GISERA
Gas Industry Social and Environmental Research Alliance

GISERA's research selection and approval process

GISERA, GPO Box 2583, Brisbane QLD 4001, Australia

Contents

List of Tables

List of Figures

1 Introduction

This paper provides an overview of the process used to explore, select and approve CSIRO independent research projects undertaken as part of the Gas Industry Social and Environmental Research Alliance (GISERA). Projects that are chosen from a wide range of opportunities must deal with a number of stakeholder challenges and viewpoints, and meet a number of established key performance indicators (KPIs) within a limited budget.

GISERA aims to establish an integrated, regional, systems-based portfolio of research projects that provides regional communities and the general public with evidence-based knowledge to underpin decisions on unconventional gas development – coal seam gas (CSG) and shale. Information sourced from GISERA research is primarily for benefit of local communities living in gas development regions but there is also additional value for governments and industry to generate better outcomes for Australia.

This selection process has been used since 2011 to build what has become an internationally-respected portfolio of research on the social and environmental issues and opportunities related to unconventional gas. This report aims to provide a record of the process, and to ensure 100% transparency in all activities undertaken by CSIRO under the GISERA agreement. The regions in Australia currently involved in the program are the Surat Basin in Queensland (since 2011) and Gunnedah Basin in NSW (since 2016), with other regions under consideration. The selection process is used to materially and transparently enable CSIRO, together with our partnering research bodies, to meet GISERA objectives as well as specific KPIs agreed to with our Alliance members and partners; and also, specific KPIs agreed to with our Alliance members and partners.

2 Using industry hazards, community concerns and opportunities to identify research

CSIRO began to consider social and environmental impacts related to unconventional gas in 2011 and over that time the following questions have emerged as fundamental issues upon which we seek to expand knowledge in regions with potential natural gas development:

- Does developing natural gas affect the quality or quantity of surface water or groundwater?
- What are the impacts on agricultural land management, farm production and amenities?
- Does developing or operating natural gas assets contribute further to regional greenhouse gases, affect local air quality or global climate change?
- What are the social and economic costs and benefits for regional communities?

- What are the impacts to regional flora and fauna and the marine environment?
- What are the human health impacts?
- What issues are associate with decommissioning gas industry assets?

The process undertaken to identify research topics is carefully aimed at answering these questions and guided by the *risks* and *uncertainties*, as seen by the community. Projects are created under a 7-step process outlined below (Figure 1) that involves a comprehensive series of reviews and workshops attended by the community, consultants, industry participants and research scientists with a wide range of affiliations and backgrounds. Research themes and topics are subsequently developed into potential research projects by collaborating with subject matter experts from CSIRO, academia, government and industry and then developed into project proposals (or Project Orders) for approval by the relevant Regional Research Advisory Committee (RRAC).

The strength of this 'on-the-ground' or 'bottom-up' approach is that it focuses on external stakeholders and aims to develop applied research with a direct path to valued information. It overcomes any dependency associated with asking experts themselves to develop ideas that might be based on their own research agendas where their area of expertise can become the focus. In this way, we test our capacities to understand and answer gaps in knowledge which result in research projects that truly emanate from a broad and unbiased base of possibilities.

Yet, a weakness of 'bottom-up' methods is they can limit the attainment of a broad strategic framework from which research gaps and opportunities can be visualised and addressed over time. Our efforts might be diverted from important and agreed GISERA goals; for example, where particular interest groups may attempt to impose a particular point of view thereby compromising CSIRO's independence. Another challenge is that we must deliver our projects within a limited budget and timeframe.

The GISERA Director and management team use a parallel top-down/bottom-up approach as evidenced by the 7-step process. This approach seeks to maintain strong connections over time between the GISERA vision, and our research, and on-the-ground communication and knowledge-sharing with our local communities and the general public. It is important to note that the GISERA research model is sufficiently agile to adapt to evolving community issues through time as industry and government practices change. This ensures that the highest quality science is directed towards priority issues and that we are able to answer relevant and important questions cognisant of the current issues.

