Australia's National
Science Agency

GISERA | Gas Industry Social and Environmental Research Alliance

Progress report

Methane emissions from CSG water holding ponds in Queensland

Australian Government Department of Industry, Science and Resources
NSW Government
Supported by Government of South Australia
Queensland Government
Northern Territory Government
origin
Australia Pacific LNG
QGC
Santos
tamboran Resources
Empire Energy

Progress against project milestones

Progress against milestones/tasks are approved by the GISERA Director, acting with authority in accordance with the GISERA Alliance Agreement.

Progress against project milestones/tasks is indicated by two methods: Traffic light reports and descriptive Project schedule reports.

1. Traffic light reports in the Project Schedule Table below show progress using a simple colour code:

- **Green**:
  - Milestone fully met according to schedule.
  - Project is expected to continue to deliver according to plan.
  - Milestone payment is approved.
- **Amber**:
  - Milestone largely met according to schedule.
  - Project has experienced delays or difficulties that will be overcome by next milestone, enabling project to return to delivery according to plan by next milestone.
  - Milestone payment is withheld.
  - Milestone payment withheld for second of two successive amber lights; project review initiated and undertaken by GISERA Director.
- **Red**:
  - Milestone not met according to schedule.
  - Problems in meeting milestone are likely to impact subsequent project delivery, such that revisions to project timing, scope or budget must be considered.
  - Milestone payment is withheld.
  - Project review initiated by GISERA Director.

2. Progress Schedule Reports outline task objectives and outputs and describe, in the 'progress report' section, the means and extent to which progress towards tasks has been made.

Project schedule table

TASK NUMBER	TASK DESCRIPTION	SCHEDULED START	SCHEDULED FINISH	COMMENT
1	Representative pond selection for survey of methane emissions	1 Aug 2023	30 July 2024	Completed
2	Sampling logistics and field campaign planning	1 Apl 2024	30 Sept 2024	Completed
3	Field trips I and II – Methane emissions measurement and water sampling	1 Nov 2024 and 1 May 2025	30 Nov 2024 and 31 May 2025	Completed
4	Coordination between CSG holding pond projects	1 Aug 2023	31 Dec 2025	
5	Project reporting	1 Aug 2023	31 Dec 2025	
6	Communicate findings to stakeholders	1 Aug 2023	31 Dec 2025	

Project schedule report

TASK 1: Representative pond selection for survey of methane emissions

BACKGROUND

The GISERA phase 1 project 'Methane contributions from CSG water holding ponds' literature review showed that CSG holding ponds are a potentially significant source of methane emissions, however, there is a high level of uncertainty as to the quantity of methane emitted from these holding ponds in Queensland. Identifying representative CSG holding ponds from the Surat Basin for evaluating the methane emissions is critical. Selection of representative ponds will be based on a number of criteria including accessibility, type of held water, pond size, water chemistry, and location.

TASK OBJECTIVES

This task is to identify the representative CSG holding ponds from the Surat Basin for future evaluation of ebullitive methane emissions and dissolved methane concentrations in the field campaign. The project team will liaise with CSG companies operating in the Surat Basin to obtain information on the properties and accessibility of the CSG ponds. Dependent on accessibility, the pond selection will cover both produced water ponds and brine ponds, attempting to encompass the range of properties such as location, pond size and water chemistry represented in CSG ponds across the Surat Basin.

1. Liaise with representatives from CSG companies to assist with pond selection and further sampling campaign.
2. Select representative CSG holding ponds in the Surat Basin based on accessibility, type of held water, pond size, water chemistry, and location.
3. Identify the requirements for permission to access and sample the selected ponds.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

Identify up to twenty CSG holding ponds in the Surat Basin for direct methane emission measurements and produce a document describing contacts, sampling site accessibility and relevant permission requirements.

PROGRESS REPORT

This milestone is completed.

