New Mexico Climate Pollution Reduction Grant Greenhouse Gas Emissions Inventory Quality Assurance Review: Quantitative & Qualitative Analysis

New Mexico Environment Department

August 3, 2026

This analysis of the results and methodologies used in the state and federal emissions inventories for New Mexico was developed according to the New Mexico Environment Department (NMED) Climate Pollution Reduction Grant (CPRG) Quality Assurance Project Plan (QAPP) Revision 4, dated March 27, 2026, and signed by the U.S. Environmental Protection Agency (EPA) on May 5, 2026. The quality assurance (QA) review supports grant number 02F36101 with a period of performance from July 3rd, 2023, to June 30, 2027.

Analysis was performed by Samantha Valentine of NMED and subject matter experts from ERG. This analysis report was drafted by Samantha Valentine of NMED.

New Mexico's oil and gas and economy-wide greenhouse gas (GHG) emissions inventories (hereafter referred to as the oil and gas state inventory and the state inventory respectively) for the 2023 inventory year were reviewed as well as the associated emissions reductions measures contained in the Comprehensive Climate Action Plan (CCAP).

In this QA review, a quantitative comparison of GHG emissions by sector between the state inventory and EPA's GHG emissions inventory disaggregated to the NM state level was performed for all sectors. Where the percent difference between sector emissions of greater than 5% was observed, a qualitative evaluation of the reason(s) for the difference was subsequently performed. The equation used to compute the percent difference between the state and federal inventories for each sector is as follows:

$$\text{Percent Difference} = \frac{\text{State Estimate} - \text{Federal Estimate}}{\left(\frac{\text{State Estimate} + \text{Federal Estimate}}{2}\right)} \times 100\%$$

The data source used for this comparison is the 1990–2023 EPA GHG emissions inventory disaggregated to the state level (2023 GHGI)[1], as outlined in the QAPP revision 4; the New Mexico state-wide values from any future disaggregated inventory may vary from the values presented here due to changes in methods, assumptions, or underlying datasets used by EPA in the development of the annually updated disaggregated inventory. The comparison between changes in emissions estimates for the same sector and calendar year across different releases of the disaggregated Federal inventory is outside the scope of this document.

Task 1. Industry Sector

- The industry sector of the state inventory was reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.
- **Findings**
  - The HGL (energy use) CO_2 content coefficient was transcribed incorrectly from Table A-22 of the Annexes to the 2023 GHGI.
    - The CO_2 content coefficient was updated, resulting in a 363 MT or a 0.000363 MMT CO_2e increase in emissions from the industrial fuel combustion subsector.
- The industry sector includes four subsectors: oil and gas, industrial fuel combustion, industrial processes and product use, and coal mining and abandoned mines. The latter three subsectors are reported separately from oil and gas and are therefore compared to federal estimates separately here.

All Industry Subsectors Excluding Oil and Gas

- The 2023 state estimate for industry sector emissions is 3.20 MMT CO_2e. The 2023 federal estimate for the state of NM is 10.52 MMT CO_2e. The 2023 state estimate is 107% less than the 2023 federal estimate for the state of NM, which is greater than the 5% difference threshold needed for a qualitative evaluation of methods (Table 1).

Table 1. New Mexico Industry Subsectors Emissions Estimate Comparison

[1] U.S. Environmental Protection Agency. 2025. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2023.* Released via FOIA to Environmental Defense Fund, May 7, 2025. Freedom of Information Act documents for the EPA's greenhouse gas inventory

Sector	State Estimate (MMT CO_2e)	Federal Estimate (MMT CO_2e)	Percent Difference
Industrial Fuel Combustion	1.59	9.06	140%
Industrial Processes and Product Use	1.52	1.38	10%
Coal Mining and Abandoned Mines	0.08	0.08	0.3%
Total	**3.20**	**10.52**	**107%**

- **2023 State Estimate Method:**
  - Industrial Fuel Combustion
    - Fuel consumption data was obtained from the U.S. Energy Information Administration (EIA) State Energy Data System (SEDS) for 2023 for New Mexico.[2]
    - The following adjustments to this fuel consumption data were made to be consistent with the methodology used in the U.S. GHG Inventory and to prevent double counting of emissions across sectors:
      - Excluded biofuels from the industrial distillate fuel consumption quantity, since biogenic emissions are not included in this inventory.
      - Excluded fuel ethanol from the industrial motor gasoline consumption quantity, since biogenic emissions are not included in this inventory.
      - Deducted the quantity of fuels used for non-energy purposes within the industry sector, since these fuels are included in the industrial processes and product use subsector.
      - Deducted the quantity of natural gas consumed as lease and plant fuel, as emissions from lease and plant fuel combustion are accounted for in the oil and gas production subsector.
      - Included emissions from the combustion of fuel for nonroad sources (gasoline and diesel-powered agricultural equipment, construction, logging, industrial, oilfield, and mining equipment) in the transportation sector and excluded those emissions from the industry sector. EIA's distillate fuel and gasoline consumption data for the industry sector includes nonroad fuel use for construction, agriculture, logging, and commercial applications.

[2] https://www.eia.gov/state/seds/seds-data-complete.php?sid=NM

- Deducted gasoline combustion emissions because the commercial buildings subsector already includes those emissions. EIA's gasoline consumption data for the industry sector also includes the quantity of gasoline consumed in the commercial buildings subsector.
- Deducted emissions from two industrial electric power plants from the industrial fuel combustion totals, as these emissions are accounted for in the electricity generation sector.

▪ Default emissions factors for CO_2 for each fuel type were obtained from the 2023 GHGI.[3]

▪ Default emissions factors for CH_4 and N_2O for each fuel type were obtained from EPA's State Inventory Tool (SIT) Stationary Combustion Module.[4]

○ Industrial Processes and Product Use (IPPU)

▪ This subsector only includes emissions from industrial processes and products used for non-energy-related purposes. Emissions from fuel use for energy-related purposes are accounted for in the industrial fuel combustion subsector.

▪ The National and NM specific IPPU emissions from the 2022 GHGI[5] were used to create a ratio to scale down the National IPPU emissions from the 2023 GHGI.[6]

- While the national 2023 GHGI was available at the time of this subsector's calculation, the 2023 GHGI broken down by state was not.

○ Coal Mining and Abandoned Mines

▪ Active surface and underground mining emissions were estimated using mine-level data from the Mine Safety and Health Administration

[3] Table A-21 and A-22 (National GHGI Annex 2025, GHGI, 1990-2023) downloaded from Freedom of Information Act documents for the EPA's greenhouse gas inventory

[4] Downloaded from Data and Tools – GHGIA

[5] U.S. Environmental Protection Agency. 2024. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022*. EPA 430R-24004. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022

[6] U.S. Environmental Protection Agency. 2025. *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: NM, 1990-2023*. Released via FOIA to the Environmental Defense Fund, September 9, 2025. https://www.edf.org/freedom-information-act-documents-epas-greenhouse-gas-inventory.

(MSHA)[7], EIA's annual coal production data[8], and GHG emissions factors from the 2023 GHGI.[9]

- The MSHA data indicated that there were no active underground mines in New Mexico in 2023, therefore active underground coal mine emissions are zero.