3 GISERA's research themes

GISERA's research has evolved to focus on seven social and environmental areas which have emanated from industry Environmental Impact Statement (EIS) reports, policy development, stakeholder engagement, surveys and workshops, international comparisons and a plethora of public discourse over time:

Surface and groundwater

To enable the natural gas industry to plan and manage water resources according to local and global water resource management plans. The work centres mostly on the health and flow of groundwater including depletion and contamination of surrounding aquifers; and fluctuations in water availability for other uses.

Agricultural land management

To identify landscape and development configurations that minimise disruption to farm businesses, maximise co-benefit opportunities from the co-location of gas assets and agriculture, and minimise the likelihood of development-based erosion.

Greenhouse gas and air quality

To build regional profiles of greenhouse gases and the proportional contribution from gas development, including the full gas lifecycle and its end use. This includes: containment of hydrocarbons; naturally occurring seeps; and fugitive methane emissions from gas infrastructure. Overall regional greenhouse budgets (mining, energy, agriculture, transport) will be obtained.

Health impact

To investigate potential health effects to people and the environment of gas industry activity by scrutinizing emission pathways for harmful exposure levels.

Terrestrial biodiversity

To advance scientific understanding of the ecological function of the regions, the cumulative impacts of anthropogenic activity on biodiversity at a regional scale and the best ways of reversing anthropogenic impacts through effective whole-of-landscape conservation including biodiversity offsets.

Marine environment

To understand the vulnerable components of the marine ecosystem surrounding Gladstone in Queensland, with a view to minimising CSG to LNG impacts.

Social and economic impacts and opportunities

To review socio-economic indicators and survey results to maximise net positive change that arises from gas development and assist decision makers and locals to be able to enhance regional and community benefits and aspirations.

Decommissioning

This is another research area that has recently emerged that does not completely align with any of the above themes but currently sits in the social impacts theme. We have received strong feedback from stakeholders to begin testing the current decommissioning approaches and impacts, and explore new approaches. We are currently focusing on CSG well plugging and abandonment and area rehabilitation.

4 Constructing our research portfolio

The aim of the process described below is to identify a range of social and environmental issues that are of highest concern to communities and require further knowledge in the areas of government approval processes, regulatory development, industry practice, local communities and the general public.

GISERA's research identification process centres around 7 steps across 2-3 or more expenditure tranches to identify priority issues and to ensure they can be informed by the highest quality scientific research. The process seeks to understand the issues of community concern in natural gas development regions and to prioritise these issues into a form suitable for developing research projects that seek to provide timely, new information of use to communities, industry and governments. The process is as follows (and, see Figure 1 below):

1. **AWARENESS**: Acquiring information from stakeholders to enable a clear articulation of their concerns. This involves a large stakeholder engagement process across local communities, industry, government and the general public. A stakeholder survey is also used where the results form a quantified and well-documented list of leading stakeholder topics and questions (see Attachment A)
2. **RANK**: These topics are then ranked according to relative importance and value as determined by communities and expert judgement to identify priorities
3. **REVIEW**: The current state of knowledge, research projects already completed, policies in place and associated data and information on these topics is compiled and reviewed, for example:

water allocation policies and programs, Chief Scientist reports, government department and stakeholder reports, and GISERA results that has been completed in Queensland

4. **IDENTIFY**: Request CSIRO staff to create new research ideas. This involves consideration of resource capacities, knowhow and experience across CSIRO, and other organisations, to undertake the research and answer the research questions (Attachment A)
5. **SELECT**: Projects are then selected based on their ability to meet a wide range of predetermined criteria (see Attachment B) and answer the stakeholder and community questions
6. **PROPOSE**: Preferred project ideas are then developed into formal research proposals (or Project Orders) that fully discuss the research aims, methods and expected outputs and impact, in conjunction with the GISERA Director
7. **APPROVE**: Our independent Regional Research Advisory Committees (RRACs) then review and approve proposals, and research commences

The 7-step process meets CSIRO's research independence while providing public good outcomes from our research. The RRACs and GISERA team apply this selection process to enable research that materially and transparently meets CSIRO research obligations. Ultimately, the RRACs approve all research; and, individual projects may be ceased or modified at the direction of the RRAC. This process is currently operating in unconventional gas regions in New South Wales and Queensland.

