

COAL STUDIES BOTTOM-UP GLOBAL COORDINATION



Measuring coal mine emissions to improve global inventories and enable mitigation.



DONOR:
European Commission



**BENEFITTING COUNTRIES
OR REGIONS:**
Worldwide



SECTOR:
Coal



Subsector, if applicable:
-

STATUS:
Measurement campaign ongoing

TIMELINE:
Measurements 2024 to 2025



**IMEO SCIENCE
OBJECTIVE:**

→ **Advance reconciliation and data integration approaches for multi-scale emissions data.**



© ADP University



KEY FINDINGS

Results will assess approaches for estimating coal mine methane emissions across mine-based measurements, inventory calculations (UNFCCC) and satellite quantifications.

RATIONALE

Coal mining is a significant source of global methane emissions. Accurate data on the sector's emissions is needed to track climate impact, target mitigation and assess progress. However, current inventories which apply generic emissions factors don't align with available measurement data – signaling uncertainty that needs to be resolved. This requires validating approaches for measuring coal mine methane emissions.

Ventilation shafts are a major source of coal mine emissions able to be observed by satellites, in addition to other airborne and ground-based methods and in-mine safety sensors. This offers a unique opportunity to compare data across these measurement techniques to validate their effectiveness and assess the best approaches for deployment.



RELATED PUBLICATIONS

In progress



SIGNIFICANCE FOR DECISIONMAKERS

For policymakers: Validating empirical measurement methods will enable more accurate inventories of coal sector methane emissions. More accurate inventories are needed to define the magnitude of emissions from the various economic sectors, enable comparison between processes or activities that can be considered as emission sources, and provide the foundational information for designing mitigation actions. Inventories backed by empirical data are needed to accurately report emissions and track reduction targets.

For industry: Improved quality of emissions estimates will enable coal producers, buyers, and importers to assess greenhouse gas intensity. This is particularly relevant for the iron and steel industry, which consumes metallurgical coal associated with higher methane emissions than thermal coal used for power generation. Accurate quantification of methane emissions will also enable more thorough lifecycle analysis of products' greenhouse gas emissions.



CATALYZING ACTION

Study aims and potential insights that can be used to better understand emissions have been shared with facility operators. Methods and preliminary insights have been shared with the Australian Department of Climate Change, Energy, the Environment and Water to aid ongoing efforts to ensure accurate reporting of emissions.



STUDY APPROACH/ACTIVITIES

In-mine safety sensor data will be used to estimate emissions from mines throughout Poland's Upper Silesia Basin. Building upon prior research in Poland, a state-of-the-art spectrometer (TDLAS system) will measure emissions from one coal mine for a year. This data will be contrasted with in-mine safety sensor data to define data quality and provide a benchmark for satellite-based quantifications. A comparison of emission estimates from safety sensor data and production-based inventory calculations will be made at several different mines.

Furthermore, safety sensor estimates will be compared satellite quantifications in Poland through the Methane Alert and Response System metcoal pilot project conducted by UNEP's IMEO. Similar comparisons will be made at other mines around the world where in-mine measurements can be accessed.

Through these activities, the best approaches for estimating coal mine methane emissions will be considered in the context of mine-based measurements, inventory calculations (UNFCCC) and satellite quantifications. This global coordination approach aims to build the best quality, fine temporal resolution, bottom-up data to support validation of inventory estimates through top-down methods. Such data will refine our understanding of the quality of emission estimates of coal mines using satellite platforms.

OTHER SUPPORTERS/STAKEHOLDERS

Principal Investigator: **Utrecht AGH University of Science and Technology, Poland**

Revision History: **29 October 2024**

The UN Environment Programme's International Methane Emissions Observatory (IMEO) exists to provide open, reliable, and actionable data to the individuals with the agency to reduce methane emissions. IMEO does this by integrating and reconciling data across sources, including its global methane science studies. IMEO supports measurement and research studies around the world to close the knowledge gap on methane emissions and provide policy-relevant insights to decisionmakers.