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# Annex

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## Suggested Citation

**Full report:** Mausami Desai, Vincent Camobreco, Toby Hedger, William Irving, Kenna Rewcastle, John Steller, Lindsay Barbieri, Melissa Weitz, Tanvi Murumkar, Anusha Patel, Mollie Averyt, Katherine Bronstein, Jake Butler, Leslie Chinery, Kara Edquist, Rebecca Ferenchiak, Johanna Garfinkel, Matt Hakos, Melissa Icenhour, Jeremy Kaelin, Emily Kerr, Brandon Long, Gopi Manne, Tiffany Moore, Ajo Rabemiarisoa, David Randall, Libby Robinson, Karen Schaffner, Peter Scully, Sophia Stonebrook, Tara Stout, Emily Thompson, Riley Vanek, Allen Fawcett, Jiehong Lou, Ryna Cui, Nate Hultman. (2026). *Methodology report for greenhouse gas inventory and analysis by U.S. state: 1990–2024*. Digital Repository at the University of Maryland. https://doi.org/10.13016/5wlk-9ksj

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# Annex 1. Access Official State GHG Data

Many states and territories are compiling and publishing state-level GHG inventories on a regular basis. The *GHGIA by State* is intended to supplement and complement official state data. See Chapter 1. Introduction to learn more about potential reasons CGS's estimates may differ from official state estimates.

Table A1-1 provides links to official greenhouse gas inventories for the states and territories listed below, where available. Where official links are not available, users may find data from state and territorial governments at https://www.epa.gov/inflation-reduction-act/ghg-inventories-searchable-table.

**Table A1-1: Official U.S.** State and Territory Links

| State/Territory | Direct State Inventory link |
|---|---|
| Alabama | |
| Alaska | https://dec.alaska.gov/air/anpms/projects-reports/greenhouse-gas-inventory |
| Arizona | |
| Arkansas | |
| California | https://ww2.arb.ca.gov/ghg-inventory-data |
| Colorado | https://cdphe.colorado.gov/apcd/climatechange#inventory |
| Connecticut | https://portal.ct.gov/deep/climate-change/ct-greenhouse-gas-inventory-reports |
| Delaware | https://dnrec.delaware.gov/air/greenhouse-gas/ |
| Florida | |
| Georgia | https://epd.georgia.gov/air-protection-branch/air-branch-programs/planning-and-support-program/greenhouse-gases |
| Hawaii | https://health.hawaii.gov/cab/hawaii-greenhouse-gas-program/ |
| Idaho | |
| Illinois | https://epa.illinois.gov/topics/climate/climate-pollution-reduction-grants.html |
| Indiana | |

| State/Territory | Direct State Inventory link |
|---|---|
| Iowa | https://www.iowadnr.gov/environmental-protection/air-quality/greenhouse-gases |
| Kansas | |
| Kentucky | |
| Louisiana | https://www.lsu.edu/ces/research/greenhousegasreport2021.php |
| Maine | https://www.maine.gov/dep/air/emissions/index.html |
| Maryland | https://mde.maryland.gov/programs/Air/ClimateChange/Pages/GreenhouseGasInventory.aspx |
| Massachusetts | https://www.mass.gov/lists/massdep-emissions-inventories#greenhouse-gas-baseline,-inventory-&-projec |
| Michigan | https://www.michigan.gov/egle/about/organization/climate-and-energy/mi-healthy-climate-plan |
| Minnesota | https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y&%3Asid=6BAC6F59E3184173B1F4BF5A0A74E32F-1%3A1 |
| Mississippi | |
| Missouri | |
| Montana | |
| Nebraska | |
| Nevada | https://ndep.nv.gov/air/air-pollutants/greenhouse-gas-emissions |
| New Hampshire | https://www.des.nh.gov/air/state-implementation-plans/air-emissions-inventory |
| New Jersey | https://dep.nj.gov/ghg/nj-ghg-inventory/ |
| New Mexico | https://www.env.nm.gov/wp-content/uploads/sites/13/2022/04/Binder6-10.pdf |
| New York | https://dec.ny.gov/environmental-protection/climate-change/greenhouse-gas-emissions-report |
| North Carolina | https://www.deq.nc.gov/energy-climate/climate-change/greenhouse-gas-inventory |
| North Dakota | |