Once approved, projects are monitored and evaluated over time to ensure that GISERA's research program maintains its relevance and provides valued outcomes. This value will be judged on the research being able to pursue an agenda that addresses community concern, knowledge gaps, and residual risk.

Overall, we aim for the portfolio of approved research projects to:

- Be structured to simply and transparently support the KPIs established for CSIRO research under GISERA
- Seek high impact early in the research to rapidly show value to a range of external stakeholders and establish considered methods to meet CSIRO's longer term goals under GISERA
- Demonstrate that CSIRO research under GISERA has been developed according to a clear and transparent framework
- Identify research priorities based on risk, opportunity, urgency and tractability
- Be used to identify key research partnerships, from an expertise (input) and stakeholder (output) perspective
- Be amenable to engaging community stakeholders in discussion around project value and priority

- Invest in project topics in proportion to their risk and opportunity

Figure 1: 7-step research selection process

4.1 Allocating the budget across research themes

Another research program management feature is to allocate funds based on good transparency, economy and reason. The proportion of funds allocated to projects is influenced by a range of factors including stakeholder surveys, collaboration with selected subject matter experts across CSIRO, academia, government and industry, consideration of the reputational risks, gaps in knowledge, capacity for research, and cost.

A sequence of funding tranches may be used to allocate funds. For example, a first tranche may be aimed at identifying areas requiring early impact such as baselining or profiling elementary indicators across air, water and the community, including current water allocations, background pollutant levels, local demographics and industry profiles. Later funding tranches are aimed at developing projects to understand and address a broader suite of topics put forward by stakeholders or derived from other inquiries, reviews, reports and policy making. These tranches and projects are aimed at addressing outstanding issues and knowledge gaps identified through deeper inquiry and consultation. Later tranches take the time to review and discuss stakeholder input that has been

compiled over time, review other research programs and inquiries, and conduct focused workshops. A small budget is held for expenditure near the end of our programs and it is likely small adjustments to proportions are made as additional projects are added or others terminated where necessary to meet community needs for current, independent, trusted science-based information.

Research requirements for the various states and territories will be different. For example, the NSW scope of research does not include LNG for export and therefore does not require any marine-based research. And finally, extension and leverage options with other regions may increasingly become available when enabling resources in those regions are finalised as part of the national expansion.

The current approximate proportional spend on our research themes across the New South Wales and Queensland portfolios is:

- Surface and Groundwater, 34%
- Social and Economic, 13%
- Greenhouse gas and air quality, 16%
- Agriculture, 15%
- Terrestrial Biodiversity, 12%
- Marine, 9%
- Health, 1%

5 ATTACHMENT A – Summary of leading stakeholder questions and concerns

Following extensive consultation since 2011 with various CSG stakeholders, a list of stakeholder questions and concerns has been developed. While many of these issues have cemented themselves as key areas of concern that we have directed our research effort towards, it is also likely this list will continue to evolve over time as more stakeholders are surveyed and different issues are identified in different regions.

Table 5.1 Stakeholder questions and concerns

SUBJECT AREA	ID NO.	KEY ISSUE / QUESTION
Water	WQ01	What amount of water is used by the CSG industry, and where does it come from?
	WQ02	How much groundwater is being extracted from CSG wells; and how much from other bores and industries?
	WQ03	How do coal seams and aquifers and groundwater systems interact?
	WQ04	Is fracking dangerous for water, the environment or people?
	WQ05	What are the major water impacts from CSG; and what are the cumulative impacts along with agriculture and mining?
	WQ06	Is there a sufficient amount of water for everyone, including future generations?
	WQ07	What will happen with produced water? What amount of water is recycled and reused? Will this be an overall net gain?
	WQ08	Does CSG development affect any particular water sources (such as the Great Artesian Basin (GAB)), or other people's water uses such as farmers?
	WQ09	How will the brine resulting from CSG activities be cost-effectively and sustainably managed?
Greenhouse Footprint	GQ01	What is the overall carbon account and baseline of greenhouse gases and air pollutants natural gas regions and what contribution will come from CSG?
	GQ02	What is the gap between the carbon content of CSG and coal, and could fugitive emissions and seeps affect that gap?
	GQ03	What are the risks and opportunities for CSG around climate change?
	GQ04	Under what climate change mitigation scenarios is CSG an advantage; and when are gas resources at risk of being underused (i.e., creating stranded assets)?
	GQ05	What is the full breadth of scientific research being undertaken in natural gas regions regarding greenhouse gases and what are the collective findings?
Health	HQ01	Do people get sick from CSG?

