



Summary of State Expert Review Comments and Responses:
Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks by State:
1990–2022

State Expert Review Period (Summer 2024)
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Responses to Comments Received during the State Expert Review Period
on the Draft *Inventory of U.S. Greenhouse Gas Emissions and Sinks by
State: 1990–2022*

| | |
|---|----|
| Preface..... | ii |
| Chapter 1. Introduction | 1 |
| Chapter 2. Energy..... | 1 |
| Chapter 3. Industrial Processes and Product Use | 1 |
| Chapter 4. Agriculture | 2 |
| Chapter 5. Land Use, Land-Use Change, and Forestry | 4 |
| Chapter 6. Waste | 4 |
| Appendix A: List of State Expert Reviewers and Commenters | 5 |

Preface

EPA thanks all commenters for their interest and feedback on the *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990–2022*. To continue to improve the estimates in the annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State*, EPA distributed draft chapters of the *Methodology Report for Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990–2022* for a preliminary State Expert Review of estimates and methodological updates prior to publication. The State Expert Review was 30 days and included review of the draft methodology report, draft data appendices and results from July 18–August 19, 2024. The goal of the State Expert Review is to provide an objective review of the Inventory to ensure that the final Inventory estimates, and methodological documentation reflect sound technical information and analysis. Conducting a basic expert peer review of all categories before completing the inventory in order to identify potential problems and make corrections where possible is also consistent with IPCC good practice as outlined in Volume 1, Chapter 6 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and its refinement, i.e., 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

EPA received 12 unique comments as part of the state expert review process. The verbatim text of each comment extracted from the original comment letters is included in this document, arranged by sectoral chapters. EPA did not receive comments for every chapter. EPA’s responses to comments are provided immediately following each comment excerpt. The list of reviewers is included in Appendix A of this document.

Chapter 1. Introduction

No comments received.

Chapter 2. Energy

Comment E1: Suggestion to prioritize state-level abandoned well counts for GHG emissions estimates from abandoned oil and gas wells (Section 2.2: Fugitive Emissions)

The approach and methodology used to estimate national and state-level GHG emissions are clearly defined, and data sources are cited. The uncertainties in emission estimates are discussed as well as future improvements. Emission sources that could be included in this sector but estimated in other sectors were identified which resolves readers' concerns regarding missing sources or double counting. Overall, methodologies used to estimate fugitive GHG emissions from energy sources are well documented for the reader to fully understand how emissions were estimated and the uncertainties associated with them. Regarding GHG emissions estimates from abandoned oil and gas wells, incorporating state-level abandoned well counts should be prioritized. States are more likely to have up to date and more accurate data for abandoned well count, especially orphaned wells. Furthermore, through the grant program to plug orphaned wells, states can produce the most up to date orphaned wells count for plugged and unplugged wells.

Response: The abandoned oil and gas well emission estimates do rely on state-level abandoned well counts, as available through Enverus. Enverus well data are based on state-developed datasets, from which we estimate the number of abandoned wells for each state and the percent of a state's wells that are plugged and unplugged. If commenters believe there are state-developed datasets that may not be accounted for in Enverus data, please provide information that we can review. EPA is also aware of the Department of Interior's orphaned well grant program, and for future inventory updates, EPA plans on reviewing the state-level data that are available through this program.

Note in disaggregating data to all 50 states and incorporating any new data, EPA must ensure consistency over time, e.g., time series dataset based on consistent definitions to ensure the estimates reflects true trends. EPA notes that states may use different definitions for identifying well status (i.e., abandoned, orphaned, etc.) and this may also result in differences if comparing Enverus to state-level datasets.

Chapter 3. Industrial Processes and Product Use

Comment I2: Editorial comment in Section 3.1.3.4: Recalculations

There is a spelling error "...the stat-level impacts for the three...".

Response: This has been addressed Section 3.1.3.4 of the final methodology report available online at <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2022>.

