



Overview of Resources for State Action on Climate

EPA's Office of Atmospheric Programs

*Presentation for NACAA – Emissions and
Modeling Committee Meeting*

April 5, 2022

Overview

New suite of state-level resources to understand opportunities for action at subnational level

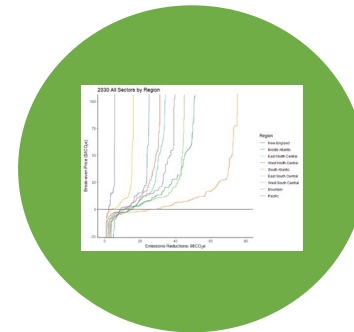
Now available online at <https://www.epa.gov/ghgemissions/state-and-tribal-greenhouse-gas-data-and-resources>



Inventory of U.S. Greenhouse Gas Emissions and Sinks by State



State Inventory Tool Updates



State-level Non-CO₂ Technical and Economic Mitigation Potential Data

Note: EPA's OAP also already publishes GHGRP State and Tribal Fact Sheets.

Inventory of U.S. GHG Emissions and Sinks by State

- New data, fully disaggregating national *Inventory* across the 50 states for all gases, sectors/categories
 - Consistent with the national *Inventory* in terms of emission and removal totals across the time series, from 1990 to the most recent inventory year.
 - Updates on annual basis, publishing after national inventory (e.g., planning late summer each year)
 - Support researchers, policymakers, and the general public
- Completed concurrent reviews of state data (Fall 2021)
 - Letter peer review
 - State expert review (included 4 background informational webinars)
 - Published responses to feedback from both reviews
- Includes data caveats
 - This dataset should not be viewed as official data of any state government, and we provide information on how to access up-to-date official data from states where it exists.
 - Indicate clearly where data differences could exist when comparing EPA state-level GHG data with official state Inventories (i.e., scope, accounting approaches, time series, etc.) and explain complementary relationship to EPA's State Inventory Tool (SIT))

What does “consistent with the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*” mean?

State-level estimates:

- Adhere to international standards, including the Intergovernmental Panel on Climate Changes (IPCC) Guidelines and United Nations Framework Convention on Climate Change (UNFCCC) transparency reporting system
- Are based on the same methodologies as the national *Inventory* and reflect the latest methodological improvements in the national *Inventory*, including the use of Greenhouse Gas Reporting Program (GHGRP) data.
- Cover all anthropogenic sources and sinks, and all seven gases (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃).
- Cover the complete time series consistent with the national Inventory, starting with 1990 through the latest national Inventory year (i.e., 2019)
- Estimates were compiled to avoid double counting or gaps in emissions coverage between States. This ensures that State totals, when summed, will equal totals in the national *Inventory*. This is important for those looking for consistent, comparable, and complete state data for analyses and other purposes where double counting or omissions would be problematic.

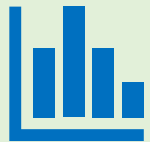
Areas where differences with an existing state inventory may occur

- Organization of sectors (e.g., states may organize and allocate emissions by economic sector rather than IPCC sector; states including some Industrial Process and Product Use (IPPU) sources in Energy sector)
- Different methods and/or data than those used by EPA
- Differences in accounting approaches (e.g., due to state legislation/goals)
 - Consumption-based accounting approaches (i.e., inclusion of “Scope 3” emissions that occur outside state geographic boundaries)
 - Varying approaches to estimating transportation, including cross-border aviation and marine emissions
 - Treatment of biogenic CO₂
- Time series
- Use of Global Warming Potentials (GWPs) other than 100-year GWP from IPCC Fourth Assessment Report used by EPA per UNFCCC reporting

GHG Inventory by State Publication Products

Available online at: <https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals>

Data and supporting products



State-by-state GHG data accessible via the Data Explorer web tool (1990-2019) and other formats (e.g., xlsx)



Methodology Report



Responses to Reviews



New state GHG Data/Web area
Links to official state GHGs



Supplemental fact sheets to respond to state comments on areas where differences with official state inventories may occur, including State Inventory Tool crosswalk

Include data caveats in products and in web content

Clearly communicate that this dataset should not be viewed as official data of any state government and provide information on how to access up-to-date official data from states where it exists. EPA data is supplemental and complementary to official state data. Link to fact sheet on differences with official state inventories:

<https://www.epa.gov/system/files/documents/2022-03/fact-sheet-differences-epa-and-offical-state-ghgi.pdf>

