



CLEAN AIR
TASK FORCE

Status of Coal Mine Methane in the United States

February 2023

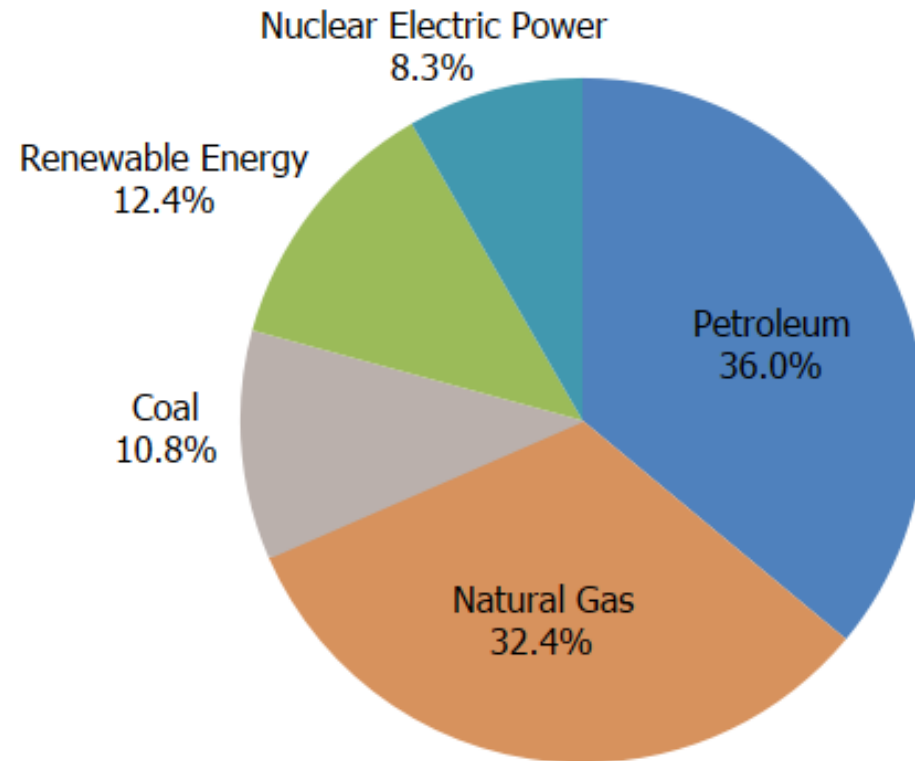
CATF: Who We Are

- Our mission: We push the change in technologies and policies needed to get to a zero-emissions, high-energy planet at an affordable cost for a world where **the energy needs of all people are met efficiently without damaging the atmosphere.**
- Founded in 1996 in the U.S., now present around the world.
- 150+ global staff from Berlin to Brazil, San Francisco to China, Mexico City to Abuja



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U.S. Energy Use by Energy Source (2021)