The project team, in discussion with two of the major gas operators in the Surat Basin have identified 16 ponds that will be available for undertaking evaluation of methane emissions during the field trips in late 2024 and 2025. The ponds include a range of in-field produced water holding ponds, treatment plant feeder ponds, effluent ponds, and brine ponds. The project team visited the ponds where they have evaluated sampling site accessibility, and with the relevant operators have identified permissions required for the field work.

TASK 2: Sampling logistics and field campaign planning

BACKGROUND

During this task, the project team will consult with representatives from CSG companies in Queensland to prepare for sampling water and measuring emissions from the selected CSG holding ponds in the Surat Basin (selected in Task 1), and develop safe, environmentally sensitive planning and logistics for the sampling campaign.

This task will also ensure that sampling methods will be able to be practicably carried out in the field for accurately measuring methane flux from holding ponds.

TASK OBJECTIVES

1. Consult with CSG companies' representative for guidance of the sampling campaign.
2. Establish sampling requirement, e.g., locations, volume, number.
3. Prepare for remote sampling fieldwork including accommodation, vehicle hire and HSE considerations.
4. Establish logistics of transporting equipment and samples between CSIRO laboratory in Sydney and collection sites in Queensland.
5. Detail the analytical requirements from external laboratories.
6. Undertake necessary commissioning and calibration of measurement equipment for use in the field campaign.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

This task will yield a series of documents describing sampling equipment, sampling details, analysis plan, field trip details and HSE considerations.

PROGRESS REPORT

This milestone is completed.

CSIRO staff have continued to meet with representatives from 3 CSG companies operating water treatment ponds in the Surat Basin. The requirements for sampling, including pond types and locations, sampling procedure requirements, HSE considerations and timeframes have been established. The dates for field sampling have been set with the operators. The required analysis from external laboratories for water samples has been documented. The remote-operated flux chamber measurement equipment has been constructed and the commissioning program is currently underway prior to the field campaign.

TASK 3: Field trips I and II – Methane emissions measurement and water sampling

BACKGROUND

The GISERA phase 1 project 'Methane contributions from CSG water holding ponds' literature review showed that methane emissions are temperature dependent, especially ebullitive methane emissions. This task will investigate the emissions from the selected CSG holding ponds in both winter (June 2024 - July 2024) and summer (December 2024 - January 2025). This task will involve two or three staff travelling to Queensland with the purpose of measuring emissions from the selected CSG holding ponds in the Surat Basin. Additionally, water samples will be collected for chemical analyses and FLIR camera detection of methane will be undertaken at each holding pond to assess hotspots of methane emissions.

TASK OBJECTIVES

1. Continuous monitoring of methane emissions flux from the holding pond using a floating chamber deployed onto the surface of the pond.
2. Collect water samples for dissolved gas analysis by a commercial laboratory.
3. Collect water samples for water chemistry analysis by a commercial laboratory.
4. Relevant environmental parameter measurements (e.g., water temperature and air temperature) during sampling.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

This task aims to investigate methane emissions from CSG holding ponds in winter and summer. The project team will measure methane emissions flux from all selected holding ponds using CRDS and collect water samples for measuring dissolved gas and water chemistry analyses. Additionally, environmental parameters will by recorded during sampling and FLIR camera detection of methane will be undertaken at each holding pond to assess potential existence of hotspots of methane emissions.

PROGRESS REPORT

This milestone is completed.

Field Trip I: Field trip one has completed measurement of methane flux, as well as other relevant environmental parameters at 10 CSG water holding ponds, working with two CSG companies in the Surat Basin. In addition, water samples have been collected at the 10 ponds and analysed for dissolved methane and general water chemistry by a commercial laboratory. Further measurements were taken in January 2025 at ponds operated by a third CSG company.

Field Trip II: Field trip two (the winter sampling campaign) was confirmed in collaboration with the three CSG companies visited during field trip one. Scheduling requirements at the pond facilities impacted the timing of the second campaign, which was conducted between 25 July and 3 August 2025. The team were able to sample the identical pond locations as field trip one. This provided the final field measurements and sampling required for the project.