View State GHG Data

Available in GHG Inventory Data Explorer

<https://cfpub.epa.gov/ghgdata/inventoryexplorer/>

3) EPA is including links to latest official state GHG Inventory if available

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Greenhouse Gas Inventory Data Explorer

The Data Explorer is an interactive tool that provides access to data from the EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks* and the new *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State*. You can use the tool to create customized graphs, examine trends over time, and download data. Visit other EPA pages to learn more about the [EPA's national inventory](#) and [how it relates to EPA's Greenhouse Gas Reporting Program](#) and the [EPA's state-level greenhouse gas \(GHG\) data](#). The EPA recognizes that there will be differences between the EPA's state-level GHG estimates and some inventory estimates developed independently by individual state governments. Inventory data presented here should not be viewed as official data of any state government. Additional information is available on [official state GHG data](#), where it exists, including information on potential areas of difference between EPA's data and official state data.

- Navigation**
- [Index of Charts](#)
 - [Data Explorer Home](#)
 - [National GHG Inventory Report Home](#)
 - **NEW!** [National GHG Inventory by State Home](#)

Notes on viewing graphs:

- To view a graph, you can either pick from the full list in the [Index of Charts](#) or create a graph by choosing options from the six dropdown menus below.
- You must select all dropdown menus in sequential order to view a graph. A graph may remain visible until you sequentially select all six dropdowns to see a new graph.
- Some dropdown menu options are unavailable at this time (e.g., viewing state-level data by economic sector) and may be added in the future as more data and capabilities are added to the tool.
- Within each graph, you can click the legend to turn layers on or off, and you can hover your mouse over the display to reveal data. Graph data can be downloaded from the table below each graph.

Choose:

1. Sector:

All sectors

2. Category:

All sectors

3. Greenhouse gas:

All gases

4. Break out by:

Inventory sector

5. Year(s):

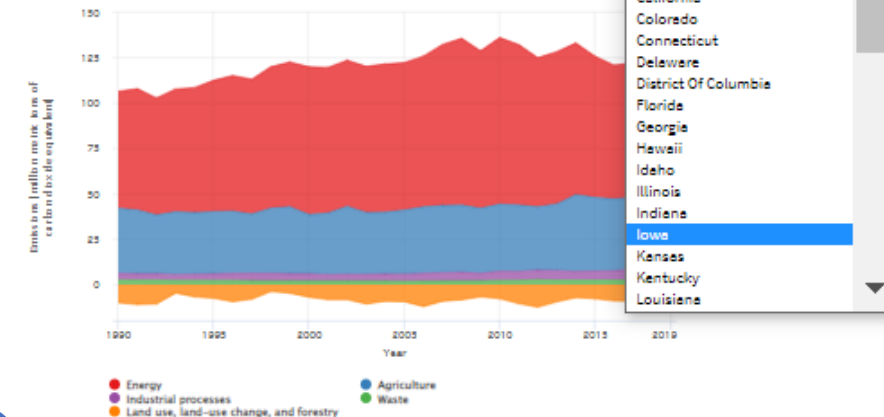
All years

6. Geography:

Iowa

Date range: 1990-2019

Iowa Greenhouse Gas Emissions by Inventory Sector, 1990-2019



Source: U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks by State, 1990-2019. <https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals>

[View the official state inventory for Iowa](#)

1) EPA updated introduction to reflect availability of official state data and relevant data caveats.

2) Choose to view data by inventory sectors, gas and use new "geography" dropdown to view national or state data. Data can be downloaded via table below chart in CSV format

Iowa Emissions by Inventory Sector, 1990-2019, etc.	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Gross total	106,928	107,888	102,814	107,700	102,928	101,208	115,175	115,180	108,985	102,958
Net total	88,211	89,223	82,159	102,081	101,799	104,993	108,727	108,105	118,102	117,885
Energy	84,428	85,828	84,282	87,815	82,619	78,221	74,775	74,339	77,925	79,720
Agriculture	25,210	25,124	22,012	24,882	25,927	24,251	24,284	22,241	22,521	22,812
Industrial processes	3,992	3,899	3,898	3,222	2,471	3,702	3,927	4,159	4,222	4,022
Waste	2,544	2,415	2,242	2,282	2,255	2,225	2,199	2,191	2,128	2,007
Land use, land-use change, and forestry	-2,864	-11,242	-10,885	-4,822	-4,720	-7,312	-2,448	-7,277	-2,942	-4,721

[Download the data \(.csv format\)](#)