| State/Territory | Direct State Inventory link |
|---|---|
| Ohio | |
| Oklahoma | https://oklahoma.gov/deq/divisions/air-quality/emissions-inventory/state-emissions-totals-infographics.html |
| Oregon | https://www.oregon.gov/deq/ghgp/Pages/GHG-Inventory.aspx |
| Pennsylvania | https://www.pa.gov/agencies/dep/residents/climate-change/ghg-inventory |
| Rhode Island | https://dem.ri.gov/environmental-protection-bureau/air-resources/climate-change/rhode-island-greenhouse-gas-inventory |
| South Carolina | |
| South Dakota | |
| Tennessee | |
| Texas | |
| Utah | https://deq.utah.gov/daq/statewide-emissions-inventories |
| Vermont | https://dec.vermont.gov/air-quality/planning/vermonts-greenhouse-gas-emissions |
| Virginia | https://www.deq.virginia.gov/air-energy/greenhouse-gases |
| Washington | https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/ghg-inventories |
| West Virginia | https://dep.wv.gov/daq/planning/Pages/GreenhouseGas.aspx |
| Wisconsin | https://dnr.wisconsin.gov/climatechange/science |
| Wyoming | https://deq.wyoming.gov/aqd/emissions-inventories/ |
| District of Columbia | https://doee.dc.gov/service/greenhouse-gas-inventories |
| Puerto Rico | https://www.drna.pr.gov/noticias/inventario-gei-2019-2021/ |
| American Samoa | |
| Guam | |

| State/Territory | Direct State Inventory link |
|---|---|
| Northern Mariana Islands | |
| U.S. Virgin Islands | |
| Outlying minor islands | |

# Annex 2. Summary of Geographic Completeness

The geographic coverage or completeness of the *GHGIA by State* is consistent with the national-level *GHGIA*. Completeness is summarized in Table A2-1 below and is available with downloadable data tables on the *GHGIA by State* website.