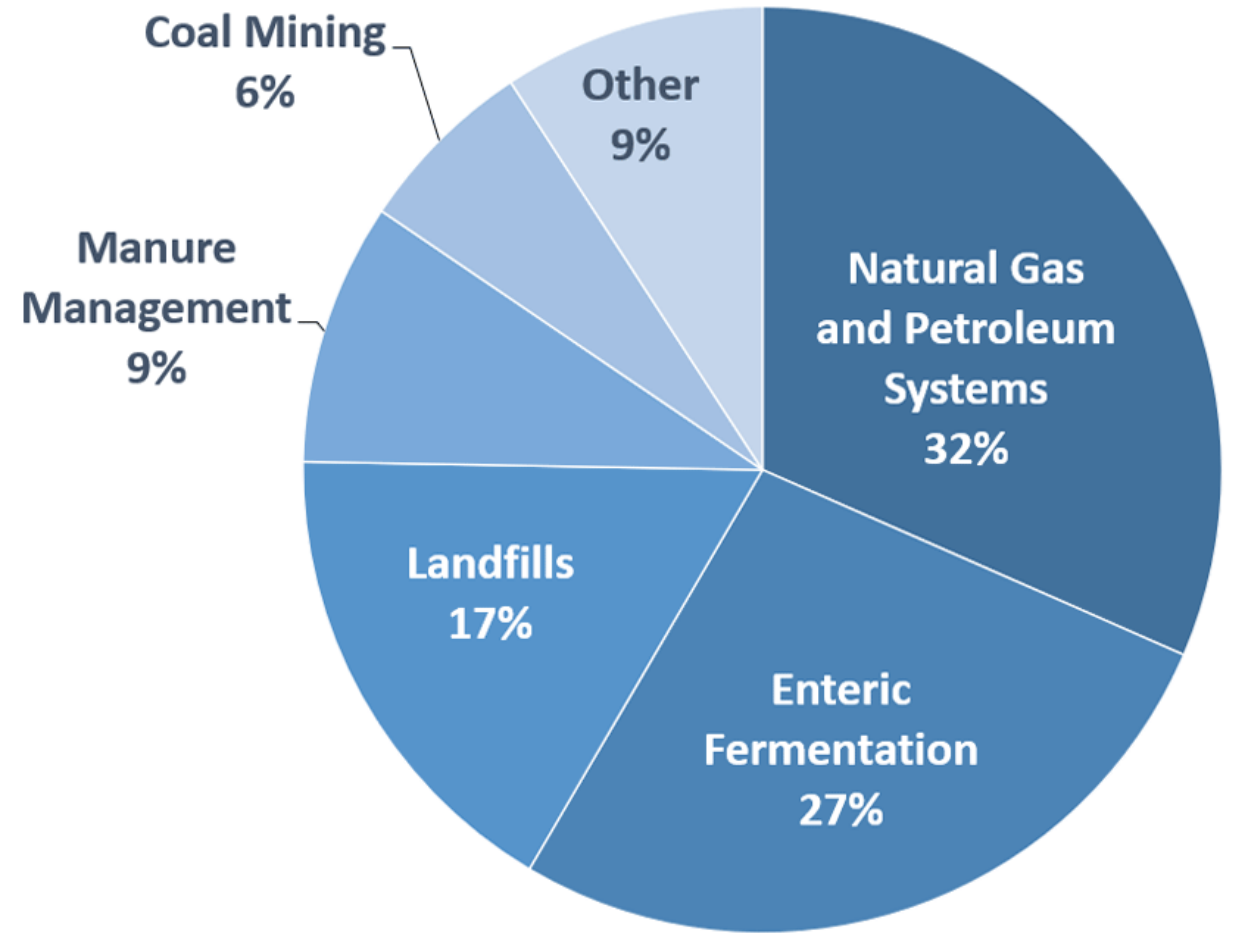


Source: <https://www.epa.gov/system/files/documents/2023-02/US-GHG-Inventory-2023-Chapter-3-Energy.pdf>

U.S. Methane Emissions

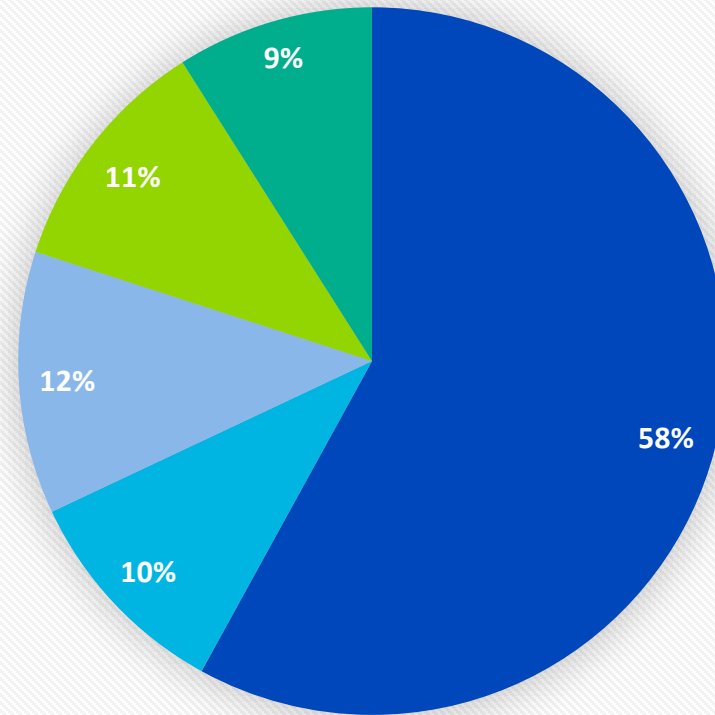
In 2020, methane (CH₄) accounted for roughly 11% of all U.S. greenhouse gas emissions from human activities.