- Abandoned mine methane emissions were estimated by multiplying the ratio of NM to national abandoned mine methane emissions from the 2022 GHGI[10] by the national abandoned mine methane emissions from the 2023 GHGI.
  - While the National 2023 GHGI was available at the time of this subsector's calculation, the 2023 GHGI broken down by state was not.

- **2023 Federal Estimate Method:**
  - Industrial Fuel Combustion
    - These emissions were generally calculated by multiplying emissions factors by activity data on fuel consumption.
    - State level activity data is from EIA SEDS and is adjusted in the following ways:
      - Subtract uses that are accounted for in the IPPU sector
      - Exclude fuels with biogenic origins, which is consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines
      - Subtract motor gasoline and distillate fuel oil use that is accounted for in other sectors
      - Subtract fuels used for non-energy purposes
    - Fuel-specific C content coefficients from the 2023 GHGI Annex 2 were used to calculate CO_2 emissions.
    - Tier 1 emissions factors from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories were used to calculate CH_4 and N_2O emissions.

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[7] Mine Safety and Health Administration. 2025. *MSHA Mines Dataset*. https://www.msha.gov/data-and-reports/mine-data-retrieval-system

[8] U.S. Energy Information Administration. 2024. *Annual Coal Report 2023*. October 2024. https://www.eia.gov/coal/annual/pdf/acr.pdf.

[9] U.S. Environmental Protection Agency. 2025. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2023.* Released via FOIA to Environmental Defense Fund, May 7, 2025. Freedom of Information Act documents for the EPA's greenhouse gas inventory

[10] U.S. Environmental Protection Agency. 2024. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022*. April 2024. EPA 430R-24004. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.

- Industrial Processes and Product Use
  - This sector includes four subsectors: minerals, chemicals, metals and product use.
    - Each of these subsectors includes a variety of sources, with specific methods outlined for each source in the 2023 GHGI Annexes.[11]
    - Overall, this sector relies heavily on the Greenhouse Gas Reporting Program (GHGRP) for activity and emissions data.
- Coal Mining and Abandoned Mines
  - Coal Mining
    - An IPCC Tier 3 method was used for estimating CH_4 emissions from underground coal mining.
      - A combination of GHGRP data and MSHA quarterly measurement data were used to estimate emissions from underground mines.
      - There were no active underground coal mines in New Mexico in 2023, therefore these emissions are zero.
    - An IPCC Tier 2 method is used for estimating CH_4 emissions from surface mining and post-mining activities.
      - For surface mines, basin-specific coal production was obtained from EIA's Annual Coal Report and was multiplied by basin-specific CH_4 contents from the EPA along with a 150% emissions factor to account for CH_4 from over- and under-burden (King 1994; Saghafi 2013).
      - For post-mining activities, basin-specific coal production is multiplied by basin-specific CH_4 contents and a mid-range 32.5 percent emission factor for CH_4 desorption during coal transportation and storage (Creedy 1993).
      - Emissions were apportioned to the state level based on coal production in each state, as reported in the EIA Annual Coal Report.
    - An IPCC Tier 1 method was used to estimate fugitive CO_2 emissions from underground coal mining and surface mining.

[11] U.S. Environmental Protection Agency. 2025. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2023.* Released via FOIA to Environmental Defense Fund, May 7, 2025. Freedom of Information Act documents for the EPA's greenhouse gas inventory

        - IPCC default emissions factors and annual coal production from the EIA were used.
    - A hybrid Tier 2/Tier 3 method was developed to model abandoned mine emissions using Monte Carlo Simulations.
        - MSHA data provided mine-level time of abandonment and basin-specific decline curves.
        - Emissions totals were downwardly adjusted to reflect CH_4 emissions avoided from abandoned mines with CH_4 recovery and use or destruction systems.
        - State-level outputs were available from the Abandoned Mine Methane (AMM) model used to estimate emissions.
- **Comparison of State and Federal Methods:**
    - Industrial Fuel Combustion
        - The federal method includes sources that the state method excludes to avoid double counting, primarily emissions from natural gas consumed as lease and plant fuel. Because the state method includes these emissions in the oil and gas sector, the state method is determined to be more reliable.
    - Industrial Processes and Product Use (IPPU)
        - 100% of the difference between the IPPU state estimate and the IPPU estimate from the 2023 GHGI by state is due to scaling from the 2022 GHGI. The 2023 GHGI by state was not available at the time of this sector's calculation, therefore the state's method is determined to be reliable.
    - Coal Mining and Abandoned Mines
        - 100% of the difference between the abandoned mines state estimate and the abandoned mines estimate from the 2023 GHGI by state is due to scaling from the 2022 GHGI. The 2023 GHGI by state was not available at the time of this sector's calculation, therefore the state's method is determined to be reliable.

- **Editor Review**
    - The industry sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. Grammatical and typographical errors were identified and corrected.

<u>Oil and gas</u>

- The 2023 state estimate for oil and gas emissions is 34.34 MMT CO_2e. The 2023 Federal estimate for the state of NM is 19.41 MMT CO_2e. The 2023 state estimate is 55.6% greater than the 2023 Federal estimate for the state of NM, which is greater than the 5% difference threshold needed for a qualitative evaluation of methods (Table 2).

Table 2. New Mexico Oil and Gas Emissions Estimate Comparison

State Sector	State Estimate (MMT CO_2e)	Federal Sector Equivalent	Federal Estimate (MMT CO_2e)	Percent Difference
Exploration and Production	12.49	Petroleum Systems	4.98	86%
Gathering and Boosting	15.65	N/A	NE	N/A
Natural Gas Processing	5.08	Natural Gas Systems	14.39	96%
Transmission and Storage	1.10	N/A	NE	N/A
Inactive Wells	0.02	Abandoned Oil and Gas Wells	0.03	63%
Total	**34.34**		**19.41**	**55.6%**

- **2023 State Estimate Method:**
    - A combination of the NMED Air Quality Bureau emissions inventory (NMED EI) and the U.S. EPA GHGRP (subparts W and C) emissions data were used for the majority of emissions sources.
    - NMED EI emissions data was used for exploration and production, gathering and boosting, natural gas processing, and transmission and storage stations that were not collected by the GHGRP.
        - The NMED EI collects criteria air pollutant and GHG emissions data for major and non-major sources with air quality construction or operating permits, including those that are below the GHGRP subpart W reporting threshold of 25,000 MT of CO_2e per year.
        - Companies reporting to the NMED EI were required to follow subpart W and subpart C methodologies and only included data for NM operations.
    - The following sources in each industry segment used emissions data sources other than the GHGRP subpart W or the NMED EI:
        - Exploration and Production

- Basin-level total well counts and production volumes were needed when calculating basin-level emissions. This data was obtained from the Oil Conservation Division's (OCD) NM Water Data Act API.
- Mud Degassing: NEI tool for CH_4 emissions and CO_2:CH_4 ratio for CO_2 emissions.
- Well Pad Equipment Leaks: Pasci et al. 2019 and Rutherford et al. 2021 studies for emissions factors and well data from Subpart W. A CO_2:CH_4 ratio was used for CO_2 emissions.
- Hydrocarbon Liquid Storage Tank Unloading: NEI tool for CH_4 emissions and CO_2:CH_4 ratio for CO_2 emissions.
- Produced Water Tanks: 2022 GHGI for CO_2 and CH_4 emissions.

