GISERA
Gas Industry Social and Environmental Research Alliance

Research progress to date

How much has been completed to date?

March 2020

Surface and groundwater

Current research projects are looking at maximising the amount of treated coal seam gas water that can be re-injected into aquifers.

Overall progress **82%**

100% GEOCHEMICAL RESPONSE TO RE-INJECTION – understand how treated coal seam gas water interacts with groundwater.

100% RE-INJECTION OF COAL SEAM GAS WATER– understand how to minimise clogging of re-injection wells.

100% HIGH PERFORMANCE GROUNDWATER MODELLING – determine the possibility of large scale re-injection programs.

100% GROUNDWATER BASELINE MONITORING– understand the origin and age of groundwater prior to and during initial stages of development.

100% HYRDOCARBONS IN GROUNDWATER, SURAT AND BOWN BASINS – assess the presence and source of hydrocarbons found in the Surat and Bowen basins.

100% CONSTRAINING WATER FLOWS IN THE SURAT BASIN – measuring and modelling specific chemicals called environmental tracers to gain a better understanding of the speed and direction of groundwater flow.

100% IMPACTS OF CSG DEPRESSURISATION ON THE GREAT ARTESIAN BASIN FLUX – improve the understanding of the GAB groundwater flow in the Pilliga region through integration of existing information from models, hydrochemical data and environmental tracers.

100% SPATIAL DESIGN OF GROUNDWATER MONITORING NETWORK IN THE NARRABRI GAS PROJECT AREA – analysis and design of groundwater bore networks for optimal groundwater monitoring and early detection of changes.

100% IMPROVING THE REPRESENTATION OF THE IMPACT OF CSG EXTRACTION IN GROUNDWATER FLOW MODELS FOR THE NAMOI REGION- develop more representative models for estimating the groundwater impacts from coal seam gas well fields.

100% GROUNDWATER CONTAMINATION RISK ASSESSMENT – analysing and designing optimal groundwater bore networks for groundwater monitoring will provide early detection of changes.

100% AIR, WATER AND SOIL IMPACTS OF HYDRAULIC FRACTURING– PHASE 1 - design an intensive monitoring campaign that will measure the air, water and soil impacts of hydraulic fracturing of production wells in the Surat Basin.

100% AIR, WATER AND SOIL IMPACTS OF HYDRAULIC FRACTURING, PHASE 2– involves undertaking a comprehensive monitoring campaign to measure the air, surface water groundwater and soil impacts of hydraulic fracturing of gas production wells in the Surat Basin, Queensland.

67% WATER CONTAMINATION: CAUSES, PATHWAYS AND RISKS- investigates potential groundwater contamination causes, pathways and vulnerability to understand onshore gas water quality impacts for south east South Australia.

80% GROUNDWATER BALANCE IN GAS DEVELOPMENT REGIONS OF SOUTH EAST SA- aims to improve groundwater balance models in the onshore gas development regions of south east South Australia.

100% MICROBIAL DEGRADATION OF CHEMICAL COMPOUNDS USED IN ONSHORE GAS PRODUCTION IN THE SE OF SOUTH AUSTRALIA- aims to provide information about which chemical compounds are degraded by microbes living in the soils and subsurface aquifers, and the impact.

80% BASELINE ASSESSMENT OF GROUNDWATER CHARACTERISTICS IN THE BEETALOO SUB-BASIN, NT- will sample and analyse groundwater in the Beetaloo Sub-basin, and create a set of baseline data against which any potential impacts caused by the gas industry can be measured. It will provide information about the baseline geochemistry and groundwater flow characteristics in the Cambrian Limestone Aquifer.

35% ENVIRONMENTAL MONITORING AND MICROBIAL DEGRADATION OF ONSHORE SHALE GAS ACTIVITY CHEMICALS AND FLUIDS, NT - To better understand how typical onshore gas chemicals bio-degrade in relevant aquifers and soil types in the northern Territory.