TASK 4: Coordination between CSG holding pond projects

BACKGROUND

The focus of this phase 2 project is on comprehensively surveying CSG holding ponds through direct measurement of methane emissions. The results from the first round of fieldwork (Task 3 Field trip I) from this project will be used to guide selection of holding ponds for examination in the other phase 2 project coming out of GISERA phase 1 project 'Methane contributions from CSG water holding ponds'. This other phase 2 project 'Key controls, and contributors, to emissions from CSG holding ponds' aims to fill knowledge gaps around microbial communities, microalgal growth, carbon particulates and organic carbon content associated with methane emissions from holding ponds. The project leaders of these two phase 2 projects will work closely and communicate with each other on pond selection, sampling plan and analyses.

TASK OBJECTIVES

To ensure coordination between the phase 2 projects coming out of GISERA phase 1 project.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

The project leaders of the two phase 2 pond emissions projects work closely to communicate project findings with the aims to reduce the uncertainties around measured emissions from CSG holding ponds in the Surat Basin, and fill knowledge gaps associated with potential methane emissions from CSG holding ponds.

PROGRESS REPORT

This task will be completed in December 2025.

TASK 5: Project reporting

BACKGROUND

Information from this project is to be made publicly available after completion of standard CSIRO publication and review processes.

TASK OBJECTIVES

To ensure that the information generated by this project is documented and published after thorough CSIRO internal review.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

1. Provide 6 monthly progress updates to GISERA office.
2. Preparation of a final report outlining the scope, methodology and findings;
3. Following CSIRO Internal review, the report will be submitted to the GISERA Director for final approval; and

PROGRESS REPORT

This task will be completed in December 2025.

TASK 6: Communicate findings to stakeholders

BACKGROUND

Communication of GISERA's research is an important component of all research projects. The dissemination of project objectives, key findings and deliverables to relevant and diverse audiences allows discourse and decision making within and across multiple stakeholder groups.

TASK OBJECTIVES

Communicate findings to stakeholders through meetings, a Knowledge Transfer Session, fact sheets, project reports and journal article/s, in collaboration with the GISERA Communication team.

TASK OUTPUTS AND SPECIFIC DELIVERABLES

Communicate results to GISERA stakeholders according to standard GISERA project procedures, which will include:

1. Presentation and workshop (held in conjunction with the other phase 2 project workshops) with local government and community groups to convey the knowledge gaps discovered in GISERA phase 1 project 'Methane contributions from CSG water holding ponds' and the commencement of the two subsequent phase 2 emissions projects.
2. Knowledge Transfer Session with relevant government/ gas industry representatives.
3. Presentation of findings to community members/groups with a community workshop held in Chinchilla to communicate project outcomes (September-October 2025).

4. Two project fact sheets: one developed at the commencement of the project, and another that will include peer-reviewed results and implications at completion of the project. Both will be hosted on the GISERA website.
5. Project reporting.
6. Preparation of an article for the GISERA newsletter.
7. Peer-reviewed scientific manuscript ready for submission to relevant journal (optional).

PROGRESS REPORT

This task will be completed in December 2025.

Variations to Project Order

Changes to research Project Orders are approved by the GISERA Director, acting with authority, in accordance with the GISERA Alliance Agreement. Any variations above the GISERA Director's delegation require the approval of the relevant GISERA Research Advisory Committee.

The table below details variations to research Project Order.

Register of changes to Research Project Order

DATE	ISSUE	ACTION	AUTHORISATION
05/06/2024	Due to lack of data from existing measurements from CSG ponds, the G11 project now aims to take flux measurements on up to 20 ponds in two separate fieldtrips (summer and winter). This requirement affects the planned timeline for G11.	Milestone 1 delivery date extended from 30 April 2024 to 30 July 2024 Milestone 2 delivery date extended from 30 June 2024 to 30 Sept 2024 Milestones 3 start date extended from 1 June 2024 and 31 Dec 2024 to 1 July 2024 and 31 Jan 2025. Milestones 4, 5 and 6 delivery dates extended from 30 Oct 2025 to 31 Dec 2025.	

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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.