▪ Gathering and Boosting
- Compressors: 2022 GHGI by state for CO_2 and CH_4 emissions.
- Hydrocarbon liquid storage tanks: used a combination of subpart W reported emissions, a 2024 revised subpart W tank leak emissions factor, and a 2022 GHGI emissions factor for CH_4 emissions.
- Station leaks: adjusted reported subpart W station leak emissions using the 2024 revised subpart W emissions factors for CH_4 emissions.

▪ Natural Gas Processing
- Pneumatic controllers: 2022 GHGI for CO_2 and CH_4 emissions.

▪ Transmission and Storage
- Reciprocating compressors: partially subpart W and emissions factors from a PRCI white paper. Used CO_2:CH_4 ratio for CO_2 emissions.
- Centrifugal compressors: partially subpart W and emissions factors from a PRCI white paper. Used CO_2:CH_4 ratio for CO_2 emissions.
- Pipeline leaks: 2022 EPA GHGI for CO_2 and CH_4 emissions
- Pipeline blowdowns: Subpart W data includes data from other states. This was scaled down to NM using pipeline mileage that was reported to the Pipeline and Hazardous Materials Safety Administration (PHMSA).

▪ Internal Combustion Engine Exhaust
- CH_4 emissions factor data for natural gas-fired ICE exhaust.

- CH_4 emissions factors from AP-42 were used for all oil and gas industry segments.
- Fractions of rich burn and lean burn 4-stroke natural gas engines were developed from the NMED EI.
- Composite CH_4 emissions factors were developed for production, gathering and boosting, processing and transmission segments based on AP-42 emission factors and engine fractions from NMED EI.

- These composite CH_4 emissions factors along with GHGRP Subpart C CO_2 emissions factors were used to create a CO_2:CH_4 ratio to estimate CH_4 emissions for each segment.

- Inactive Wells
  - Emissions factors from Townsend-Small et al. 2016 and 2021 were used for plugged and unplugged inactive wells.
  - The OCD Wells Database[12] was used to determine the count of inactive wells in each county.
  - Defined "inactive" as not producing during the years 2023-2025, even if labeled as "active" in the OCD database.

- Two types of facilities were evaluated for each industry segment:
  - Group 1: facilities for which emissions data are available (GHGRP subpart W and NMED EI).
  - Group 2: facilities for which emissions data are not available.
    - Emissions estimates for Group 2 facilities were developed using data from the Group 1 facilities.
      - For each industry segment, average emissions for each emission source were calculated from the entire Group 1 dataset and the average emissions were then applied to estimate emissions for the industry segment as a whole.
- The industry segment options that could be reported to the NMED EI do not directly correlate with the industry segments reported in the oil and gas state inventory, therefore some realignment of industry segment assignments was required. This process is documented in detail in section 4.2 of the oil and gas state inventory.

[12] See the "All Wells" data by clicking on the "Go-Tech Site" link at <https://www.emnrd.nm.gov/ocd/ocd-data/statistics/>.

- This methodology includes an estimate of emissions from both fuel combustion and fugitive emissions associated with oil and gas activities.

- **2023 Federal Estimate Method[13,14]:**
  - Oil and gas industry emissions are reported under the "Energy" sector of the inventory by IPCC category and under the "Industrial" sector of the inventory by economic sector. Oil and gas emissions are categorized into three sources: natural gas systems, petroleum systems, and abandoned oil and gas wells.
  - Excludes all combustion emissions except for flaring CO_2 emissions (did not use GHGRP subpart C).
  - All combustion emissions except for flaring are included in the fossil fuel combustion section.
    - EPA fossil fuel combustion emissions are not broken down by fuel type or source, therefore the fossil fuel combustion emissions associated with oil and gas activities are unable to be disaggregated without more information than is publicly available.
  - "Petroleum systems" include emissions from:
    - Fugitive emissions from leaks, venting and flaring like those from onshore and offshore crude oil exploration, production, transportation and refining operations.
  - "Natural Gas systems" include emissions from:
    - Fugitive emissions from leaks, venting and flaring like those from normal operations (natural gas engine and turbine uncombusted exhaust, flaring and leak emissions), routine maintenance (pipelines, equipment and wells during repair and maintenance activities) and system upsets (pressure surge relief systems and accidents).
    - Hundreds of thousands of wells, hundreds of processing facilities, and over a million miles of gathering, transmission and distribution pipelines were analyzed for the national inventory.
  - "Abandoned Oil and Gas Wells" includes emissions from:
    - Wells with no recent production that are not plugged and wells that have been plugged to prevent migration of gas or fluids.

[13] In the absence of the 2023 version of this methodology document, the 2022 version is used in its place: Methodology Report: Inventory of U.S. GHG Emissions and Sinks by State 1990-2022, https://www.epa.gov/system/files/documents/2024-09/method-report_ghgibystate-508-september.pdf

[14] Annexes to the Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2023, Freedom of Information Act documents for the EPA's greenhouse gas inventory

- Both Petroleum and Natural Gas Systems use a “hybrid” approach to estimate state-level emissions:
    - Approach 1: Estimates built by applying national methods directly to geographically disaggregated data (at the state or finer level).
    - Approach 2: Estimates disaggregated from national-level estimates using geographic proxies or other indicators (e.g. population, production capacity, GHGRP). A key factor in this approach is how well emissions correlate with proxies.
- Abandoned Oil and Gas Wells use Approach 1 to estimate state level emissions.
- Data Sources:
    - Petroleum Systems
        - Exploration and Production
            - Primarily used emissions data collected by the GHGRP.
            - For sources where recent data are unavailable from the GHGRP, emissions factors from GRI/EPA (1996) and Radian (1999) studies were used.
            - Oil well counts and production levels from Enverus and total crude oil production from the EIA.
            - State level proxy data sets that were used include the fraction of oil wells in each state relative to national totals, the number of oil well completions without hydraulic fracturing in each state, and the total volume of oil produced in each state, all from the Enverus time series of oil and gas well data.
        - Crude Oil Transport
            - Combination of crude oil transportation and pipeline and crude deliveries data from the EIA, the American Petroleum Institute, and the Oil and Gas Journal.
            - Vented emissions from truck loading and rail loading were allocated based on onshore levels of oil well production in each state from Enverus.
            - All other transport emissions (tanks, pump stations, floating roof tanks) were allocated based on the relative state counts of oil refineries from GHGRP subpart Y.
        - Refineries
            - Data from GHGRP subpart Y and national level activity data.

        - Activities not reported to the GHGRP were estimated using data from Radian (1999).
        - State-level estimates were based on that state's share of refinery emissions of each gas as reported to GHGRP subpart Y.
- Natural Gas Systems
    - Exploration and Production
        - Data collected from the GHGRP for most sources and data from a GRI/EPA 1996 study for sources where recent data are unavailable.
        - Zimmerle et al. (2019) was also used and production and well count data were from Enverus.
        - Emissions data was scaled to the state level using either well counts or gas production from Enverus.
        - "Emissions from gathering and boosting were allocated based on the relative emissions in each state of all other production sources"[15] implies that gathering and boosting emissions were included in the exploration and production category.
    - Processing
        - Data collected from the GHGRP for most sources and data from a GRI/EPA 1996 study for sources where recent data are unavailable.
        - Key activity data include processing plant counts from the Oil and Gas Journal.
        - Disaggregated national level estimates based on the fraction of national onshore marketed natural gas production occurring in each state (EIA 2023).
    - Transmission and Storage
        - Used emissions data collected by the GHGRP and data from a Zimmerle et al. (2015) study for most sources.
        - Used data from GRI/EPA (1996) for sources where recent data are unavailable.