45% CHARACTERISATION OF THE STYGOFAUNA AND MICROBIAL ASSEMBLAGES OF THE BEETALOO SUB-BASIN, NT- This project aims to provide improved knowledge of stygofauna and subterranean groundwater dependent ecosystems in the Beetaloo Sub-Basin and Roper River system, in line with the Final Report of the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (2018).

20% ASSESSMENT OF FAULTS AS POTENTIAL CONNECTIVITY PATHWAYS - this study will assess the continuity and performance of aquitards separating shallow aquifers and coal seams within and near the proposed gas project development area south-west of Narrabri.

0% IMPROVED APPROACHES TO LONG-TERM MONITORING OF DECOMMISSIONED ONSHORE GAS WELLS - investigates options for long-term monitoring of well integrity in decommissioned onshore gas wells in the Northern Territory

Agricultural land management

Current research projects are designed to maximise agricultural productivity during and beyond the life of gas extraction on farms.

Overall progress **100%**

100% PRESERVING AGRICULTURAL PRODUCTIVITY – land use planning to help protect agricultural productivity.

100% SHARED SPACE– understand how farmers perceive and value coal seam gas developments on their and others' farms.

100% GAS FARM DESIGN – understand how to design farms for a new mixed land use.

100% MAKING TRACKS, TREADING CAREFULLY – understand the impacts of tracks and traffic on weeds and erosion in agricultural landscapes.

100% WITHOUT A TRACE – identify the nature and extent of damage to agricultural soils, and methods for improving soils.

100% TELLING THE STORY – share understanding of changes on farms and in towns during CSG development in the Surat area.

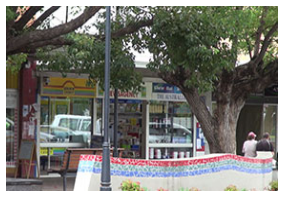
100% CSG AND LIVESTOCK- INSIDE THE HERD – monitoring grazing land with coal seam gas (CSG) infrastructure to better understand the impacts of CSG infrastructure, traffic and dust on animals and pastures.

100% GAS IMPACTS AND OPPORTUNITIE ON PRIMARY INDUSTRIES- analyse possible impacts and opportunities from gas development for rural areas in South Australia's south east.

Socio-economic

Current research projects are identifying what communities want and need to help inform and support changes occurring in coal seam gas development regions.

Overall progress **95%**



100% MONITORING REGIONAL TRANSITION – track and document the population and monetary changes occurring in coal seam gas development regions.

100% COMMUNITY FUNCTIONING AND WELL-BEING – understand what makes communities strong and how they respond to major developments.

100% UNDERSTANDING COMMUNITY ASPIRATIONS – understand how different sectors of the community see the future of their region.

100% ECONOMIC ASSESMENT AND FORECASTING – understand future impacts on regional economies and how local businesses can respond.

100% COMMUNITY FUNCTIONING AND WELL-BEING 2 – conduct a community well-being survey to measure the changes since the end of the construction and start of the operations phases and compare results with the Survey 1 in 2014.

100% SOCIAL BASELINE ASSESSMENT OF THE NARRABRI REGION OF NSW IN RELATION TO CSG DEVELOPMENT – understand and measure attitudes, perceptions and expectations that exist within the community with respect to CSG development, and current levels of community wellbeing and community resilience.

100% ANALYSING ECONOMIC AND DEMOGRAPHIC TRAJECTORIES IN NSW REGIONS EXPERIENCING CSG DEVELOPMENT AND OPERATIONS – identify current levels and trajectories of economic, social and demographic variables in CSG regions and analyse if the CSG industry could change the trajectories.

100% DECOMMISSIONING PATHWAYS FOR CSG PROJECTS – the project will review regulatory frameworks in relation to principles derived from international literature and consider social concerns with regard to decommissioning of wells and well pad infrastructure.

100% TRENDS IN COMMUNITY WELLBEING AND ATTITUDES TO CSG DEVELOPMENT- SURVEY 3- involves monitoring and communicating the changes and trends in community wellbeing, resilience and attitudes to CSG development across different phases of industry operation.