**Table A2-1: Geographic Completeness Summary**

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Energy** | | | | | | | | | | | | | |
| Fossil Fuel Combustion | $CO_2$ | | | | | | | | | | | | |
| *Transportation* | $CO_2$ | Y | Y | Y | Y | Y* | Y* | Y* | Y* | Y* | Y* | Y | Y* = included in U.S. territories estimate under FFC (note: territories data is not broken out by end-use sector) |
| *Electric Power* | $CO_2$ | Y | Y | Y | Y | Y* | Y* | Y* | Y* | Y* | Y* | Y | Y* = included in U.S. territories estimate under FFC (note: territories data is not broken out by end-use sector) |
| *Industrial* | $CO_2$ | Y | Y | Y | Y | Y* | Y* | Y* | Y* | Y* | Y* | Y | Y* = included in U.S. territories estimate under FFC (note: territories data is not broken out by end-use sector) |
| *Commercial* | $CO_2$ | Y | Y | Y | Y | Y* | Y* | Y* | Y* | Y* | Y* | Y | Y* = included in U.S. territories estimate under FFC (note: territories data is not broken out by end-use sector) |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Residential* | $CO_2$ | Y | Y | Y | Y | Y* | Y* | Y* | Y* | Y* | Y* | Y | Y* = included in U.S. territories estimate under FFC (note: territories data is not broken out by end-use sector) |
| Non-Energy Use of Fossil Fuels | $CO_2$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | |
| Stationary Combustion (excluding $CO_2$) | $CH_4$, $N_2O$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | |
| Mobile Combustion (excluding $CO_2$) | $CH_4$, $N_2O$ | Y | Y | Y | Y | IE | IE | IE | IE | IE | IE | Y | Gasoline and diesel fuel use non-$CO_2$ emissions in territories based on stationary combustion factors, reported under stationary non-$CO_2$ |
| Coal Mining | $CH_4$, $CO_2$ | Y | NO | NO | Y | NO | NO | NO | NO | NO | NO | Y | |
| Abandoned Underground Coal Mines | $CH_4$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | Y | |
| Petroleum Systems | $CO_2$, $CH_4$, $N_2O$ | Y | Y | Y | Y | NO | NO | Y | Y | NO | NO | Y | |
| Natural Gas Systems | $CO_2$, $CH_4$, $N_2O$ | Y | Y | Y | Y | NO | NO | Y | Y | NO | NO | Y | |
| Abandoned Oil and Gas Wells | $CO_2$, $CH_4$ | Y | NO | NO | Y | NO | NO | NO | NO | NO | NO | Y | |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Incineration of Waste | $CO_2$, $CH_4$, $N_2O$ | Y | Y | Y | Y | NE | NE | NE | NE | NE | NE | Y | |
| $CO_2$ Transport, Injection and Storage | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **Industrial Processes and Product Use** | | | | | | | | | | | | | |
| Cement Production | $CO_2$ | Y | NO | Y | Y | NO | NO | Y | NO | NO | NO | I | |
| Lime Production | $CO_2$ | Y | NO | NO | NO | NO | NO | Y | NO | NO | NO | I | |
| Glass Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Other Process Uses of Carbonates | $CO_2$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | NO | Y | |
| Ammonia Production | $CO_2$ | Y | NO | NO | Y | NO | NO | NO | NO | NO | NO | I | |
| Urea Consumption for Non-Agricultural Purposes | $CO_2$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | NO | Y | |
| Nitric Acid Production | $N_2O$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Adipic Acid Production | $N_2O$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Caprolactam, Glyoxal, and Glyoxylic Production | $N_2O$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | Caprolactam production is included (Y). Glyoxal and Glyoxylic acid production are not currently estimated (NE) due to a lack of publicly available data. |
| Carbide Production and Consumption | $CO_2$, $CH_4$ | Y | NO | Y | Y | NO | NO | Y | NO | NO | NO | Y | |
| Titanium Dioxide Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Soda Ash Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Petrochemical Production | $CO_2$, $CH_4$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Fluorochemical Production (including HCFC-22 Production) | HFCs | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Non-EOR Carbon Dioxide Utilization | $CO_2$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | NO | Y | |
| Phosphoric Acid Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Iron and Steel Production & Metallurgical Coke Production | $CO_2$, $CH_4$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Ferroalloy Production | $CO_2$, $CH_4$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Aluminum Production | $CO_2$, $CF_4$, $C_2F_6$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Magnesium Production and Processing | $CO_2$, HFCs, $SF_6$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Lead Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Zinc Production | $CO_2$ | Y | NO | NO | NO | NO | NO | NO | NO | NO | NO | I | |
| Electronics Industry | $N_2O$, HFCs, PFCs,[a] $SF_6$, $NF_3$ | Y | NO | Y | NO | NO | NO | NO | NO | NO | NO | I | |
| Substitution of Ozone Depleting Substances | $CO_2$, HFCs, PFCs[b] | Y | Y | Y | Y | Y | Y | Y | Y | Y | NO | Y | |
| Electrical Transmission and Distribution | $SF_6$ | Y | Y | Y | Y | NE | Y | Y | Y | NE | NO | Y | |
| $N_2O$ from Product Uses | $N_2O$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | NO | Y | |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $SF_6$ and PFCs from particle accelerators and military applications | $SF_6$, PFCs | Y | Y | Y | Y | NO | NO | NO | NO | NO | NO | NO | |
| **Agriculture** | | | | | | | | | | | | | |
| Enteric Fermentation | $CH_4$ | Y | NO | Y | Y | NE | NE | NE | NE | NE | NO | Y | |
| Manure Management | $CH_4$, $N_2O$ | Y | NO | Y | Y | NE | NE | NE | NE | NE | NO | Y | |
| Rice Cultivation | $CH_4$ | Y | NO | NO | NO | NO | NO | NE | NE | NO | NO | Y | Rice is commercially grown in select U.S. states. See the *GHGIA* for more details |
| Liming | $CO_2$ | Y | NE | NE | NE | NE | NE | NE | NE | NE | NO | Y | |
| Urea Fertilization | $CO_2$ | Y | NE | Y | Y | NE | NE | Y | NE | NE | NO | Y | |
| Field Burning of Agricultural Residues | $CH_4$, $N_2O$ | Y | NO | NE | NE | NE | NE | NE | NE | NE | NO | Y | |
| Agricultural Soil Management | $N_2O$ | Y | Y | Y* | Y* | NE | NE | NE | NE | NE | NO | Y | *: Agricultural Soil Mgt. Estimates of $N_2O$ emissions from managed croplands and grasslands are not available for Alaska and Hawaii except for managed manure and PRP nitrogen, and biosolid additions for Alaska, and |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | managed manure and PRP nitrogen, biosolids additions, and crop residue for Hawaii. |