[15] The 1990-2022 Methodology Report for Inventory of U.S. Greenhouse Gas Emissions and Sinks by State is referenced here in the absence of the 1990-2023 version of the same document. https://www.epa.gov/system/files/documents/2024-09/method-report_ghgibystate-508-september.pdf

    - Key activity data include transmission stations (PHMSA and FERC data), storage stations (Zimmerle et al. and EIA data), and transmission pipeline miles (PHMSA 2024).
    - Disaggregated national level estimates based on the fraction of national transmission pipeline mileage occurring in each state.
    - Anomalous events were added to storage emission totals.
- Distribution
    - Used emissions data collected by the GHGRP and data from a Lamb et al. (2015) study for most sources.
    - Used data from GRI/EPA (1996) for sources where recent data are unavailable.
    - Key activity data include pipeline mileage by material (PHMSA), metering and regulation station counts (GHGRP subpart W), and number of natural gas residential, commercial, and industrial consumers (EIA).
    - Went from national level to state level based on the relative pipeline mileage by material (cast iron, unprotected/protected steel, plastic) in each state, the relative number of natural gas residential, commercial, and industrial consumers in each state from EIA, and the number of above- and below-grade stations in each state as reported to the GHGRP (scaled up by the ratio of PHMSA to GHGRP pipeline mileage in each state to include non-reporters).
- Post-meter sources
    - Sources include leak emissions from residential and commercial appliances, industrial facilities and power plants, and natural gas fueled vehicles.
    - Key activity data include counts of homes with natural gas appliances (American Housing Survey), the number of commercial natural gas customers (EIA), natural gas consumption volumes for industrial and electric generating units (EIA) and counts of CNG vehicles (EPA MOVES).

- Emissions from residential and commercial appliances were allocated to states using the relative number of residential and commercial natural gas customers in each state from EIA.
- "Industrial and electric generating unit emissions were allocated based on the relative consumption volumes from the EIA SEDS and compressed natural gas vehicles were allocated to the number of compressed natural gas vehicles in each state, derived from the MOVES model".[16]

- Abandoned Oil and Gas Wells
  - Key data sources include Kang et al. (2016) and Townsend-Small et al. (2016) for emissions factors and the Enverus database and "historical state level datasets" for abandoned well counts.
  - Well type and plugging status were derived from Enverus.

- **Comparison of State and Federal Methods:**
  - The 2023 state and federal methods for estimating oil and gas emissions for New Mexico rely heavily on the GHGRP. The state method also relies on GHGRP information reported in subparts W (petroleum and natural gas systems) and C (general stationary fuel combustion sources).
    - Components included in the state method that are not included in the federal method include emissions estimates from facilities reporting to the NMED EI and emissions from fuel combustion (Fuel combustion accounts for 62% of the state method 2023 oil and gas emissions).[17]
      - By assuming that 72% of industrial combustion emissions in New Mexico are from the oil and gas industry (this was estimated in the 2018 inventory), the Federal estimate for oil and gas emissions in 2023 would increase to 25.6 MMT CO_2e, still substantially less than the state estimate of 34.34 MMT CO_2e. Therefore, some—but not all—of the discrepancy

[16] The 1990-2022 Methodology Report for Inventory of U.S. Greenhouse Gas Emissions and Sinks by State is referenced here in the absence of the 1990-2023 version of the same document. https://www.epa.gov/system/files/documents/2024-09/method-report_ghgibystate-508-september.pdf

[17] Table 62 in the 2023 NM O&G GHGI, updated 6/30/2026

between the state and federal estimates can be accounted for by the inclusion or exclusion of combustion emissions from the oil and gas sector.

- Components included in the federal method that are not included in the state method include natural gas distribution and post-meter sources and petroleum refining and transportation (these sources account for 1.5% of the federal method's NM oil and gas emissions).[18]

- Across sectors, the state method uses more *recent* and *local* emissions factors than the federal method.
  - For example, within the exploration and production sector, the federal estimate uses emissions factors from GRI/EPA (1996) and Radian (1999) studies while the state method uses Pasci et al. (2019) and Rutherford et al. (2021) estimates for production well pad equipment leaks which contain measurement data from the Western U.S.
  - For inactive/abandoned oil and gas wells, the federal method uses Kang et al. (2016) and Townsend-Small et al. (2016) for emissions factors, while the state method uses Townsend-Small et al. (2016) and Townsend-Small et al. (2021). The state method studies use measured data from the Western U.S. and the Permian Basin while the federal method studies use measured data from both the Western and Eastern U.S.
  - For internal combustion engine exhaust across sectors, the federal method uses a single emission factor for all engine types combusting natural gas, based on the 1996 GRI/EPA study. This emissions factor does not account for engine technology type (i.e., rich burn and lean burn).[19] The state method developed specific emissions factors for ICE exhaust in each sector based on AP-42 emissions factors and engine fractions from the NMED EI.
- A potential source of the difference in exploration and production emissions between the two methods is the different datasets used for well counts.
  - Emissions for well pad equipment leaks, which used well data from NM OCD, account for 13% of the state method exploration and

[18] DRAFT_AllStateGHGdata_90-23.xlsx from Freedom of Information Act documents for the EPA's greenhouse gas inventory

[19] p.25-26 of the 2023 NM O&G GHGI, updated 6/30/2026

production emissions.[20] The federal method used a database from Enverus for both scaling and calculating exploration and production emissions. It is likely that the NM OCD well count is more appropriate than the Enverus well count because it is a New Mexico-specific, measurement-based dataset. Both methods estimate emissions for sources where data are unavailable.

    - The use of more recent and local data sets in the state method compared to the federal method suggests that the state's method is more accurate.
        - The federal method includes some sources of emissions that the state method does not include. The state method also includes sources that the federal method does not.
        - Emissions included in the state method that are not included in the federal method are of a much greater magnitude, which contributes to the 55.6% greater oil and gas emissions estimate via the state method compared to the federal method.
- **Editor Review**
    - The oil and gas state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. Grammatical and typographical errors were identified and corrected.

Task 2. Transportation Sector

- The transportation sector of the state inventory was reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.
- **Findings**
    - A formula error was identified and corrected in the rail CO_2 emissions calculation, resulting in a 3,237 MT or 0.003237 MMT CO_2e increase in emissions from rail transportation.
- The 2023 state estimate for transportation sector emissions is 17.23 MMT CO_2e. The 2023 Federal estimate for the state of NM is 15.87 MMT CO_2e. The 2023 state estimate is 8.2% greater than the 2023 Federal estimate for the state of NM, which is greater than the 5% difference threshold needed for a qualitative evaluation of methods (Table 3).

