



GREENHOUSE GAS – MAY 2021

GISERA | Gas Industry Social and Environmental Research Alliance

Methane emissions quantification of well drilling to completion processes in Beetaloo sub-basin

This project will measure methane emissions in processes from drilling through to completion of wells from unconventional shale petroleum exploration in the Beetaloo Sub-basin, Northern Territory. It will do this by conducting long-term continuous monitoring at well sites using specifically designed technology.

Key points

This project will quantify methane emissions by conducting long-term continuous monitoring at well sites using autonomous emission monitoring stations (AEMS) – automatic remote sensors.

AEMS have the benefit of enabling ongoing monitoring in an accurate and cost-effective manner.

The project will investigate the optimal number of AEMS needed to provide representative sampling of gas activities and infrastructure across the Beetaloo Sub-basin and elsewhere in the Northern Territory.

All monitoring results will be publicly available online on a continuous basis in real time.

Beetaloo Sub-basin

The Beetaloo Sub-basin lies southeast of Katherine in the Northern Territory and spans an area of about 30,000 square kilometres. One of the most promising areas for shale gas production in Australia, it contains an estimated resource of 178,200 petajoules (PJ) of gas. Two to five wells are expected to be constructed in the Sub-basin starting in the dry season in 2021 with potentially more in 2022.

Vital research

Community concerns about potential impacts of greenhouse gas emissions from gas industry operations were raised in submissions to the [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory](#).

This project seeks to address these concerns by providing evidence-based information on the magnitude of methane emissions potentially produced from a pre-drilling baseline through each stage of well drilling, including hydraulic fracturing, to completion and operation.

Research conducted in the USA indicates some operations may be a significant source of emissions. However, because the shale industry is new in Australia, there is no local/Australian data to verify this or quantify potential amounts of emissions.



Drawing on previous research

The project builds on a number of previous studies and uses statistical modelling methods together with emission source information from CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA) study '[Baseline measurement and monitoring of methane emissions in the Beetaloo Sub-basin](#)' (2019).

It uses the monitoring system deployed in the GISERA study '[Quantifying methane emissions from Queensland's coal seam gas producing Surat Basin using inventory data and a regional Bayesian inversion](#)' (2020).

The Northern Territory [Strategic Regional Environmental and Baseline Assessment](#) (SREBA) will be used to determine the optimal number and location of AEMS.

The technology

CSIRO developed the prototype mobile AEMS: off-the-grid, solar-powered and 'ruggedised' for the extreme outback environments to ensure stability of measurements.

AEMS will be deployed at two proposed well sites, placed downwind of the well at the predicted prevailing wind direction (based on Bureau of Meteorology climate data) to maximise emissions data capture.

The project will provide real-time online data for methane concentration, ethane concentration and associated weather information via a live link available from the GISERA website, addressing recommendation 9.5 of the Scientific Inquiry into Hydraulic Fracturing that all monitoring be publicly available online.

The project is generating interest

Industry operators have expressed strong interest in this project to address stakeholder concerns, understand emissions from well drilling and completion activities, and develop the potential for long-term continuous monitoring technology.

The Northern Territory Department of Environment, Parks and Water Security, and the Commonwealth Government Department of Industry, Science, Energy and Resources are also interested in the results.

This project addresses recommendation 9.4 of the NT Scientific Inquiry into Hydraulic Fracturing that baseline and ongoing monitoring be the responsibility of the regulator and funded by the gas industry.

The Federal and Northern Territory Governments, industry operators Santos, Origin, and Pangaea, and the CSIRO have provided funding for the project.

AEMS have broad potential

Mobile AEMS that can be readily re-used/redeployed are an ideal solution for short-term operations such as well drilling and completion activities.

The second part of this project will address longer term use; the number, location and optimal cost-effective configuration of the AEMS to enable effective monitoring of emissions over extended periods.

AEMS could also be used to measure emissions of other gases such as carbon monoxide, provide additional information related to bushfire emissions, and inform climate change and land management practices.



More information about:

[This project](#)

[Other GISERA research in the Northern Territory](#)

[Other GISERA research into greenhouse gas and air quality](#)

Further information | 1300 363 400 | gisera@gisera.org.au | gisera.csiro.au

GISERA is a collaboration between CSIRO, Commonwealth and state governments and industry established to undertake publicly-reported independent research. The purpose of GISERA is to provide quality assured scientific research and information to communities living in gas development regions focusing on social and environmental topics including: groundwater and surface water, greenhouse gas emissions, biodiversity, land management, the marine environment, and socio-economic impacts. The governance structure for GISERA is designed to provide for and protect research independence and transparency of research.