Comment I3: Noting that retroactive estimation of emissions from the Electronics Industry is not sufficiently explained (Section 3.4.1: Electronics Industry)

Retroactive estimation of emissions from this industry makes sense since these types of pollutants have considerably long half-lives. However, this is not explained in the document other than to suggest data is being compared to current production through linear interpolation.

Response: EPA will reach out to the commenter to fully understand the commenter's concern. The methodology report does describe disaggregation methods over the time series, (e.g., see narrative but also Section 3.4.1 tables 3-17, 3-18, 3-19 and section 3.4.1.4 which describes updates from the previous publication covering 1990-2021 published in September 2023). As noted in the narrative, for years before 2011, when data gathering under the GHGRP began, each state's estimated share of U.S. total manufactured layer area (TMLA) was multiplied by the national semiconductor emissions estimate to calculate that state's semiconductor emissions. This method is used for each year of the timeseries to estimate emissions per state. The methodology report is available online at <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2022>. For information on how the national emissions for semiconductor manufacturing are estimated, see section 4.24 of the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022, available online at https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf.

Chapter 4. Agriculture

Comment A4: Acknowledgement of desert vs. non-desert forage for enteric fermentation

Though the state-level estimates for enteric fermentation do not address the desert vs. non-desert forage issue that was identified in December, the Uncertainty section (4.1.1.3) does at least acknowledge it: "...cattle diets can vary significantly even between states that are in similar regions because of the wide variety of forage types..." and the Planned Improvements section (4.1.1.5) notes that "...state-level livestock diet data would be of value...".

Response: EPA notes feedback and continues to review literature to improve characterization of livestock diets.

Comment A5: Missing information about control methods relate to manure management

State-level estimates for manure management do not address the additional control methods that were identified in December.

Response: EPA notes the reiteration of feedback from review of the national GHGI. Please see the manure management improvements implemented for additional details; this information can be found on PDF page 161 of <https://www.epa.gov/system/files/documents/2024-08/us-ghg-inventory-1990-2022-expert-review-comment-log.pdf>. As identified by commenter, additional information is being considered for future improvements to this category.

Comment A6: Labeling issues in section 4.2.2.4

Section 4.2.2.4 provides a list of improvements indexed by letters, which letters are (b), (d), and a second (d), but neither (a) nor (c). Some list items are not labeled with a letter-- maybe those were supposed to be (a) and (c). There are also some extra periods and white space at the end of the section. All of this suggests that there were editing errors in that section which need to be double-checked by the authors, as they may include some more substantial omissions than just labels.

Response: *These edits were corrected/addressed on pages 4-8 and 4-9 of Chapter 4 the final report now available online at <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2022>.*

Comment A7: Concerns related to linearly extrapolating trends for agricultural residue burning

Regarding agricultural residue burning, ADEQ has serious reservations about linearly extrapolating from trends that are over a decade old at this point. See for example section 4.2.5.3. Those trends (at least when limited to first order approximations) do not reflect, e.g., the impacts that present megadroughts have had on agricultural throughputs in the southwest or market-driven changes to crop type distributions.

Response: *EPA notes the feedback. As part of the next national Inventory report which will be published in April 2025, an improved extrapolation approach will be implemented to improve the accuracy of estimates from this source at that state and national levels. Future planned improvements to directly link agricultural residue burning with the Tier 3 methods used in the estimation of soil carbon stock changes on cropland soils and soil N₂O emissions from agricultural soil management, as noted in the planned improvements section of the national Inventory, will also eliminate the need for extrapolation in the estimates for field burning of agricultural residues. EPA will continue to reassess the best available data and methods as part of future inventory improvements.*

Comment A8: Broken links

Throughout the chapter, there are several broken links to "<https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022>" (n.b. the missing hyphen between "and" and "sinks").

Response: *This has been corrected across chapter 4 of the final methodology report available online at <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2022>.*

Comment A9: Noting some deviations from IPCC recommendations

There are some deviations from IPCC recommendations here and there, but they all seem reasonably well justified.