[20] Table 47 in the 2023 NM O&G GHGI, updated 6/30/2026

Table 3. New Mexico Transportation Emissions Estimate Comparison

State Estimate (MMT CO_2e)	Federal Estimate (MMT CO_2e)	Percent Difference
17.23	15.87	8.2%

- **2023 State Estimate Method:**
  - The U.S. GHG Inventory 1990-2023[21] was utilized for national on-road CO_2 emissions that were scaled down to state on-road CO_2 emissions via an allocation factor.
  - EPA's Emissions Modeling Platform (EMP) 2016v3[22] and MOVES4.0.1[23] were utilized to create a ratio of US to New Mexico CO_2 emissions by on-road vehicle type that was then applied to the U.S. GHG Inventory 2023 on-road CO_2 emissions to get NM on-road CO_2 emissions by vehicle type.
    - This method is necessary to have emissions broken down by vehicle type as opposed to just by fuel type as would be the case if the state-specific estimate from the U.S GHG Inventory 2023 were used directly.
  - EIA SEDS[24] was utilized for NM and US jet fuel consumption in 2023. The ratio of NM to US jet fuel consumption was then applied to the 2023 U.S. GHG Inventory CO_2 emissions estimate for aircrafts to get a NM CO_2 estimate for aircrafts.
    - The ratio of US to NM jet fuel was used for the allocation factor because jet fuel accounts for 97.6% of aviation fuel consumed by aircrafts in NM, while aviation gasoline accounts for the remaining 2.4%.
    - Aircraft CH_4 and N_2O emissions were not accounted for because data on aircraft engine technologies and flight data is required and is not available in SEDS.
    - US EIA CO_2 emissions coefficients[25] were used to convert fuel consumption to CO_2 emissions, although this was not a necessary step as the ratio of NM to US CO_2 emissions from jet fuel is equal to

[21] downloaded from Environmental Defense Fund site, obtained via FOIA request, https://www.edf.org/search/content?keys=2023%20national%20ghg%20emissions Transportation-Related Greenhouse Gas Emissions (MMT CO2; Table 2-13)
[22] Index of /Air/emismod/2016/v3/reports/county_annual_monthly
[23] MOVES Versions in Limited Current Use | US EPA
[24] U.S. Energy Information Administration - EIA - Independent Statistics and Analysis
[25] https://www.eia.gov/environment/emissions/co2_vol_mass.php

the ratio of NM to US jet fuel consumption, and this NM CO_2 emissions estimate for aircrafts was not used otherwise.

- EPA's EMP 2022v1[26] was utilized for rail sulfur dioxide (SO_2) emissions, which were used to back-calculate fuel consumption of rail diesel. CO_2 emissions were then calculated from fuel consumption using the EIA CO_2 emissions factor for diesel[27]. This value was interpolated for 2023 by calculating both 2022 and 2026 rail CO_2 emissions.
  - Rail CH_4 and N_2O emissions were not accounted for because they are expected to be insignificant compared to CO_2 emissions.
- MOVES5 was utilized to calculate CO_2 and CH_4 emissions from nonroad vehicles and equipment including agriculture, airport support, commercial, construction, industrial, lawn/garden, logging, oil field, pleasure craft, railroad support, recreational, and underground mining vehicles.
- MOVES does not enable modeling of N_2O emissions for nonroad vehicles and equipment.
- MOVES4.0.1 was used to calculate NM-specific CH_4 and N_2O emissions for on-road vehicles by vehicle category.

- **2023 Federal Estimate Method:**
  - The transportation sector emissions are primarily comprised of CO_2 emissions from fossil fuel combustion. These emissions were calculated via the following method:
    - These emissions estimates follow a Tier 2 method as described in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006) Chapter 2, Figure 2.1 decision tree.
    - EIA's SEDS provided fuel consumption statistics for each state by fuel type and sector, with the following adjustments:
      - Portions of the fuel consumption data for seven fuel categories -coking coal, distillate fuel, industrial other coal, petroleum coke, natural gas, residual fuel oil, and other oil (as applicable to the transportation sector) were reallocated to the IPPU chapter when they were consumed during non-energy-related industrial activity. The data used for these adjustments is as follows: AISI (2004 through 2021), Coffeyville (2012), U.S. Census Bureau (2001 through 2011), EIA (2024a, 2024f, 2024h), USAA (2008 through 2021), USGS (1991 through 2020),

[26] https://www.epa.gov/air-emissions-modeling/emissions-modeling-platforms
[27] https://www.eia.gov/environment/emissions/co2_vol_mass.php

(USGS 2019), USGS (2014 through 2021a), USGS (2014 through 2021b), USGS (1995 through 2013), USGS (1995, 1998, 2000, 2001, 2002, 2007), USGS (2021a), USGS (1991 through 2015a), USGS (1991 through 2020), USGS (2014 through 2021a), USGS (1991 through 2015b), USGS (2021b), USGS (1991through 2020). This national level data was allocated to states based on state-level emissions estimates for each IPPU category.

- Net carbon fluxes from changes in biogenic carbon reservoirs are accounted for in the estimates for LULUCF, therefore, fuel consumption estimates were adjusted to remove ethanol and biodiesel.
- For the national inventory, EPA conducted a separate bottom-up analysis of transportation fuel consumption based on data from the Federal Highway Administration (FHWA)[28] that indicated that the amount of distillate and motor gasoline consumption allocated to the transportation sector in the EIA statistics should be adjusted.
- The data sources used in the bottom-up analysis of transportation fuel consumption include AAR (2008 through 2022), Benson (2002 through 2004), DOE (1993 through 2022), EIA (2007), EIA (2025a), EPA (2024e), and FHWA (1996 through 2024).
- For state inventories, the national inventory totals of distillate fuel and motor gasoline were scaled down to states based on the percentage of fuel use by state in gallons from FHWA data (FHWA 2023a, 2023b).
    - This fuel consumption data represents the point-of-sale not the point-of-use.
    - FHWA data only reflect on-highway fuel use, but because the majority of motor gasoline and diesel fuel use is on-highway, this was determined to be reasonable by the EPA.
- EIA (2025a) was used to subtract fuels consumed for non-energy purposes.
- Consumption of international bunker fuels was subtracted from the transportation end-use sector in line with IPCC guidelines. The Office of the Under Secretary of Defense (Installations and Environment) and the Defense Logistics Agency Energy (DLA Energy) of the U.S. Department of Defense (DoD) (DLA Energy 2025) supplied data on

[28] Bottom-up gasoline and diesel highway vehicle fuel consumption estimates are based on data from FHWA Highway Statistics Table MF-21, MF-27, and VM-1 (FHWA 1996 through 2024).

military jet fuel and marine fuel use. Commercial jet fuel use was estimated based on data from FAA (2024) and DOT (1991 through 2023); residual and distillate fuel use for civilian marine bunkers was obtained from DOC (1991 through 2024) for 1990 through 2001 and 2007 through 2020.