New Web Page for Official State GHG Inventories

Greenhouse Gas Emissions

[CONTACT US](#)

[GHG Emissions and Removals Home](#)

[Overview of Greenhouse Gases](#)

[Sources of GHG Emissions and Removals](#)

[Global Emissions and Removals](#)

[National Emissions and Removals](#)

[State and Tribal GHG Data and Resources](#)

[Facility-Level Emissions](#)

[Carbon Footprint Calculator](#)

[GHG Equivalencies Calculator](#)

[Capacity Building for GHG Inventories](#)

Learn more about Official State Greenhouse Gas Inventories

Across the United States, many states are developing and publishing state level GHG inventories on a regular basis. EPA's [state-level data](#) does not replace official state data but is intended to supplement and complement official state data. Learn more about potential reasons EPA's estimates may [differ from official state estimates \(pdf\)](#). To explore official state greenhouse gas inventories where available, please visit the following links.



States

- [Alaska](#) [EXIT](#)
- [California](#) [EXIT](#)
- [Colorado](#) [EXIT](#)
- [Delaware](#) [EXIT](#)
- [Hawaii](#) [EXIT](#)
- [Illinois](#) [EXIT](#)
- [Iowa](#) [EXIT](#)
- [Louisiana](#) [EXIT](#)
- [Maine](#) [EXIT](#)
- [Maryland](#) [EXIT](#)
- [Massachusetts](#) [EXIT](#)
- [Nevada](#) [EXIT](#)
- [New Hampshire](#) [EXIT](#)

Includes full list of states with official GHG Inventories

State-level Non-CO₂ GHG Mitigation Report and Dataset

- U.S. state-level companion report to [Global Non-CO₂ Greenhouse Gas Emission Projections and Mitigation report](#).
- Provides technical and economic mitigation estimates for non-CO₂ GHGs from anthropogenic sources at the U.S. state-level.
- Covers all non-CO₂ GHGs from 20+ sources and sectors for the time period 2020 – 2050.
- Web-based summary report and interactive data-tool are intended to provide analysis of the abatement potential and costs of implementing specific abatement technologies.

U.S. State-level Non-CO₂ GHG Mitigation Report

Overview

Non-CO₂ greenhouse gases are more potent than CO₂ (per unit weight) at trapping heat within the atmosphere. Global warming potential (GWP) is the factor that quantifies the heat trapping potential of each GHG relative to that of carbon dioxide (CO₂). For example, methane has a GWP value of 25 which means that each molecule of methane released into the atmosphere is 25 more times effective at trapping heat compared to an equivalent unit of CO₂. Additionally, some non-CO₂ GHGs can remain in the atmosphere for longer periods of time than CO₂. The table shows the list of GHG gases with their GWP values that are considered in this report.

Greenhouse Gas	GWP Factor (100-yr)
CO ₂	1
CH ₄	25
N ₂ O	298
HFCs	124 - 14,800
NF ₃	17,200
SF ₆	22,800
PFCs	7,380 - 12,200

National Emissions in 2030

US Non-CO₂ Emissions by Sector in 2030 (MtCO₂e)

Sector	Emissions (MtCO ₂ e)
Agriculture	625
Energy	286
IPPU	307
LULUCF	23
Waste	174

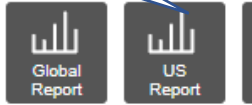
Emission sources were grouped into five economic sectors: energy, industrial processes (IPPU), agriculture, land use, land use change and forestry (LULUCF), and waste. LULUCF is included in the pie chart above for completeness of non-CO₂ data, however we do not project emissions or mitigation potential for this source. Although CO₂ emissions are concentrated in the energy sector, agriculture, which includes non-CO₂ emissions from livestock and manure management, croplands, and rice cultivation, accounts for the largest share of non-CO₂ emissions throughout the time-period evaluated. The heat map shows the distribution of projected 2030 emissions across the United States for each sector.

View State-level Non-CO₂ GHG Data

Visit the web summary report

Non-CO₂ Greenhouse Gas Data Tool

A data exploration tool for viewing non-CO₂ GHG projections and mitigation assessments as compiled in the EPA Non-CO₂ Greenhouse Emission Projections & Mitigation Potential Reports (2019 & 2022).