2020 U.S. Methane Emissions, By Source



U.S. CMM Emissions (2019)

Net CMM Emissions (CMM vented minus CMM used)



■ VAM ■ Post-mining ■ Surface mines ■ Abandoned mines ■ Drained gas ■

Source: *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2020*

Recent U.S. Coal Sector Trends

- U.S. coal consumption decreased by 19% in 2020, but projected to increase in 2021
- Number of producing coal mines in the U.S. decreased to 546 mines in 2020 (146 underground mines, 350 surface)
- Methane emissions from coal mines (U.S. EPA estimates, 2020):
 - Active underground: 31.4 MMTCO₂e
 - Abandoned underground: 8.4 MMTCO₂e
- In 2020, CMM projects avoided 15.4 MMTCO₂e in methane emissions from active mines, and 2.6 MMTCO₂e in methane emissions at abandoned mines
- As of October 2021, 23 CMM projects at 15 active coal mines, 32 AMM projects at 60 abandoned mines

Federal Policy...or lack thereof

- **No regulations requiring mitigation of methane emissions from U.S. coal mines**
- In June 2010, environmental groups petitioned the U.S. Environmental Protection Agency (EPA) to make a finding that air emissions from coal mines endangered public health and welfare, and to thereby list coal mines as a stationary-source category under Section 111 of the Clean Air Act.
- Petition also requested the EPA to adopt strict limits on other dangerous air pollutants released from coal mines, ***including methane***, as well as particulate matter, nitrogen oxide gases, and volatile organic compounds — all toxic air pollutants under the Clean Air Act
- EPA denied the petition in April of 2013 due to “limited resources and ongoing budget uncertainties” – not a determination of whether emissions from coal mines endanger public health but that the agency wasn’t going to determine that at that time.

Regulatory Barriers to U.S. CMM Mitigation Projects

- Lack of regulatory policy requiring or encouraging CMM to be used or destroyed
- On Federal lands (much of western U.S.), federal government owns mineral leases (coal, oil, and gas)
- Oil & gas estates are separate from coal estate, so the right to use CMM is not automatically granted to the coal mine and can require additional permitting and royalty obligations
- Permitting rules can be complicated as wellbores and gas gathering systems can be located on or near public lands and can vary from state-to-state
- Extensive coal bed methane production and surface mining co-exist in Wyoming's Powder River Basin and other western coal basins, creating conflicts
- On private lands, ownership of coal seam gas depends on laws of each state
 - Several states have enacted legislation to clarify ownership
 - In general, the coal mine has the right to the gas
 - Many disputes are resolved through legal challenges and negotiations

Support for CMM Mitigation in the U.S.

- According to the U.S. Methane Emissions Reduction Action Plan 2022 update, abandoned coal mines are estimated to emit 237,000 metric tons of methane annually -- Bipartisan Infrastructure Law appropriated more than \$11 billion to eligible states and Tribes to reclaim abandoned coal mines over 15 years to help eliminate methane pollution.
- Current administration also extended the Abandoned Mine Land (AML) grant program, which supports both land reclamation and local economic development in former mining communities.
- Biden Harris administration's Greenhouse Gas Monitoring & Measurement Interagency Working Group: CMM is one of the focus areas - specifically, monitoring CMM emissions in an integrated fashion.

Support for CMM Mitigation in the U.S. (cont.)

- Advanced Research Projects Agency-Energy (ARPA-E) REMEDY (Reducing Emissions of Methane Every Day of the Year) program is a three-year, \$35 million research program to reduce methane emissions from the oil, gas, and coal value chains
 - 3 of the 12 projects focus on methane from coal mine shafts:
 - Johnson Matthey, Inc. (Wayne, PA) is developing new technology, which uses a noble metal catalyst to combust the dilute methane in coal mine ventilation systems. (\$4,346,015)
 - Massachusetts Institute of Technology (Cambridge, MA) is developing a low-cost copper-based catalyst for reducing methane emissions. (\$2,020,903)
 - Precision Combustion, Inc. (North Haven, CT) proposes an innovative modular system that promotes methane reaction and manages thermal loads in a novel reactor design. (\$3,720,317)
- CMM is included in state-level renewable/alternative energy portfolio standards in Colorado, Indiana, Ohio Pennsylvania and Utah.
- Voluntary carbon markets help improve cash flow projects: California's Air Resources Board, Climate Action Reserve, American Carbon Registry, Verra.

Additional Food for Thought

- Federal Cap-and-trade regulations, with CMM as a covered source under the cap
- Reinstate the Bureau of Land Management (BLM) Waste Mine Methane Policy
- Amendments to existing legislation
- Additional funding under the REMEDY program
- And of course.....overarching federal legislation mitigating mine methane emissions



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