AUSTRALIA
BOWEN BASIN PILOT

Confirming feasibility of airborne methods to quantify coal mine methane as satellite data indicates Bowen Basin emissions are higher than national inventories report.

DONOR:
European Commission

BENEFITTING COUNTRIES OR REGIONS:
Australia

SECTOR:
Coal

Subsector, if applicable:
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STATUS:
Analysis ongoing

TIMELINE:
Measurements 2022

IMEO SCIENCE OBJECTIVE:

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

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KEY FINDINGS

Determining whether the airborne mass balance approach can be successfully applied to accurately quantify methane emissions from open pit coal mines.

RATIONALE

Australia is the world's fifth largest coal producer and second largest exporter. Understanding the scale and location of its coal sector emissions is needed to assess total climate impact, target mitigation, and track progress. This pilot study aims to determine the feasibility of the aircraft mass balance approach for estimating emissions from large surface mines in Australia's Bowen Basin. Validating this approach is an important step for assessing the accuracy of emissions estimates from satellite and inventory methods in the coal sector. Satellite studies indicate that coal mine methane emissions in Queensland's Bowen Basin are many times higher than emission inventories suggest. Meanwhile, the International Energy Agency's 2023 Global Methane Tracker indicates Australia's coal mine emissions reported through the United Nations Framework Convention on Climate Change may be underreported by 82 per cent.

UN environment programme

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.

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STUDY APPROACH/ACTIVITIES

The research team selected the Bowen Basin as their study area based on satellite studies that showed it to be area with high emissions that could not be explained through an analysis of inventory data. In addition, the region is a major coal producing area that lacks other methane sources that could interfere with atmospheric quantification. The team then identified four suitable open pit mines and conducted five flights to determine the feasibility of applying the mass balance approach to measure and quantify methane emissions from coal mines in the Bowen Basin. This method consists in contrasting upwind and downwind methane levels and applying wind field data to quantify total emissions from the coal mines.

CATALYZING ACTION

The Inventory, Reporting, and Engagement Team of the National and International Reporting Branch of the Emissions Reduction Division of the Australian Department of Climate Change, Energy, Environment, and Water were informed about the study. The results from this study will guide discussions on the definition of emissions from coal mines, whether the data comes from inventories or from other measurement- based approaches. It will also provide new methods for independent validation. In addition, mining companies are likely to be able to better estimate emissions.

OTHER SUPPORTERS/STAKEHOLDERS

Principal Investigator: **Airborne Research Australia**
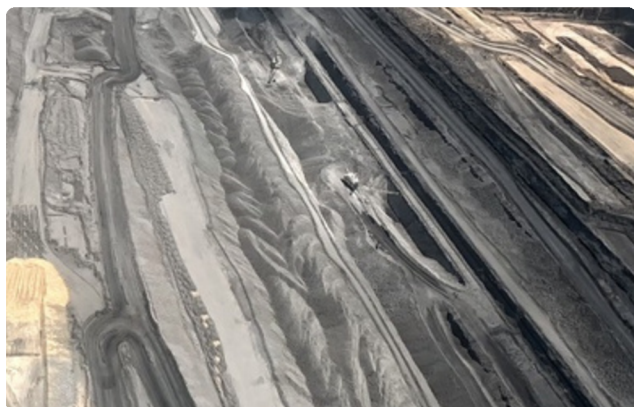
Revision History: **16 August 2024**

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.

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