- The total carbon content of fuels was estimated by multiplying the amount of fuel consumed by the amount of carbon in each fuel. This was done using national-level average C content values from the EIA and EPA from detailed fuel information and can be found in Table A-20 of Annex 2.1 of the U.S. GHG Inventory 1990-2023.
- Total CO_2 emissions are the product of the adjusted fuel consumption, the carbon content of the fuel consumed, and the fraction of carbon that is oxidized. The fraction oxidized was assumed to be 100% for petroleum, coal and natural gas based on guidance from the IPCC (2006). Finally, carbon emissions were multiplied by the molecular-to-atomic weight ratio of CO_2 to carbon (44/12) to obtain total CO_2 emitted from transportation fossil fuel combustion in million metric tons (MMT).
- While the national inventory allocates transportation emissions by vehicle type, this analysis is not completed for state emissions estimates.

- CH_4 and N_2O emissions from Mobile combustion were also calculated via the following method:
  - Emissions factors multiplied by activity measure for each fuel and vehicle type.
  - On-Road vehicles:
    - CH_4 and N_2O emissions factors by vehicle type and emission tier for on-road gasoline vehicles from model year 2004 onward were calculated by Browning (2019) from annual vehicle certification data compiled by EPA.
    - CH_4 and N2O emissions factors for on-road gasoline vehicles from model year 2003 and earlier were developed by ICF (2004).
    - CH_4 and N_2O emissions factors for diesel on-road vehicles from model year 2006 and earlier were developed by ICF (2006).
    - CH_4 and N_2O emissions factors for diesel on-road vehicles from model year 2007 onward (engines with aftertreatment

systems) were calculated from annual vehicle certification data compiled by EPA.

- CH_4 and N_2O emissions factors for alternative fuel vehicles were developed based on the 2023 Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) model (ANL 2023). Vehicle types were matched from GREET to EPA classification in the following manner:
    - Light-duty trucks=travel fraction for LDT1 and LDT2[29]
    - Medium-duty vehicles=light heavy-duty vocational trucks
    - Heavy-duty vehicles=long-haul combination trucks
    - Buses=transit buses
- Biodiesel CH_4 emissions factors were corrected from GREET values to be the same as CH_4 emissions factors for diesel vehicles due to an overestimation in GREET.
- Annual vehicle miles traveled (VMT) data for 1990-2022 were obtained from the FHWA's Highway Performance Monitoring System database as reported in Highway Statistics (FHWA 1996-2024). This VMT data was proxied for 2023 based on FHWA's Traffic Volume Trends Data for 2023.
- VMT estimates were then allocated to vehicle type using ratios of VMT per vehicle type to total VMT, derived from EPA's MOVES5 model[30].

▪ Non-road mobile sources:

- These sources include ships and boats, aircraft, locomotives, and other mobile non-road sources like construction and agricultural equipment.
- CH_4 and N_2O emissions estimates for locomotives, aircrafts, ships and non-recreational boats follow an IPCC Tier 1 approach in that fuel-based emissions factors are applied to data on fuel consumption.
    - The Tier 2 approach for these sources would require separate fuel-based emissions factors by technology, for which data are not currently available.

[29] See U.S. GHG Inventory 1990-2023 Annex 3.2 for further information
[30] See U.S. GHG Inventory 1990-2023 Annex 3.2 for further information about the MOVES model

- For all other non-road sources, EPA uses a Tier 2 approach in that separate emissions factors are applied to specific engine technologies.
    - Emissions factors by horsepower bin are estimated from EPA engine certification data.
- CH_4 and N_2O emissions factors for all non-road modes were taken from IPCC (2006) and Browning (2020 and 2018).
- Fuel use was estimated using a combination of the Nonroad component of the MOVES model, and data from AAR (2008 through 2024), APTA (2007 through 2024), Rail Inc (2014 through 2024), APTA (2006), BEA (1991 through 2015), Benson (2002 through 2004), Bureau of Transportation Statistics (BTS; 2023), DLA Energy (2025), DOC (1991 through 2024), DOE (1993 through 2022), DOT (1991 through 2024), EIA (2002, 2007, 2024, 2023), EIA (1991 through 2023), EPA (2024a), Esser (2003 through 2004), FAA (2022), FHWA (1996 through 2024), Gaffney (2007), FTA (2023), and Whorton (2006 through 2014).

- **Comparison of State and Federal Methods:**
    - The state method relies heavily on scaling down the 2023 U.S. GHG Inventory on-road CO_2 emissions to the state-level. While the federal method also scales down on-road CO_2 emissions to the state-level from the 2023 U.S. GHG Inventory, the state method uses a different scaling factor that allows on-road CO_2 emissions to be broken down by vehicle type, whereas the federal method only provides on-road CO_2 emissions by fuel type. This methodology deviation allows for a more granular look at on-road CO_2 emissions in New Mexico and is therefore determined to be more reliable than the federal method.
    - The federal method calculates CH_4 and N_2O emissions for on-road mobile sources using national-level VMT data from the FHWA and various emissions factors for each fuel and vehicle type. These national-level CH_4 and N_2O on-road emissions are then scaled down to the state level. The state method calculates on-road CH_4 and N_2O emissions using MOVES4.0.1 at the state-level directly. This again allows for emissions to be broken down by vehicle type as opposed to just by fuel type. The state methodology allows for a more granular look at on-road CH_4 and N_2O emissions in New Mexico and is therefore determined to be more reliable than the federal method.
    - The federal method calculates CH_4 and N_2O emissions for nonroad mobile sources from fuel consumption data and fuel-based emissions factors from

a combination of MOVES and other sources. The state method used MOVES exclusively to calculate CO_2 and CH_4 emissions for nonroad vehicles excluding rail and aircrafts. This again allows for emissions to be broken down by vehicle type as opposed to just by fuel type. The state methodology allows for a more granular look at nonroad CO_2 and CH_4 emissions in New Mexico and is therefore determined to be more reliable than the federal method.

- **Editor Review**
  - The transportation sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. The writing was identified as being clear, and no grammatical or typographical errors were identified.

Task 3. Electricity Generation Sector

- The electricity generation sector of the state inventory was reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate
- The 2023 state estimate for electricity generation emissions is 6.60 MMT CO_2e. The 2023 federal estimate for the state of NM is 13.80 MMT CO_2e. The 2023 state estimate is 70.6% less than the 2023 federal estimate for the state of NM, which is greater than the 5% difference threshold needed for a qualitative evaluation of methods (Table 4).

Table 4. New Mexico Electricity Generation Emissions Estimate Comparison

Electric Power Fuel	State Estimate (MMT CO_2e)	Federal Estimate (MMT CO_2e)	Percent Difference
Coal	0	7.20	200%
Natural Gas	6.53	6.53	0.07%
Petroleum	0.06	0.06	0.1%
Wood	0.003	0	200%
Other	0	0.001	200%
Total	**6.60**	**13.80**	**70.6%**
Total (including Four Corners)	13.78	13.80	0.2%

- **2023 State Estimate Method:**

- Emissions and generation data was obtained from EPA's Emissions and Generation Resource Integrated Database (eGRID). This data was used directly after subtracting the emissions from the coal-fired Four Corners Generating Station because it is located on the Navajo Nation and therefore falls under Tribal authority, not state authority.

