



Australia's National
Science Agency

GISERA | Gas Industry Social and Environmental Research Alliance

Progress report

Offsets for Life Cycle Greenhouse Gas Emissions of Onshore
Gas in the Northern Territory



QGC



Santos



Australian Government
Department of Industry, Science,
Energy and Resources



Supported by
**Government of
South Australia**



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
1.1	Review of reports and literature and consultation with stakeholders	13/07/2020	31/08/2020	
1.2	Define physical and conceptual scope and report	13/07/2020	31/08/2020	
2	Develop production scenarios	14/08/2020	30/09/2020	
3	LCA of production scenarios	01/10/2020	01/05/2021	
4	Identify, quantify offset options	05/01/2021	31/08/2021	
5	Synthesize Production Scenarios and Offsets	05/01/2021	31/08/2021	
6	Report writing, review, Final Report	01/07/2021	10/12/2021	

Project schedule report

TASK 1.1: Review of reports and literature and consultation with stakeholders

BACKGROUND

It is important to consult with government, industry and other stakeholders to obtain perspective and understand the material issues of the onshore gas proposal in the Northern Territory. There will also be a review of the recent (last 5 years) peer-reviewed literature regarding onshore gas and GHG emissions.

TASK OBJECTIVES

A knowledge base from peer-reviewed literature, expert submissions and industry to inform the scoping of the project and development of production scenarios

TASK OUTPUTS AND SPECIFIC DELIVERABLES:

Series of workshops or online meetings with stakeholders and a literature review.

PROGRESS REPORT

This milestone is 100% complete.

A literature review has been completed and forms the Background section to the scoping report. Desktop review completed of: carbon capture and storage (CCS) experience, globally; current practice in Australia and; identified maps of suitable storage basins close to potential NT onshore gas extraction.

Material is also available through shared files and notes on the project MS Teams site set up expressly for interactions and sharing information.

We have reviewed submissions to the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (2018), specifically from: Origin Ltd.; Santos Ltd; Pangaea Resources Pty Ltd; Geoscience Australia; The Australia Institute; and Climate Council.

An initial consultation with senior officers from the Northern Territory Government (NTG) on the 31st July 2020 led to contact information for the Northern Land Council and high-level representatives of other Land Council, and the Indigenous Carbon Industry Network (ICIN). Before we could contact these and other stakeholders (especially Indigenous stakeholders), the project was required to obtain ethics clearance – this was obtained on 28th August 2020 (see also Task 1.2).

Among the stakeholders and experts consulted for this Task were representatives from:

- Senior Officers from NT Government
- Indigenous Carbon Industry Network
- Tiwi Land Council
- Northern Land Council
- Fenner School of Environment and Society, ANU
- Origin Energy Ltd
- Chair in Chemical Engineering at the University of Texas and author of a series of resources on best practice for onshore shale gas (<https://methaneguidingprinciples.org/>)
- Watson Institute for International & Public Affairs, Brown University, Providence, Rhode Island.
- CSIRO Hydrogen Mission
- CSIRO – land-based carbon sequestration
- CSIRO and Science Director National Geosequestration Laboratory
- CSIRO Land and Water principal economist – advice on offset markets

Further consultations are planned as the scoping of the project (see Task 1.2) is ongoing although there is enough technical definition to commence discussions (and sub-contracting) on Task 2 and 3.

TASK 1.2: Define physical and conceptual scope and report

BACKGROUND

This task includes scoping of the scale and duration of upstream and downstream activity and likely logistics regarding the particular geology and geography of the NT onshore gas project.

TASK OBJECTIVES

Having consensus on the bounds of the project distributes ownership of the scope (and implications) beyond the research team to include multiple stakeholders

TASK OUTPUTS AND SPECIFIC DELIVERABLES

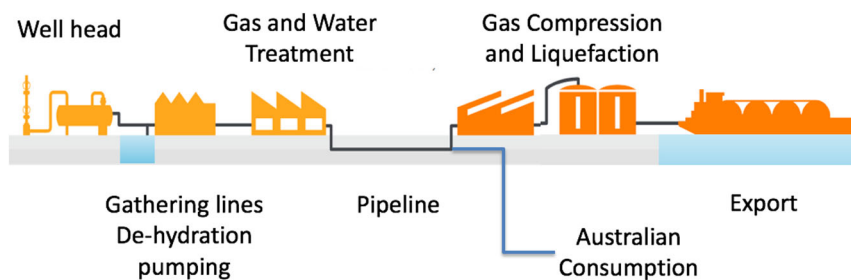
A scoping report outlining agreed terms of reference and parameters of the study in the context of local and international knowledge on GHG emissions from onshore gas.

PROGRESS REPORT

This milestone is 100% complete.

- Scope defined
- Report draft circulated
- Verbal agreement on scope of LCA

The scope of the research has been defined: including the upstream extraction of dry gas and any processing; the downstream compression and liquefaction stages; other stages leading up to export; and shipping. Explicitly excluded are the stages of re-gasification, distribution and consumption overseas – see figure below. The duration of the gas development has been set at 25-30 years.



A draft scoping report has been circulated to some stakeholders and, responding to the initial delays of the project, the scenarios of scale of gas production (Task 3) are being discussed concurrently. We are awaiting feedback from industry.

