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Annex



UNIVERSITY OF
MARYLAND
SCHOOL OF PUBLIC POLICY

CENTER FOR
GLOBAL
SUSTAINABILITY

Authors

Full report: Mausami Desai^{1*}, Vincent Camobreco¹, Toby Hedger¹, William Irving¹, Kenna Rewcastle¹, John Steller¹, Lindsay Barbieri², Melissa Weitz¹, Tanvi Murumkar¹, Anusha Patel¹, Mollie Averyt³, Katherine Bronstein⁴, Jake Butler³, Leslie Chinery³, Kara Edquist⁵, Rebecca Ferenchiak³, Johanna Garfinkel³, Matt Hakos⁴, Melissa Icenhour⁴, Jeremy Kaelin⁴, Emily Kerr⁴, Brandon Long⁵, Gopi Manne⁵, Tiffany Moore⁴, Ajo Rabemiarisoa³, David Randall⁴, Libby Robinson⁴, Karen Schaffner⁴, Peter Scully³, Sophia Stonebrook³, Tara Stout⁵, Emily Thompson⁴, Riley Vanek⁴, Allen Fawcett¹, Jiehong Lou¹, Ryna Cui¹, Nate Hultman¹ (*corresponding author)

Chapter 1. Introduction: Mausami Desai, William Irving, John Steller, Vincent Camobreco, Jiehong Lou, Ryna Cui, Nate Hultman

Chapter 2. Energy: Vincent Camobreco, Melissa Weitz, Brandon Long, Gopi Manne, Tara Stout, Tanvi Murumkar

Chapter 3. Industrial Processes and Product Use: Toby Hedger, Mollie Averyt, Jake Butler, Leslie Chinery, Rebecca Ferenchiak, Johanna Garfinkel, Matt Hakos, Melissa Icenhour, Jeremy Kaelin, Emily Kerr, Tiffany Moore, Tanvi Murumkar, Ajo Rabemiarisoa, David Randall, Libby Robinson, Karen Schaffner, Peter Scully, Sophia Stonebrook, Tara Stout, Emily Thompson, Riley Vanek

Chapter 4. Agriculture: Kenna Rewcastle, John Steller

Chapter 5. Land Use, Land-Use Change and Forestry: John Steller, Kenna Rewcastle, Lindsay Barbieri, Anusha Patel

Chapter 6. Waste: Mausami Desai, Katherine Bronstein, Kara Edquist, Emily Thompson

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- 1 Center for Global Sustainability, University of Maryland, College Park. A. Fawcett is also affiliated with Pacific Northwest National Laboratory, which did not provide support for this report.
 - 2 Department of Geographical Sciences, University of Maryland, College Park
 - 3 ICF, Reston, VA, United States
 - 4 RTI International, Research Triangle Park, NC, United States
 - 5 Eastern Research Group, Inc. headquartered in Concord, MA

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* = 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* = 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* = 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* = 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 ₂ O	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Mobile Combustion (excluding CO ₂)	CH ₄ , N ₂ O	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 ₂ O	Y	Y	Y	Y	NO	NO	Y	Y	NO	NO	Y	
Natural Gas Systems	CO ₂ , CH ₄ , N ₂ O	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 ₂ O	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 ₂ O	Y	NO	NO	NO	NO	NO	NO	NO	NO	NO	I	
Adipic Acid Production	N ₂ O	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 ₂ O	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	

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
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 ₂ F 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 ₂ O, 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 ₂ O from Product Uses	N ₂ O	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 ₂ O	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 <i>GHGIA</i> 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 ₂ O	Y	NO	NE	NE	NE	NE	NE	NE	NE	NO	Y	
Agricultural Soil Management	N ₂ O	Y	Y	Y*	Y*	NE	NE	NE	NE	NE	NO	Y	*: Agricultural Soil Mgt. Estimates of N ₂ O 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

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
													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 ₂ O	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-CO₂ 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. ** : 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-CO₂ 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).

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
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 ₂ O	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

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
													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 ₂ O	Y	Y*	NE	Y	NE	NE	NE	NE	NE	NO	Y	*: for off-site peatland emissions only 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 ₂ O	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 ₂ O	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 ₂ O	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 ₂ O)	N ₂ O	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.

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
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 ₂ O	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 ₂ O	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

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													(meat and poultry, pulp and paper, ethanol, petroleum, breweries, or fruits and Vegetables) may occur based on basic research.
Composting	CH ₄ , N ₂ O	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 CO₂ from the atmosphere.

*/** See source specific notes in column N