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Gas Industry Social and Environmental Research Alliance

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GREENHOUSE GAS FOOTPRINT FACTSHEET

Methane emissions in the Northern Territory's Beetaloo Sub-basin

How much background methane is being emitted, and from where?

Before any shale gas exploration is approved, this project will measure baseline methane emissions from natural and human-derived sources in the Beetaloo Sub-basin. The results will inform the community, the Northern Territory (NT) Government and the gas industry.

The Beetaloo Sub-basin

The Beetaloo Sub-basin lies south-east of Katherine, spanning an area of about 30,000 square kilometres. One of the most prospective areas for shale gas in Australia, it contains an estimated prospective resource of 178,200 petajoules (PJ) of gas.

KEY POINTS

Fires, cattle, termites, wetlands, natural geological seeps, water bores and existing mineral and petroleum wells can all emit methane into the atmosphere. These are called background emissions.

- This project will conduct mobile surveys to measure background methane emissions in the central part of the Beetaloo Sub-basin in the wet, dry and fire seasons.
- Having this baseline of methane emissions enables additional emissions from future industries, such as shale gas, to be identified and quantified.
- The results will be available in March 2019.
- This project is the first of a suite of projects that will provide an inventory and develop a monitoring method for emissions more widely in the basin.

Community concerns

The recent Scientific Inquiry into Hydraulic Fracturing in the Northern Territory highlighted community concerns about the potential of the onshore gas industry to release methane into the atmosphere. Without a comprehensive baseline of existing background emissions, any potential emissions from gas developments ('fugitive emissions') would not be quantifiable.

The inquiry also states that the NT Government must have completed at least six months of monitoring of 'background' methane emissions before approving any onshore gas exploration activity.

What are 'background' emissions?

Fires, cattle, termites, wetlands and natural geological seeps can all emit methane into the atmosphere. They are natural sources of emissions.

Water bores and existing mineral and petroleum wells can also emit methane. These are anthropogenic or human-derived sources of methane.

'Background emissions' is the collective term for both natural and existing human-derived emissions.

Objectives of this project

Between July 2018 and March 2019, researchers will collect as much data as possible on background methane emissions in the central region of the Beetaloo Sub-basin. This project is the first stage of a comprehensive methane monitoring project that will collect data for a larger area of the basin.

The project will also investigate fluxes and identify sources where methane levels are high.

Emissions can vary depending on the source

Methane sources vary in both their area and amount (flux) of methane they emit. This variation alters the concentration of methane in the atmosphere nearby these sources. Some methane emissions vary with seasons and others are continuous. Water bores and mineral and exploration wells are likely to continually emit low fluxes of methane over small areas. Fires, on the other hand, are likely to emit large fluxes of methane over large areas during the late dry season. Natural geological seepages may be confined to defined areas and emit continuous small fluxes of methane.

CSIRO | Australia Pacific LNG | QGC | origin | Santos | NSW Government | Australian Government Department of Industry, Innovation and Science | Supported by Government of South Australia | Queensland Government | Northern Territory Government

How will methane emissions be measured?

Mobile surveying will initially be used to gather the data. With this method, a state-of-the-art methane gas analyser mounted on a 4WD vehicle will continuously measure the existing methane concentration as the vehicle is driven across the landscape. Gas analysers can reliably detect very small concentrations of methane (1 part per billion (ppb)).

Measuring in the dry, fire and wet seasons

To capture the variability in emissions, three mobile surveys of 10–14 days duration will be conducted:

- Dry season: Jul – Aug 2018
- Fire season: Sep – Oct 2018
- Wet season: Dec 2018 – Jan 2019.

For each survey, up to 2000 km of trafficable roads/track will be covered by vehicle and up to 50 known sources (eg. water bores) will be surveyed.

During the wet season, access is likely to be limited and the focus will be on monitoring broad scale natural emissions from the landscape.

Mapping methane sources, concentrations and fluxes

This project will combine concentration data from the surveys with spatial and meteorological data to produce detailed maps of methane concentration.

Methane concentration is a measure of the abundance of methane in the air, usually defined as the proportion of the total volume (e.g. parts per million or billion). Flux is defined as the rate of flow of gas per unit time (grams/second). The flux of methane from sources such as production wells can be estimated by the measurement of methane concentrations in the air around the wells and simultaneously measured meteorological data to infer plume dispersion from the source. Both concentration and flux measurements are required to be able to provide baseline levels of methane and quantify the natural and anthropogenic methane emissions, where these background emissions are occurring and how much methane is being released to the atmosphere.

Methane measurements using mobile survey technology started in August 2018

FREQUENTLY ASKED QUESTIONS

What is methane and where does it come from?

Methane, a colourless, odourless, non-toxic gas, comes from two sources:

- the decomposition of organic matter, such as in lakes, rivers, wetlands and soils, or
- from deep beneath the earth's surface where gaseous methane has formed geochemically under elevated temperature and pressure conditions.

Globally, it is estimated that more than 300 million tonnes (Mt) of methane is emitted each year from natural sources such as wetlands, soils, biomass burning and geological sources and another 330 Mt of methane is produced by human activities such as agriculture; mainly rice and beef production. However, large uncertainties remain in these estimates. Of the natural sources, about 16% is seeping naturally from sedimentary basins such as from coal seams and shale basins, rising from geological structures beneath the earth's surface. About 29% of human sources of methane emitted to the atmosphere arise from fossil fuel combustion. However, these estimates are still subject to significant uncertainty (CSIRO, What does science tell us about fugitive methane emissions from unconventional gas?, 2017). The Commonwealth Government estimates that fugitive emissions from natural gas production are about 2.5% (Commonwealth Government, 2014).

What is the impact of methane?

Methane is a greenhouse gas. It can absorb infra-red radiation from the earth and then radiates this heat back into the surrounding atmosphere, warming it. Methane is a more potent greenhouse gas than carbon dioxide.

Where can I find more information?

- Read more about the methane monitoring project
- Northern Territory Inquiry final report
- About the Beetaloo Sub-basin

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