- Available at: <https://cfpub.epa.gov/ghgdata/nonco2/>

1 Select 'Mitigation Assessments'

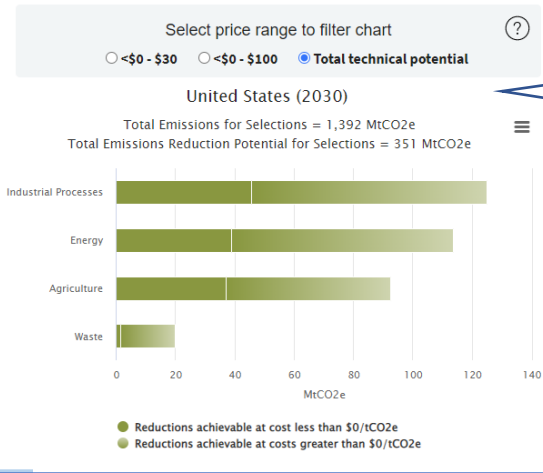
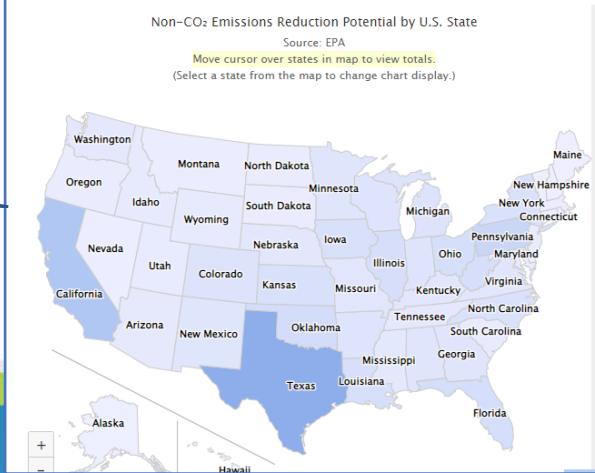
2 Select 'US'

3 Click 'Go'

Filter by non-CO₂ GHG

Filter by sector and/or source

Use map to drill down to state-level data



Filter by mitigation cost range and drill down into sector level detail

State Inventory Tool—2022 Updates

- EPA’s State Inventory Tool has been available to states since 2003 to support the development of state-level estimates of GHG emissions and sinks
- Published comprehensive updates to the Tool in March 2022
 - Update to include latest 2019 data (e.g., activity data, emission factors)
 - Allow manual entry of additional emissions sources
 - Update methods for ODS subs
- Publish additional updates in summer 2022
 - Improve alignment with *Inventory by State* while maintaining ability for states to customize
 - Prioritize updates based on comparison of emissions estimates, magnitude of emissions, and technical feasibility
 - Expected priority areas: Natural Gas and Oil, Waste, Industrial Processes



<https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool>

Fact Sheet on Crosswalk of GHG Inventory by U.S. State with existing State Inventory Tool (excerpt shown)

Available online: <https://www.epa.gov/system/files/documents/2022-03/factsheet-crosswalk-between-ghg-by-state-and-sit.pdf>

IPCC Sector/Source and/or Sink category	Gas(es)	Included in SIT (Y/N/P)	Uses same data/method (Y/N)	Key Differences	Plans to align SIT with GHG Inventory by U.S. State data
Electrical Transmission and Distribution	SF ₆	Y	N	The <i>GHG Inventory U.S. State</i> uses transmission miles and GHGRP data to allocate to the states. The SIT tool uses state and national electricity sales.	*
N ₂ O from Product Uses	N ₂ O	N	N	This source category is not included in SIT.	Δ
Agriculture					
Enteric Fermentation	CH ₄	Y	Y (SIT state-level emission factors as based on national Inventory outputs)	NA	NA
Manure Management	CH ₄ , N ₂ O	Y	Y (SIT simplifies waste management system categories into dry versus liquid)	NA	NA
Rice Cultivation	CH ₄	Y	N	For the <i>GHG Inventory by U.S. State</i> , EPA is implementing a combination of IPCC Tier 1 and Tier 3 approaches, utilizing the Daycent process model to run Tier 3 components. The SIT tool simplifies the calculation between ratoon and primary area of rice, multiplied by a seasonal emission factor.	*
Liming	CO ₂	Y	Y	NA	NA
Urea Fertilization	CO ₂	Y	Y	NA	NA
Field Burning of Agricultural Residues	CH ₄ , N ₂ O	Y	Y	NA	NA

Contact EPA with additional questions

- GHG Inventory by US State: GHGInventory@epa.gov
- State-level Non-CO₂ GHG Mitigation: ragnauth.shaun@epa.gov
- State Inventory Tool: denny.andrea@epa.gov