| **Land Use, Land-Use Change, and Forestry[a]** | | | | | | | | | | | | | |
| Forest Land Remaining Forest Land | $CO_2$, $CH_4$, $N_2O$ | Y | NO | Y* | Y | Y** | Y** | Y** | Y** | Y** | NO | Y | *: Estimates of biomass carbon stock changes in Forest Land Remaining Forest Land include Hawaii, in addition to non-$CO_2$ emissions from Forest Fires. Hawaii has a notation key of "NO" for drained organic soils and a notation key of "NE" for lands converted to forest land.<br>**: Estimates of all forest carbon ecosystem pools stock changes in Forest Land Remaining Forest Land include U.S. Territories. U.S. Territories are also included in the estimates of non-$CO_2$ emissions from Forest Fires. No other forest land categories include U.S. Territories. In some cases, this is not occurring (e.g., drained organic soils; lands converted to forest land) and in other cases it is not estimates (e.g., harvested wood products). |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Converted to Forest Land | $CO_2$ | Y | NO | NE | Y | NE | NE | NE | NE | NE | NO | Y | |
| Cropland Remaining Cropland | $CO_2$ | Y | NO | Y* | NE | NE | NE | NE | NE | NE | NO | Y | *: Only the soil carbon pool is included for HI. The estimates do not include above/belowground perennial biomass, dead wood or litter carbon stock changes. This is also true for all the other states that we provide estimates (i.e., not AK). |
| Land Converted to Cropland | $CO_2$ | Y | NO | Y* | NE | NE | NE | NE | NE | NE | NO | Y | *: Only the soil carbon pool is included for land use conversions to Cropland in HI. In other states (except AK where we currently don't estimate Land Converted to Cropland) where Forest Land conversion to Cropland occurs we do include above/belowground perennial biomass, dead wood or litter carbon stock changes. |
| Grassland Remaining Grassland | $CO_2$, $CH_4$, $N_2O$ | Y | NO | Y* | NE | NE | NE | NE | NE | NE | NO | Y | *: Only the soil carbon pool and some emissions from grassland fires are included for HI. The estimates do not include |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | above/belowground perennial biomass, dead wood or litter carbon stock changes. In other states (except AK where we currently don't estimate Grassland Remaining Grassland) we do include some, but not all, above/ belowground perennial biomass, dead wood or litter carbon stock changes and some of the emissions from grassland fires. |
| Land Converted to Grassland | $CO_2$ | Y | NO | Y* | NE | NE | NE | NE | NE | NE | NO | Y | *: Only the soil carbon pool is included for all land use conversion to Grassland in HI. In other states (except AK where we currently don't estimate Land Converted to Grassland) for Forest Land conversion to Grassland we do include some, but not all, above/ belowground perennial biomass, dead wood or litter carbon stock changes. Emissions from fires on land converted to grassland are reported under Grassland Remaining Grassland. |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wetlands Remaining Wetlands (Peatlands) | $CO_2$, $CH_4$, $N_2O$ | Y | Y* | NE | Y | NE | NE | NE | NE | NE | NO | Y | *: for off-site peatland emissions only<br>CGS is currently investigating the appropriate notation key for most U.S. Territories, "NO" or "NE" |
| Wetlands Remaining Wetlands (Flooded Lands) | $CO_2$, $CH_4$, $N_2O$ | Y | Y | Y | Y | NE | NE | Y | NE | NE | NO | Y | CGS is currently investigating the appropriate notation key for most U.S. Territories, "NO" or "NE" |
| Land Converted to Wetlands (Flooded Lands) | $CO_2$, $CH_4$ | Y | Y | Y | Y | NE | NE | Y | NE | NE | NO | Y | CGS is currently investigating the appropriate notation key for most U.S. Territories, "NO" or "NE" |
| Wetlands Remaining Wetlands (Coastal Wetlands) | $CO_2$, $CH_4$, $N_2O$ | Y | Y | NE | NE | NE | NE | NE | NE | NE | NO | Y | |
| Land Converted to Wetlands (Coastal Wetlands) | $CO_2$, $CH_4$ | Y | Y | NE | NE | NE | NE | NE | NE | NE | NO | Y | |
| Settlements Remaining Settlements (LFYTFS) | $CO_2$, $N_2O$ | Y | Y | Y | Y | NE | NE | NE | NE | NE | NO | Y | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Settlements Remaining Settlements (Soil Carbon)* | $CO_2$ | Y | N | Y | N | NE | NE | NE | NE | NE | NO | Y | |
| *Settlements Remaining Settlements (Soil $N_2O$)* | $N_2O$ | Y | N | Y | N | NE | NE | NE | NE | NE | NO | Y | |
| *Settlements Remaining Settlements (Settlement Tree Carbon)* | $CO_2$ | Y | Y | Y | Y | NE | NE | NE | NE | NE | NO | Y | |
| Land Converted to Settlements (Soil Carbon and Biomass Carbon) | $CO_2$ | Y | NE | Y | Y* | NE | NE | NE | NE | NE | NO | Y | *: Does not include soils |
| **Waste** | | | | | | | | | | | | | |
| Landfills (MSW) | $CH_4$ | Y | NO | Y | Y | NE | Y (for 2016–2024); NE (for 1990–2015) | Y | NE | NE | NO | Y | MSW landfills in the territories and Puerto Rico are included in the current methodology. American Samoa, Guam, Northern Mariana Islands, and U.S. Virgin Islands have landfills that are not currently included in estimates for portions of the time series or the full time series. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Landfills (Industrial) | $CH_4$ | Y | NO | Y | Y | NO | NO | NO | NO | NO | NO | Y | It is assumed HI and AK have industrial landfills and the national methodology accounts for emissions from all 50 states. It is assumed U.S. territories do not have industrial landfills. |
| Wastewater Treatment/ Domestic | $CH_4$, $N_2O$ | Y | Y | Y | Y | Y | Y | Y | Y | Y | NE | Y | NE is used for outlying minor islands that are uninhabited but where military operations occur and therefore may also have some type of wastewater collection/ discharge. Note, the IPCC does not provide a default methodology to capture emissions from collection systems. However, dissolved methane that forms in the collection systems and is emitted at the treatment plant is included in the estimates presented. |
| Wastewater Treatment/ Industrial | $CH_4$, $N_2O$ | Y | Y | Y | Y | NE | NE | NE | NE | NE | NE | Y | Data sources do not currently address industrial production in territories or outlying minor islands. NE means that any of the industries currently covered |