- **2023 Federal Estimate Method:**
  - Fuel consumption data was obtained directly from the Energy Information Administration (EIA).
  - Energy use and emissions associated only with the electric power sector were included.
  - The electric power sector consists of electric utilities and independent power producers whose primary business is the production of electricity. This includes both regulated utilities and non-utilities like independent power producers, qualifying co-generators, and other small power producers.
- **Comparison of State and Federal Methods:**
  - As eGRID uses data from the EIA, 99.7% of the difference between the state and federal estimates is due to the state's exclusion of the Four Corners Generating Station (see Table 4). While this generating station is within state bounds, it is on Tribal land and therefore falls outside state authority and outside the boundary of this inventory. Due to this reason, the state's method is determined to be more reliable and accurate.

- **Editor Review**
  - The electricity generation sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. The writing was identified as being clear, and no grammatical or typographical errors were identified.

Task 4. Commercial and Residential Buildings Sector

- The commercial and residential buildings sector of the state inventory was reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate
- The 2023 state estimate for commercial and residential buildings emissions is 4.22 MMT CO_2e. The 2023 federal estimate for the state of NM is 4.05 MMT CO_2e. The 2023 state estimate is 4% less than the 2023 federal estimate for the state of NM, which is less than the 5% difference threshold needed for a qualitative evaluation of methods (Table 5).

- The 2023 state estimate for residential buildings emissions is 2.35 MMT CO_2e. The 2023 federal estimate for the state of NM is 2.35 MMT CO_2e. The 2023 state estimate is 0.1% different than the 2023 federal estimate for the state of NM, which is less than the 5% difference threshold needed for a qualitative evaluation of methods (Table 5).
- The 2023 state estimate for commercial buildings emissions is 1.7 MMT CO_2e. The 2023 federal estimate for the state of NM is 1.87 MMT CO_2e. The 2023 state estimate is 9.4% less than the 2023 federal estimate for the state of NM, which is greater than the 5% difference threshold needed for a qualitative evaluation of methods (Table 5).

Table 5. New Mexico Commercial and Residential Buildings Emissions Estimate Comparison

Fuel	**State Estimate (MMT CO_2e)**	**Federal Estimate (MMT CO_2e)**	**Percent Difference**
Commercial building natural gas consumption	1.48	1.51	1.9%
Residential building natural gas consumption	2.00	2.00	0.3%
Commercial building consumption of other fuels	0.22	0.36	48%
Residential building consumption of other fuels	0.35	0.35	0.8%
Residential Total	**2.35**	**2.35**	**0.1%**
Commercial Total	**1.70**	**1.87**	**9.4%**
Commercial Total (State Method Unadjusted)	1.88	1.87	0.9%
Total	**4.05**	**4.22**	**4%**

- **2023 State Estimate Method:**
  - Emissions were quantified by multiplying the quantity of each fuel type by its associated emissions factor.
  - Commercial fuel use data from EIA SEDS 2023:

        - Fuel use from motor gasoline and ethanol was subtracted from the total because these emissions are accounted for in the transportation sector.
        - Fuel use attributable to electricity generation was deducted because these emissions are accounted for in the electricity generation sector.
    - Emissions factors are from the 2022 GHGI and EPA's Emission Factors Hub.
- **2023 Federal Estimate Method:**
    - These emissions were generally calculated by multiplying emissions factors by activity data on fuel consumption.
    - State level activity data is from EIA SEDS and is adjusted in the following ways:
        - Exclude fuels with biogenic origins (consistent with IPCC guidelines)
        - Subtract motor gasoline and distillate fuel oil use that is accounted for in other sectors.
    - Fuel-specific C content coefficients from the 2023 GHGI Annex 2 were used to calculate CO_2 emissions.
    - Tier 1 emissions factors from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories were used to calculate CH_4 and N_2O emissions.
- **Comparison of State and Federal Methods:**
    - Because 90% of the difference in commercial emissions is due to the state method subtracting emissions that are already accounted for in the transportation and electricity generation sectors (Table 5), the state method is determined to be more reliable and accurate than the federal method.

- **Editor Review**
    - The commercial and residential buildings sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. The writing was identified as being clear, and no grammatical or typographical errors were identified.

Task 5. Other Sectors

- The other sectors portion of the state inventory was reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.

Agriculture

- The 2023 state estimate for agriculture sector emissions is 10.07 MMT CO_2e. The 2023 federal estimate for the state of NM is 10.07 MMT CO_2e. The 2023 state

estimate is 0% different than the 2023 federal estimate for the state of NM, which is less than the 5% difference threshold needed for a qualitative evaluation of methods.

- **Editor Review**
  - The agriculture sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. The writing was identified as being clear, and no grammatical or typographical errors were identified.

Waste

- The 2023 state estimate for waste emissions is 1.05 MMT CO_2e. The 2023 federal estimate for the state of NM is 1.05 MMT CO_2e. The 2023 state estimate is 0% different than the 2023 federal estimate for the state of NM, which is less than the 5% difference threshold needed for a qualitative evaluation of methods.

- **Editor Review**
  - The waste sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. Grammatical and typographical errors were identified and corrected.

Natural and Working Lands

- The 2023 state estimate for natural and working lands emissions is 6.44 MMT CO_2e. The 2023 federal estimate for the state of NM is 6.44 MMT CO_2e. The 2023 state estimate is 0% different than the 2023 federal estimate for the state of NM, which is less than the 5% difference threshold needed for a qualitative evaluation of methods.

- **Editor Review**
  - The natural and working lands sector of the state inventory report was reviewed for writing clarity and the presence of grammatical and typographical errors. The writing was identified as being clear, and no grammatical or typographical errors were identified.

Task 6. Sector-Specific Measure Reductions

- The 45 discrete GHG emissions reduction measures presented in the CCAP were reviewed by a technical reviewer. Analytical methods and results were deemed to be clearly explained, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.

New Mexico Environment Department
Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defesibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client: EPA Region 6
Grant Number: 02F36101
EPA Project Officer: Mariama Mitchell
Project Number: N/A
Project Name: New Mexico Climate Pollution Reduction Grant
Grantee Org. Project Manager: Claudia Borchert
QA Form Details

