GISERA
Gas Industry Social and Environmental Research Alliance

GISERA Annual Research & Development Plan and Budget

2018-19

GISERA, GPO Box 2583, Brisbane QLD 4001, Australia

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COVER PHOTOGRAPH

CSIRO air quality monitoring instrumentation adjacent to a CSG well (in background) in Combabula, near Roma, Queensland, 2017.

Information gathered at this site feeds into the GISERA Surface and Groundwater project entitled 'Air, water and soil impacts of hydraulic fracturing: Phase 2'. This project 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.

1 Director's summary

The 2017-18 financial year has seen progress in the national expansion of CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA), with the South Australian Government investing $1 million. A funding agreement between the Minister for Mineral Resources and Energy and CSIRO was fully executed on 20 December 2017.

The Queensland Government has also contributed $500,000 to carry out a Phase 2 Human Health Study. A grant deed between the Department of Natural Resources Mines and Energy and CSIRO was fully executed on 30 January 2018.

Over the year, a total of 6 new projects were approved, taking the total number of GISERA projects to 44 and total research investment to $22,831,314[1].

A new committee was added to the governance structure this year: the Stakeholder Roundtable Group (SRG). This group provides an opportunity for CSIRO and the GISERA Director to provide feedback on research findings of interest to broad stakeholders and clarify CSIRO priorities under GISERA; and for stakeholders to provide advice and counsel to the GISERA Director on the direction and strategy of GISERA.

The first meeting was an opportunity for stakeholders, from diverse backgrounds, to express their views on what they perceived was working well, issues and areas of concern, and perspectives for improvement and GISERA's future focus. The second meeting provided stakeholders the opportunity to hear about some of GISERA's social and environmental research and communication strategy.

GISERA's primary objectives remain to:

- carry out independent research and improve and extend knowledge of social and environmental impacts and opportunities of onshore gas projects primarily for the benefit of communities living in gas development regions and the broader public
- inform governments, regulators and policy-makers on key issues regarding policy and legislative frameworks for the gas industry
- improve gas industry operations in regions where exploration and production activities are occuring.

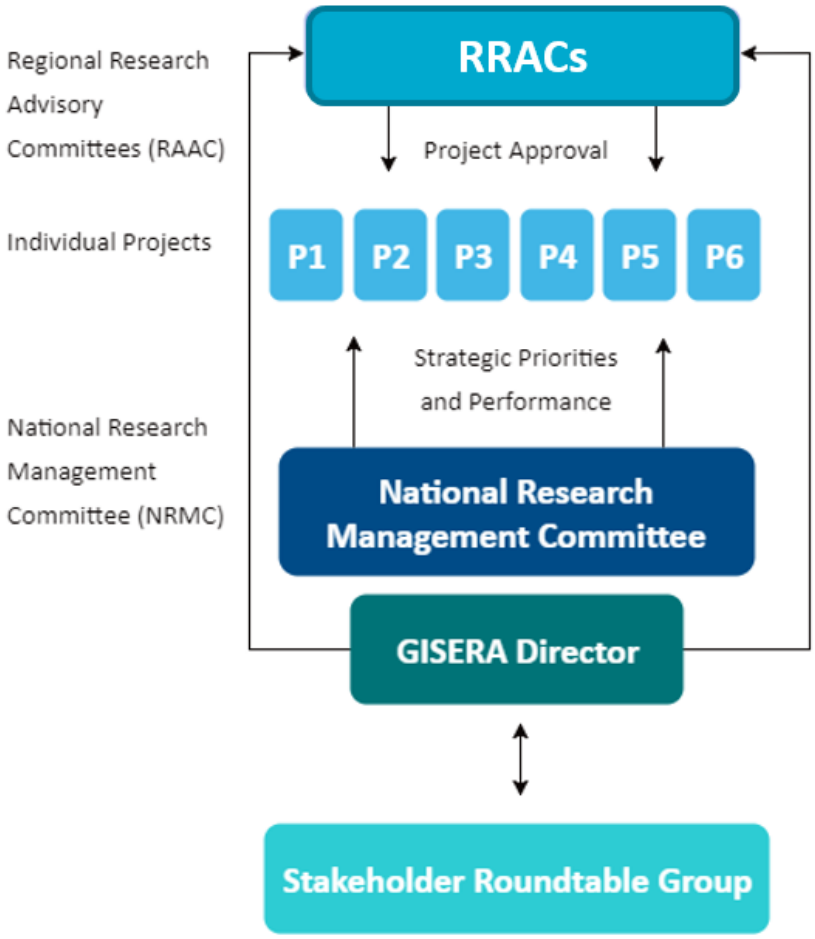
All output and activities during the year continued to contribute to GISERA's credibility, trust and respect through the open and transparent conduct and communication of its research and synthesis activities. All GISERA results and research outputs including scientific reports, journal papers and supporting communication products such as factsheets, communiques and online articles, are available to view and download (www.gisera.csiro.au) on their respective research projects.