The outcome we are seeking in these two early milestones are awareness and consensus on: the purpose of the project; terms of reference and any priority research questions for stakeholders. We have contacted ICIN and NLC and are sharing the draft Scoping Report. This is necessarily not the final scoping report as it awaits feedback from these stakeholders in an intentionally iterative process.

This part of the project is intended to be finalised well before a proposed 1st TRG meeting on the 21st October 2020. Since the commencement of the project one member of the NT Senior Officers group and one member of the TRG have discontinued participation. We are actively seeking to backfill these positions, and this includes seeking expert advice on shale gas from academics in North America.

TASK 2: Develop production scenarios

BACKGROUND

Working with industry, government and using the knowledge base of Task 1.1, these production scenarios are the main input assumptions that set the scope and scale of GHG emissions

TASK OBJECTIVES

Credible production scenarios that represent the specific conditions of the Beetaloo Sub-basin and industry commitments to mitigation practices over the life time of the hypothetical development

TASK OUTPUTS AND SPECIFIC DELIVERABLES

A dataset of technical scenarios that quantify levels of production from the Beetaloo Sub-basin, and any mitigation actions or practices that industry can reasonably commit to.

PROGRESS REPORT

We have talked to industry about an initial appraisal of scale and features of gas development in the Beetaloo Basin. Subsequent to the Scoping Report, and the background information it contains, we proceeded with a set of indicative development scenarios formulated around assumptions available in earlier work by ACIL Allen <https://frackinginquiry.nt.gov.au/inquiry-reports?a=456790>. These were also the scenarios used in the Scientific Inquiry into Fracking in the Northern Territory (2018).

A core group of Northern Territory Government Senior Officers were invited to review these production scenarios and we also contacted Aboriginal and Torres Strait Islander Land Councils that manage land-based offsets in Northern Australia, and the Indigenous Carbon Industry Network. On 24th November 2020, all stakeholders had the opportunity to review the scoping and provide feedback on all details including the production scenarios in a face-to-face roundtable held in Darwin. Further review was obtained from: the NT Department of Business Trade and Innovation; the project Technical Reference Group and; CSIRO Colleagues in Bio-regional Assessment <https://www.bioregionalassessments.gov.au/assessments/geological-and-bioregional-assessment-program/beetaloo-gba-region>. From CSIRO's Bio-regional Assessment we will also make use of common assumptions about the well pad land use/ servicing needs of infrastructure.

The consensus of industry, government and CSIRO researchers was that the "Gale Scenario" defined in the ACIL Allen submission with ~645 wells and 365PJ/year be chosen as the Baseline (minimum) scenario in this project. We will explore a few scenarios that diverge from that possibly up to 4,000 TJ/day but the main outcome of those will likely be the increase in emissions, and subsequently offsets, for LNG production for export. That is, we would be expecting < 200PJ/year domestic consumption in almost every production scenario. Otherwise, the cost of offsetting Australian emissions from consumption of NT gas would be prohibitive.

We understand there is potential for industrial chemical consumption of shale gas methane in the plans for industrial development in Darwin's Middle Arm. This suggests accompanying consumption scenarios for the non-combustion consumption of methane and/or industrial use coupled with geological CCS in the Petrel Basin. This was also raised as a genuine interest by industry attending the roundtable.

We have commenced Task 3 with the acknowledgement that there may be some variation to the scenarios if more information, or more reviews of our scope and assumptions come to hand.

TASK 3: LCA of production scenarios

BACKGROUND

This task is the key link between the production scenarios developed in Task 2 and the objective of surveying potential GHG offset options in Task 4

TASK OBJECTIVES

Adding to and updating data on life cycle assessment of GHG emissions from onshore gas production scenarios cognisant of potential mitigation actions by industry

TASK OUTPUTS AND SPECIFIC DELIVERABLES

Report and data detailing the life cycle GHG emissions of production scenarios from Beetaloo Sub-basin.

PROGRESS REPORT

This milestone is 100% complete.





- An LCA model was constructed, and a draft technical report was circulated by LifeCycles for review of assumptions by industry and the project team. Further feedback was sought on the core assumptions from the Technical Reference Group and the final deliverable incorporates that feedback.
- Although this task was delayed more than a month it was critical to have input assumptions that can be used consistently across the project and ones that will withstand a critical appraisal of the work.
- The LCA report is finished. To adhere to the ISO standards for Life Cycle Assessment, 3 independent reviewers are needed to review the work for sufficiency in scope, rigour and data transparency. As the delivery of the report (not its review) is the remaining milestone in the contract with LifeCycles, the final payment may be processed. We do not expect substantial revision to the main assumptions, modelling and results.
- The LCA modelling and analysis is now complete and the technical output feeds directly into Task 5 while we await any further refinements from the review process

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
11/06/2021	Delays incurred as the analysis required feedback and checking	Variation to milestone 3 approved from 1 Feb to 1 May 2021	
11/06/2021	Consequential delays from earlier task	Variation to milestone 4 approved from 31 March to 31 May	
16/07/2021	Due to availability of staff, the land-based offset component of the analysis required for task 4, will be conducted after the start of the financial year 2021/22	Variation to milestone 4 approved from 31 May to end August 2021	
16/07/2021	Delay in task 4 therefore impacts task 5.	Variation to milestone 5 approved from end June to end August 2021	

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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.