File Name			Deliverable			QA Review Information							QA Review Information		
Item Number	(copy the name of the file reviewed)	Deliverable Description	Date Sent to Client	(Draft)	(Final)	Document Originator	(Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	(Have All Findings Been Resolved)	(Originator Signature)	(Reviewer Signature)	(File Location)
01	NM_2023_GHGI Report_3.0.docx	Quantitative and qualitative analysis including review of the following sectors: Task 1: Industry Sector, Task 2: Transportation Sector, Task 3: Electricity Generation Sector, Task 4: Commercial and Residential Buildings Sector, Task 5: Other Sectors (Agriculture, Waste, and Natural and Working Lands)	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	06/16/2026-7/10/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:26:43 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:27:12 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 NM Inventory (ERG)\GHGI Report 3.0
02	New Mexico 2023 GHGI Supporting Data.xlsx	Quantitative and qualitative analysis including review of the following sectors: Task 1: Industry Sector, Task 2: Transportation Sector, Task 3: Electricity Generation Sector, Task 4: Commercial and Residential Buildings Sector, Task 5: Other Sectors (Agriculture, Waste, and Natural and Working Lands)	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	06/16/2026-7/10/2026	Access to additional calculations requested, source of some transcribed values needed clarification (IFC, IPPU, transportation)	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:27:11 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:27:30 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 NM Inventory (ERG)\GHGI Report 3.0
03	NM_2023_O+G-GHGI_FinalReport_2.0.docx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	06/16/2026-7/10/2026	Some methods clarification questions	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:27:37 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:27:38 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
04	NM_Oil+Gas_GHGInventory_2023_Emissions.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	06/16/2026-7/10/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:28:02 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:27:47 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
05	2023 NM O&G EPA GHGRP summary.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	06/16/2026-7/10/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:28:18 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:27:55 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
06	2023 production summary.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/8/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:28:37 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:05 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
07	AbandonedWells_2023_NM_GHGI.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/10/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:28:56 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:12 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
08	G&B_NM_GHGI_2023.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/13/2026	Requested access to associated data files	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:29:13 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:20 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
09	Processing_NM_GHGI_2023.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/14/2026	Requested access to associated data files	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:29:32 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:28 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
10	Production_NM_GHGI_2023.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/16/2026-7/22/2026	Requested access to associated data files	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:29:49 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:35 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
11	Transmission_NM_GHGI_2023.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/16/2026-7/22/2026	Requested access to associated data files	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:30:08 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:43 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
12	UndergroundNGStorage_NM_2023GHGI.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/16/2026-7/22/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:30:32 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:50 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)
13	WellCounts_ProdVolumes_NM_GHGI_2023.xlsx	Quantitative and qualitative analysis including review of the Oil and Gas sector	7/15/2026	☐	☑	ERG	Technical	Samantha Valentine	7/08/2026-7/10/2026	No significant findings	Yes	John Carter Digitally signed by John Carter Date: 2026.08.03 13:30:56 -04'00'	Samantha.Valentine Digitally signed by Samantha.Valentine Date: 2026.08.03 10:28:58 -06'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\GHG Emissions\2023 O&G Inventory (ERG)

New Mexico Environment Department

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client: EPA Region 6
Grant Number: 02F36101
EPA Project Officer: Mariama Mitchell
Project Number: N/A
Project Name: New Mexico Climate Pollution Reduction Grant
Grantee Org. Project Manager: Claudia Borchert
QA Form Details

	File Name		Deliverable					QA Review Information				QA Review Information		
Item Number	(copy the name of the file reviewed)	Deliverable Description	Date Sent to Client	(Draft)	(Final)	Document Originator	(Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	(Have All Findings Been Resolved)	(Originator Signature)	(Reviewer Signature)	(File Location)
01	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Industry sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	Elizabeth Hubbard and Brandon Long (ERG); Mark Edwards (NMED)	9/18/2025 (initial); 10/27/2025 (final)	- Revise how information from certain references are incorporated into the calcs. - Improve labeling and transparency of calculations.Revise assumptions for the emission reduction and cost calculations. - Adjust assumptions to maximize reasonable GHG reduction potential. - Question about using CO as an analogous gas for other emissions in measure I-1 - Applicability to Class II vs. Class VI wells in measure I-3	Yes	Elizabeth L Hubbard Brandon Long and Elizabeth Hubbard (ERG) Digitally signed by Elizabeth L Hubbard Date: 2026.08.03 22:15:00 -04'00'	Brandon Long Elizabeth Hubbard and Brandon Long (ERG) Digitally signed by Brandon Long Date: 2026.08.03 16:15:28 -04'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
02	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Transportation sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	Thomas Schmitt and John Carter (ERG); Becky Smith and Corina Gomez (NMED)	9/23/2025 (initial); 10/27/2025 (final)	- Cross reference results into summary tab - Improve description of assumption in the spreadsheet - Accounting for CTFP impacts in the BAU scenario - Conversion error corrected in measure T-5 - Adjust assumptions to maximize reasonable GHG reduction potential	Yes	Adison Moore Bennett Smith and Adison Moore (ERG) Digitally signed by Adison Moore Date: 2026.08.03 16:19:30 -04'00'	John Carter Thomas Schmitt and John Carter (ERG) Digitally signed by John Carter Date: 2026.08.03 15:46:50 -04'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
03	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Agriculture, Forests, and Wilderness sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	Kara Edquist and Cortney Itle (ERG); Mark Edwards (NMED)	9/16/2025 (initial); 10/27/2025 (final)	- refinement to wildfire reduction measure assumptions - improve clarity of assumptions documentation - ensure measure-specific GHG reduction estimates are linked to summary tab - measure AFW-1 could increase N2O emissions - adjust assumptions and calcs	Yes	Kara Edquist Sarah Vaisner (ERG) Digitally signed by Kara Edquist Date: 2026.08.03 16:39:45 -04'00'	Cortney Itle Kara Edquist and Cortney Itle (ERG) Digitally signed by Cortney Itle Date: 2026.08.03 16:13:57 -04'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
04	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Electricity Generation sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	Evan Fago (ERG); Richard Kirschner (EMNRD)	8/28/2025 (initial); 10/27/2025 (final)	- Need to improve labeling for clarification - Need to expand and clarify assumptions - Need to clarify source of modeled market prices for solar - Need to ensure consistent assumed installed cost of solar and wind across measures - Consider effectiveness of all measures in relation to the state RPS and IOU decarbonization scenarios	Yes	Eric Bell Eric Bell and Nathan Jeffay (ERG) Digitally signed by Eric Bell Date: 2026.08.03 17:54:37 -04'00'	Evan Fago (ERG)	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
05	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Commercial and Residential Buildings sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	Evan Fago (ERG)	9/3/2025 (initial); 10/27/2025 (final)	- Need to improve labeling for clarification - Need to increase transparency of calculations	Yes	Eric Bell Eric Bell and Nathan Jeffay (ERG) Digitally signed by Eric Bell Date: 2026.08.03 17:55:00 -04'00'	Evan Fago (ERG)	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
06	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Waste and Materials Management sector tabs within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	John Carter (ERG); Corina Gomez (NMED)	9/6/2025 (initial); 10/27/2025 (final)	- check GWP used for consistency - verify potential cost savings - link measure-specific GHG reduction estimates to source data - verify assumptions for early landfill gas collection effectiveness - emission reductions associated with refrigerants need to be reported separately since refrigerants are not part of the GHG inventory - confirm assumptions related to measure WM-1	Yes	Chad Spreadbury (ERG)	John Carter John Carter (ERG) Digitally signed by John Carter Date: 2026.08.03 15:47:18 -04'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final
07	NM CCAP_Emissions Redux Analysis_for v2 report_10-28-25.xlsx	Economy-wide tab within the Excel file containing supporting calculations for projected reductions of GHG and other pollutant emissions	10/28/2025		X	ERG	Technical	John Carter and Evan Fago (ERG); Mark Edwards (NMED)	9/22/2025 (intial); 10/27/2025 (final)	- Need to ensure calculations do not result in double-counting of emission reductions - Consider expanding scope of this measure to include all sectors of emissions included in the CA version of cap and invest	Yes	Charles Goff Digitally signed by Charles Goff Date: 2026.08.03 15:04:08 -05'00'	John Carter John Carter and Evan Fago (ERG) Digitally signed by John Carter Date: 2026.08.03 15:47:47 -04'00'	OneDrive - State of New Mexico\ENV-CCTF Staff Team - Documents\EPA ClimtPollutnReduct Grant\(3) CCAP\CCAP Final