[1] This includes CSIRO in-kind contribution.

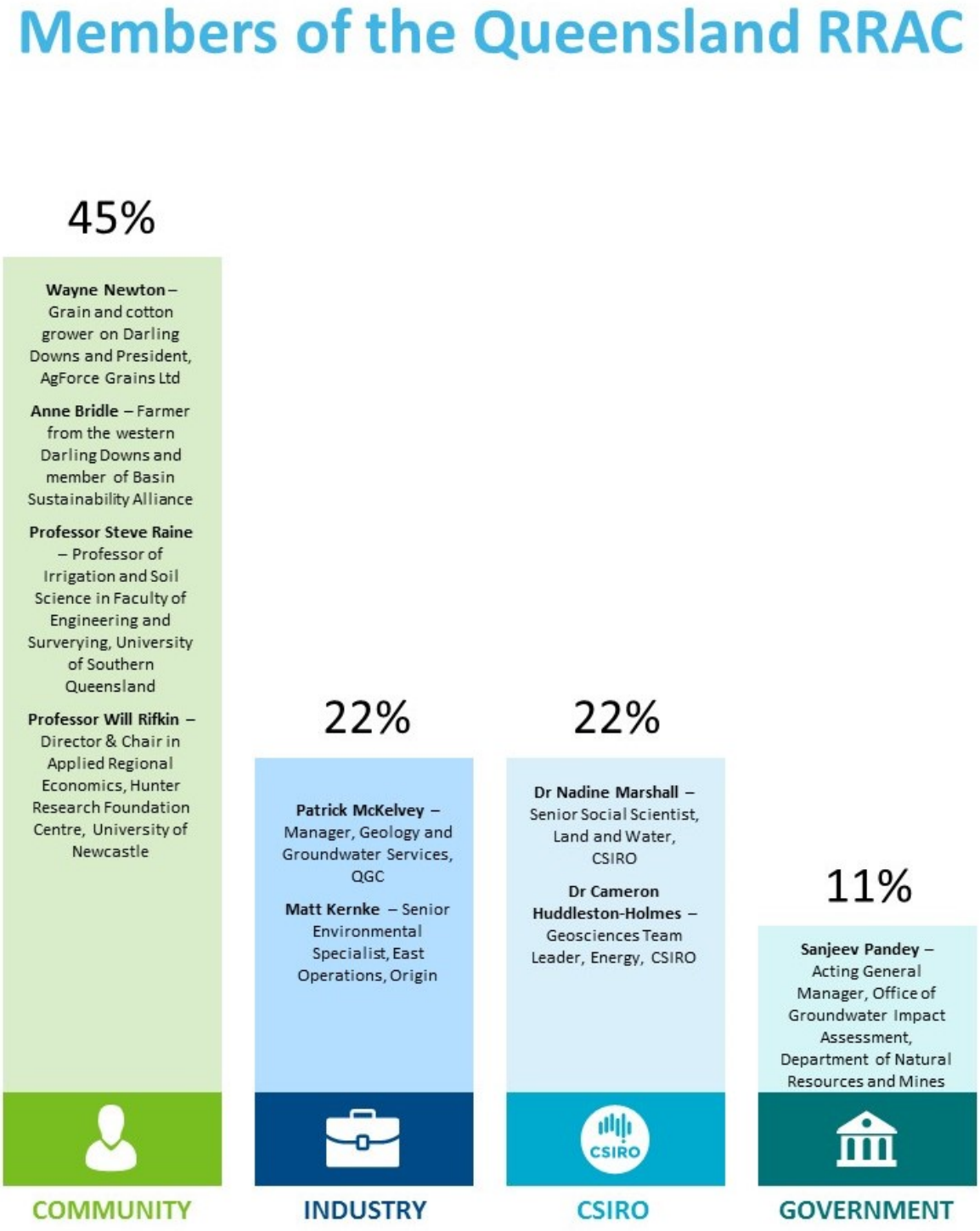
Governance

A key function of CSIRO's GISERA is to undertake research on issues of direct community interest using funding supplied by the gas industry and Commonwealth and state governments. To ensure independence of CSIRO research, a rigorous governance structure is imposed utilising external stakeholder-dominated Regional Research Advisory Committees (RRAC) in New South Wales, Queensland and South Australia.