SUBJECT AREA	ID NO.	KEY ISSUE / QUESTION
	HQ02	What are the potential exposure pathways or situations where people's health or livelihoods can be affected and what is the probability of being affected?
	HQ03	How do people typically assess risk; and does this affect the way people interpret both factual and non-factual data?
Impacts on Communities	SQ01	Which communities, and who in those communities, are impacted by CSG?
	SQ02	Are impacts being managed to the satisfaction and acceptance of the impacted communities?
	SQ03	Does CSG development, and the activities designed to attenuate its imposition such as community investment, align with community aspirations?
	SQ04	What are the most effective and efficient social impact mitigation programs that can be implemented?
Land management issues (also includes community and economic questions)	LQ01	How much land do CSG companies need access to and what type of land will it be?
	LQ02	Will access to land be gained voluntarily? And at what cost and benefit to locals?
	LQ03	Do landholders obtain an overall net gain from the presence of CSG?
	LQ04	How many landholders are aggrieved by CSG and why? What proportion are content?
	LQ05	What is the estimated net result for ecosystem services and agriculture productivity for the lands to be impacted?
Biodiversity	BQ01	What can be done about the cumulative impacts of the CSG industry, agriculture, transport and mining on biodiversity?
	BQ02	Which CSG projects are to be located in or near protected or high value areas?
	BQ03	Has CSG or natural gas development had any detrimental impacts on biodiversity anywhere in Australia?
	BQ04	Is there any possible danger to any threatened species?
	BQ05	How much land will be disturbed and how much of this will have to be rehabilitated? Will this reduce biodiversity?
	BQ06	What is the potential and actual success of the relevant biodiversity offset programs?
	BQ07	Will current policies and strategies protect biodiversity going forward?
Economics	EQ01	How much money will be spent at the local / regional / state levels in the future and by whom, because of the development of natural gas? Will this expenditure meet community aspirations?
	EQ02	How many jobs will the CSG industry create in the future; how many will be directly employed by companies vs contractors vs supply chain impacts?

SUBJECT AREA	ID NO.	KEY ISSUE / QUESTION
	EQ03	How are other industries affected by the CSG industry e.g. growth/decline in the service industry, agriculture, incubation of new industries?
	EQ04	Are there potential innovations to consider (such as using methane for energy use by farmers)?
	EQ05	What interventions can be recommended to make it easier for local businesses to supply goods and services to the industry?
	EQ06	What market position does Australian unconventional gas have under various climate change mitigation scenarios?
Decommissioning and legacy issues	DQ01	What happens to wells, and any contaminants, once they are plugged and abandoned?
	DQ02	Who has the legal and financial responsibility for the maintenance and integrity of CSG assets over time? Is this adequate?
	DQ03	What innovations or improvements can be found to decommissioning approaches and technologies?
	DQ04	What legacy issues bother the community and what is socially and environmentally acceptable?

6 ATTACHMENT B – Research selection criteria

The following criteria is used to test the relative strengths and weaknesses amongst projects

GISERA Project Attributes

Tractability of problem or opportunity

Inherent research or practical innovation

Urgency of problem or opportunity

Likelihood of meeting project goals

Addresses cumulative impacts of development

Wide audience across industry, community, and regulators

Directly informs regulatory or policy frameworks

Directly enables negative impacts of gas development to be addressed

Directly enables new opportunities from natural gas development to be sought

Directly builds community understanding of natural gas development impacts and opportunities

Directly builds community capacity to respond positively to development

Directly underpins adaptive management of development impacts by industry or community

Likelihood of creating refereed science publications

Creation of Hons, MSc and PhD research studentships

Mutual capacity building via direct involvement of industry and/or government staff

Regional capacity building via engagement will local communities

Timeframe for delivery is appropriate

Financial leverage achieved

Contact us

Dan O'Sullivan
Email: gisera@gisera.org.au
gisera.org.au