Response: *EPA notes the commenter's feedback.*

Comment A10: Issue with draft state GHG data.xlsx file (AllStateDraftGHGData90-22_v07172024.xlsx)

This might not be an error, but if it is intentional, I don't understand the utility of it: There negative values in econ_sector "industry" for sub_category_1 "ag mobile non-highway equipment" that exactly offset the emissions for the same sub_category_1 within the ag sector. I don't understand why this category of negative emissions exists.

Response: *This is intentional and is related to the reporting of emissions by Economic Sector. As per the ReadMe file discussion of the Econ Sect Tab (in the Y1990 – Y2022 column description): As described for Data by UNFCCC-IPCC Sectors. Emission values for certain mobile sources are presented as negative numbers in the Transportation Sector (Subcategories: Mobile Non-Highway Other, Mobile Non-Highway Construction, and Mobile Non-Highway Farm Equipment). These instances are not actual sinks but rather are adjustments to avoid double counting of emissions in the Agricultural Econ Sector. The Agriculture economic sector includes energy use emissions that are not included as part of the Agriculture IPCC sector, those emissions are included under the Energy IPCC sector. Therefore, for the*

economic sector calculations the emissions need to be subtracted from energy and added to agriculture. When analyzing these sources users should aggregate at the Econ_Source level rather than displaying these values separately.

Comment A11: Issue with draft state GHG data.xlsx file (AllStateDraftGHGData90-22_v07172024.xlsx)

There is one sector called "agricultural" rather than "agriculture". Within the Econ sector "Industrial", the Econ_source "stationary combustion" is the row(s) with the misnamed sector.

Response: *This was an error in the spreadsheet data. The description has been updated and there should only be an "agriculture" sector listed now under "stationary combustion".*

Chapter 5. Land Use, Land-Use Change, and Forestry

Comment L12: Issue with draft state GHG data.xlsx file (AllStateDraftGHGData90-22_v07172024.xlsx)

Within the LULUCF sector, there is inconsistency in how soils are named. Within the category "Forests Remaining Forests", the Carbon pool "Soil organic carbon" was initially confusing to me. I was able to cross reference the national report to understand that it refers to undrained organic soils. In other sub-categories, undrained organic soils are simply called "organic soils". Within the national level report, the terms used are "Soil (Organic)", alongside "Soil (Mineral)" and "Drained organic soils". Settlements remaining settlements simply refer to them as "organic" and "mineral", with no mention of soil. For consistency within the dataset, I would prefer to see all drained organic soils called "drained organic soil", all mineral soils "mineral soil", and all undrained organic soils "organic soils".

Response: *The data stratification has been updated in the latest data release as part of the final state-level emissions report publication. We standardized the "carbon pool" labels that accompany soil carbon stock change estimates in the forest, cropland, grassland, and settlement land-use categories so that "Organic Soil" and "Mineral Soil" labels are used consistently across all relevant source categories. Other labels, such as the usage of "Drained Organic Soils", exist to allow for reporting of these emissions and removals in the relevant IPCC Source Category and were retained in this data release, but EPA will explore options in future data releases to use a more concise data stratification system for the LULUCF sector, including future revisions to relevant wetlands carbon pool strata, while ensuring consistency with IPCC methodological guidance and UNFCCC reporting requirements. The latest downloadable data are available online under "Download consolidated all state data (zip)" available online at <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2022>.*

Chapter 6. Waste

No comments received.

Appendix A: List of State Expert Reviewers and Commenters

EPA distributed the expert review chapters of the draft *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022* to a list of 195 State Expert reviewers and other national experts, totaling 276 reviewers. The list below includes names of those expert reviewers who submitted comments as part of the Expert Review Period.

- Arizona Department of Environmental Quality, Air Emissions Inventory Team (Caitlyn Zaremba - Environmental Engineer Specialist; Rene Nsanzineza - Associate Environmental Engineer Specialist; Adam Ross - Associate Environmental Specialist; Julia Darby - Environmental Engineer Specialist; Melody Madden - Environmental Engineer Specialist)
- Carl Stenoien – Climate Change Research Scientist, Minnesota Pollution Control Agency (MPCA)

Note: Names of commenters are listed in no particular order.