| Sector/Source and/or Sink Category | Gas(es) | CONUS (excluding DC) | District of Columbia | Hawaii | Alaska | American Samoa | Guam | Puerto Rico | US Virgin Islands | Commonwealth of Northern Mariana Islands | Outlying Minor Islands (UM) | Tribal lands | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | (meat and poultry, pulp and paper, ethanol, petroleum, breweries, or fruits and Vegetables) may occur based on basic research. |
| Composting | $CH_4$, $N_2O$ | Y | NO | Y | NE | NE | NE | Y | NO | NO | NO | IE | This source category reflects commercial composting operations based on basic research. NO indicates current research indicates no commercially operated composting facilities. |
| Anaerobic Digesters at Biogas Facilities | $CH_4$ | Y | NO | NE | NO | NO | NO | NO | NO | NO | NO | NE | |

Notes: Y = included in current inventory; NE = occurs, but not estimated in current inventory; NO = not occurring; IE = included elsewhere; I = Investigating occurrence to update in next *GHGIA* by State

[a] Carbon sequestration estimates are expressed as net values, reflecting the balance between annual carbon gains and losses within a given pool. When losses exceed gains, the carbon stock declines and the pool functions as a source resulting in net emissions, whereas when gains exceed losses, the carbon stock increases and the pool acts as a sink and results in net removals of $CO_2$ from the atmosphere.

*/** See source specific notes in column N