | 280.5 | 265.4 | 249.9 | 3.2% |
| CFCs | | | | | | 62.4 | 51.4 | 51.4 | 40.4 | 0.6% |
| PFCs (Perfluorocarbons) | 20.7 | 5.7 | 4.8 | 4.3 | 3.7 | 3.6 | 4.1 | 3.9 | 3.7 | 0.0% |
| SF ₆ (Sulfur Hexafluoride) | 20.6 | 8.4 | 4.6 | 3.9 | 4.3 | 4.2 | 4.1 | 4.2 | 3.9 | 0.1% |
| NF ₃ (Nitrogen Trifluoride) | + | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.0% |
| Total Emissions | 7,953.5 | 8,885.9 | 8,220.0 | 8,072.3 | 7,966.8 | 8,303.4 | 8,476.9 | 8,347.6 | 7,700.9 | 100.0% |

Source: 2021 Statewide GHG Emissions Report, Summary Report

2019 NYS GHG Emissions, Excluding ODS, MMTCO2e

| Gas | 2019 Emissions (GWP-20) | % Share (GWP-20) | 2019 Emissions (GWP-100) | % Share (GWP-100) | | | | | | |
|-------|-------------------------|------------------|--------------------------|-------------------|-------------|---|--|--|--|--|
| CO2 | 221.89 | 58.5% | 221.89 | 78.9% | | Here, we looked at look at pg. iv of the Statewide GHG Emissions Report, "Industrial Processes and Product Use," to find an appropriate conversion factor for GWP-20:GWP-100. | | | | |
| CH4 | 133.07 | 35.1% | 46.20 | 16.4% | Product Use | HFC Emissions | | | | |
| N2O | 3.35 | 0.9% | 3.45 | 1.2% | GWP-20 | 20.89 | | | | |
| PFC | 0.1 | 0.0% | 0.12 | 0.0% | GWP-100 | 9.32 | | | | |
| HFC | 20.89 | 5.5% | 9.32 | 3.3% | Conversion | 2.2414163 | | | | |
| SF6 | 0.13 | 0.0% | 0.17 | 0.1% | | | | | | |
| NF3 | + | + | + | + | | | | | | |
| Total | 379.43 | | 281.16 | | | | | | | |

2019 NYS GHG Emissions, INCLUDING ODS, MMTCO2e

| Gas | 2019 Emissions (GWP-20) | % Share (GWP-20) | 2019 Emissions (GWP-100) | % Share (GWP-100) | | | | | |
|-------|-------------------------|------------------|--------------------------|-------------------|--|--|--|--|--|
| CO2 | 221.89 | 56.0% | 221.89 | 76.9% | | | | | |
| CH4 | 133.07 | 33.6% | 46.20 | 16.0% | | | | | |
| N2O | 3.35 | 0.8% | 3.45 | 1.2% | | | | | |
| PFC | 0.10 | 0.0% | 0.12 | 0.0% | | | | | |
| HFC | 20.89 | 5.3% | 9.32 | 3.2% | | | | | |
| HCFC | 14.07 | 3.6% | 6.28 | 2.2% | | | | | |
| CFC | 2.72 | 0.7% | 1.22 | 0.4% | | | | | |
| SF6 | 0.13 | 0.0% | 0.17 | 0.1% | | | | | |
| NF3 | + | + | + | | | | | | |
| Total | 396.22 | | 288.65 | | | | | | |