80% COMMUNITY WELL-BEING AND ATTITUDES TO CONVENTIONAL GAS DEVELOPMENT IN THE SOUTH EAST OF SOUTH AUSTRALIA-measure levels of perceived risk, benefits, knowledge, and other underlying drivers of trust and social acceptance of conventional gas development in SA's south east, and develop baseline data on community values, well-being and future expectations.

100% ASSESSING THE VALUE OF LOCALLY PRODUCED CONVENTIONAL GAS IN SA's SOUTH EAST- develop a profile of the gas industry and it's role within the regional economy and develop scenarios for how the local gas industry may evolve.

40% ASSESSING AND PROJECTING ON-SHORE GAS EFFECTS ON REGIONAL ECONOMIC ACTIVITY IN NSW - analyse the extent to which the on-shore gas industry influences regional economic and social indicators such as changes in industry mix, employment, land development, productivity and human capital.

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Health impact

Current research projects are focusing on reviewing current information to look for potential health impacts of coal seam gas.

Overall progress **60%**

100% HUMAN HEALTH EFFECTS OF CSG – a review will be conducted of the current information to design a study on the health effects of CSG activities based on community stakeholder, governmental, expert consultation group, and industry input.

33% POTENTIAL HEALTH IMPACTS FROM CSG- identify and screen for potential human health effects of coal seam gas (CSG) activity, including establishing processes and governance to ensure research quality.

Greenhouse gas footprint

Current research project is looking at characterising methane emissions from the Surat Basin.

Overall progress **91%**

100% METHANE SEEPAGE IN THE SURAT BASIN – measure methane seeping from underground in the Surat Basin, and identify sources of methane.

100% WHOLE OF LIFE CYCLE GREENHOUSE GAS ASSESSMENT- analysis of the whole of life cycle GHG emissions, including extraction, transportation and usage of CSG.

100% AMBIENT AIR QUALITY IN THE SURAT BASIN – comprehensive assessment of air quality in the Surat Basin region in Queensland using air quality measurement network and modelling.

100% REGIONAL METHANE EMISSIONS IN NSW CSG BASINS – identify and quantify methane emission sources such as CSG infrastructure, feedlots, coal mining, legacy bore holes in the Pilliga region.

100% BASELINE MEASUREMENT AND MONITORING OF METHANE EMISSIONS IN THE BEETALOO SUB-BASIN - understanding of the natural methane levels, over the various seasons, a baseline for accurately quantifying any future onshore gas impacts.

25% MITIGATING FUGITIVE GAS EMISSIONS FROM WELL CASINGS - evaluate techniques and assess new materials designed to minimise fugitive methane emissions leaking from microfractures and gaps in gas well cement casing.

Terrestrial biodiversity

Current research projects are identifying cost-effective actions that can be taken to reduce threats to plants and animals.

Overall progress **100%**

100% PRIORITY THREAT IDENTIFICATION AND MANAGEMENT – identify and understand the range of existing and new threats to biodiversity across a coal seam gas development region.

100% FIRE ECOLOGY OF GRASSY WOODLANDS – determine how sensitive animals and plants are to burning events in coal seam gas development areas.

100% HABITAT SELECTION BY TWO FOCAL SPECIES – understand the range of impacts from CSG development on Golden-tailed gecko and Glossy black-cockatoo habitats.

100% ENSURING BIODIVERSITY OFFSET SUCCESS: RUTIDOSIS LANTANA – identify genetic and demographic factors that may limit the success of establishing a rare daisy (Rutidosis lantana) in a new location.

100% GUIDLINES FOR OFFSET POPULTATION SIZES – improve the understanding of how ecological and biological traits of rare species of plants, commonly encountered in restoration projects, and different environmental factors determine viable population sizes

Marine environment

Current research projects are examining how sediments from dredging and discharge affect seagrass and turtle feeding grounds.

Overall progress **100%**

100% SUSTAINING TURTLES AND THEIR HOMES – understand how sediments from dredging and discharges affect seagrass and turtles.

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