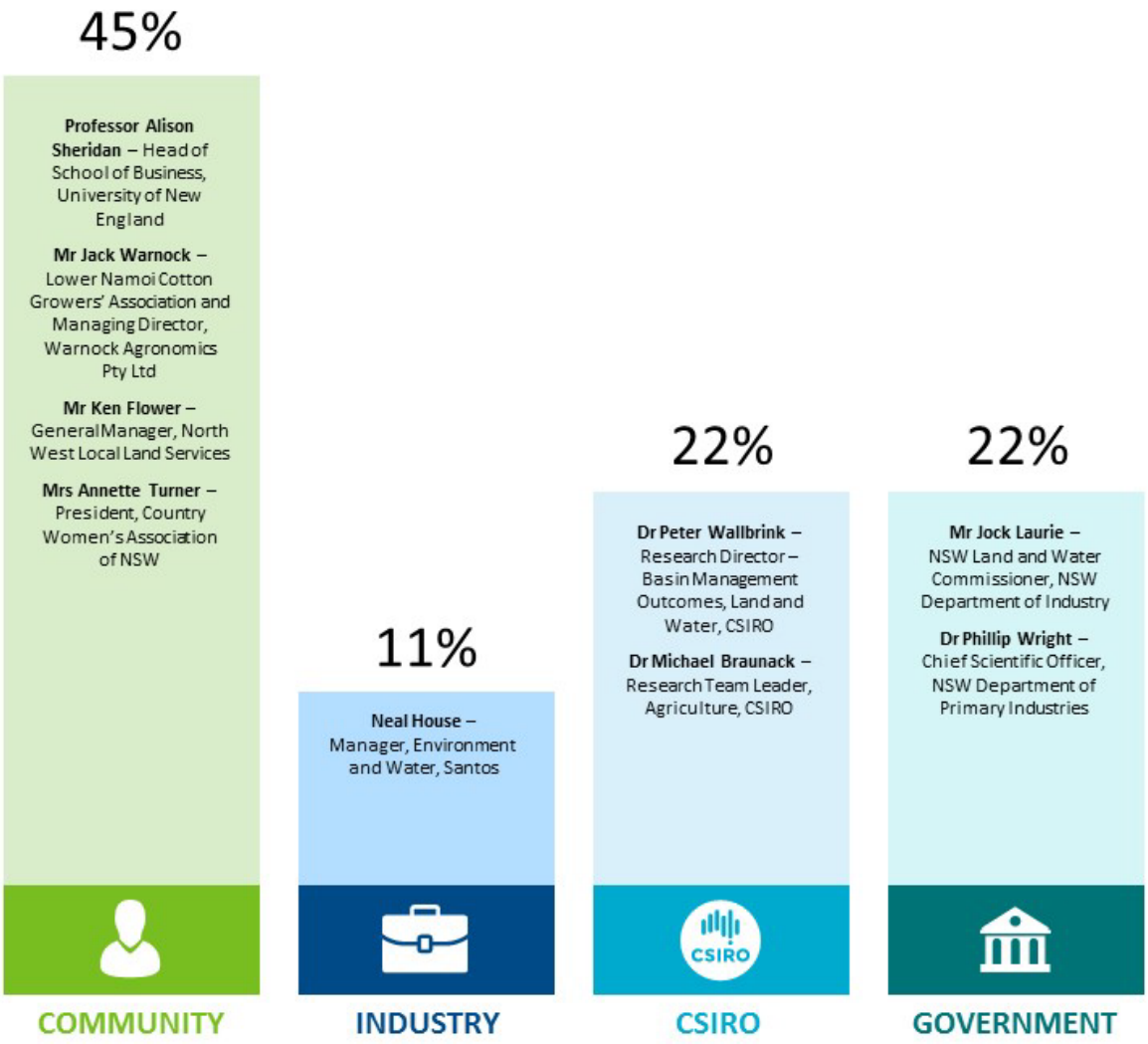
The RRACs are responsible for approving the allocation of research funds to projects which meet the community objectives of addressing issues of concern. The National Research Management Committee ensures fiscal and project level responsibilities are met but does not determine where research funds are spent. The governance structure is shown below:



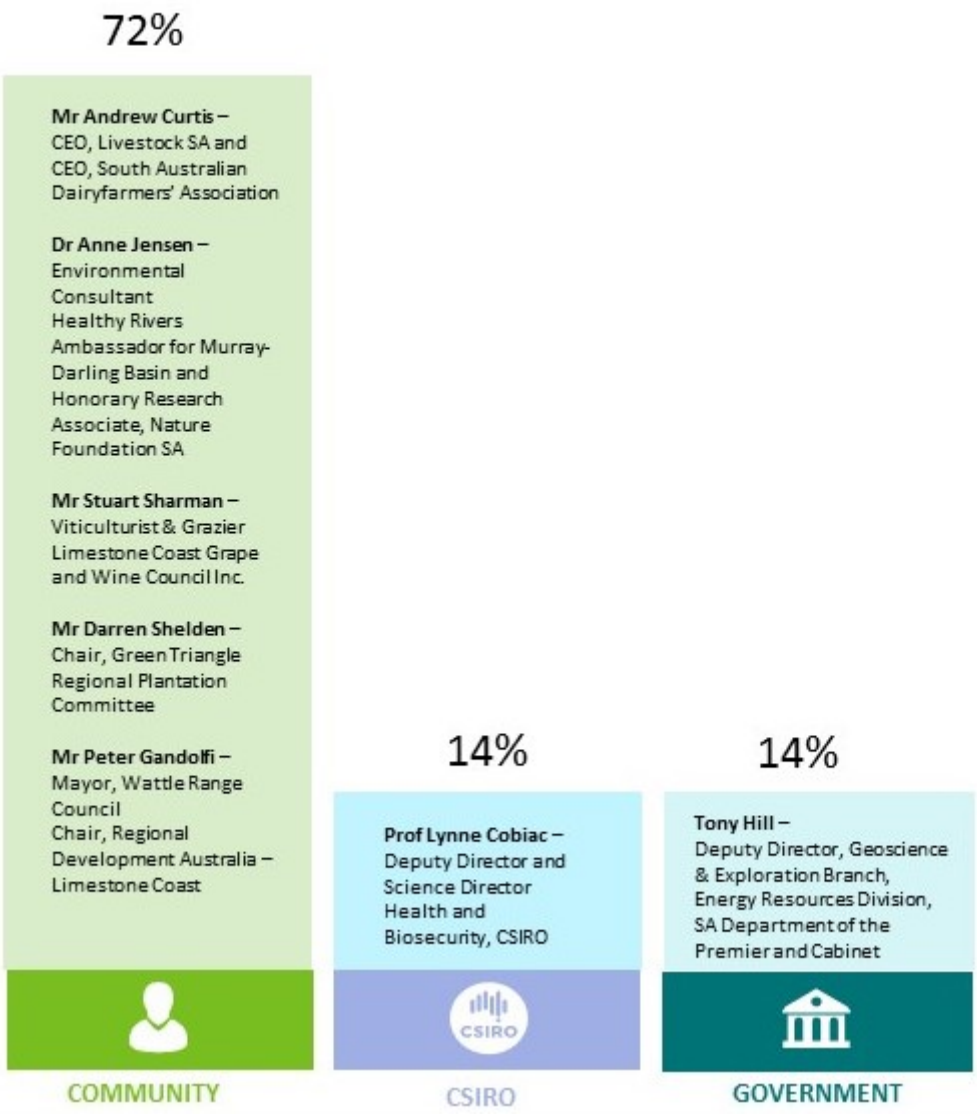
The composition and membership of the Queensland, New South Wales and South Australia RRACs is critical to the success of GISERA and, as shown below, are dominated by esteemed and respected independent participants from the communities in which gas development is occurring:



Members of the NSW RRAC



Members of the South Australian RRAC



Regional Research Advisory Committees' activities

Queensland

The Queensland RRAC considered a research proposal in December 2017, resulting in the following project being approved:

- A social and economic project titled Trends in community wellbeing and attitudes to CSG development - Survey 3. This is now the third community survey monitoring and communicating the changes and trends in community wellbeing, resilience and attitudes to CSG development across different phases of industry operation in south west Queensland, and identifies how these vary between the construction, post-construction, and operations phases of development. This will inform the community, industry and government understanding of how and why community wellbeing and attitudes to CSG vary between regions and phases of CSG activity for planning and approval purposes. A more comprehensive understanding of these dynamics across time and space will enable more strategic and proactive policy and planning around CSG development.

The Queensland RRAC met in April 2018 to review a research proposal resulting in the following project being approved:

- A health project titled Potential health impacts from CSG. This project will establish processes and governance to ensure research quality, define the project boundary, conduct hazard identification and exposure pathways, and screen data. This will identify potential chemical and physical hazards and exposure pathways, assess the quality of existing data, and gaps in the data collected. Key issues will be selected for further in-depth assessment as part of the project to enable the health study framework to be demonstrated in its entirety.

The following 6 Queensland projects were completed during this reporting period:

- Air, water and soil impacts of hydraulic fracturing, Phase 1
- Guidelines for offset population sizes
- Groundwater contamination risk assessment (joint QLD / NSW project)
- Constraining water flows in the Surat Basin
- Hydrocarbons in groundwater, Surat and Bowen Basins
- Methane Seepage fluxes, Surat, Queensland

Overall, 26 projects are now complete in Queensland.

New South Wales

The following 6 New South Wales projects were completed during this reporting period:

- Regional methane emissions in NSW CSG basins
- Potential human health effects of coal seam gas (study framework)
- Social baseline assessment of the Narrabri region of NSW in relation to CSG development
- Analysing economic and demographic trajectories in NSW regions experiencing CSG development and operations
- Spatial design of groundwater monitoring network in the Narrabri Gas Project area
- Groundwater contamination risk assessment (joint QLD / NSW project)

South Australia

The South Australia RRAC met in May 2018 to review research proposals resulting in the following projects being approved:

- An agricultural land management project titled 'Gas impacts and opportunities on primary industries'. This project will analyse possible impacts and opportunities from gas development for rural areas in South Australia's south east. The research will provide information to assist community understanding and inform policy regarding potential impacts and opportunities from conventional gas development on primary industries.
- A social and economic project titled 'Assessing the value of locally produced conventional gas in SA's South East'. This project is developing a profile of the gas industry and its role within the regional economy, and developing scenarios for how the local gas industry may evolve. The study aims to develop knowledge for policy makers and local businesses regarding the socio-economic value of gas activity for local communities, and an improved capacity to forecast outcomes from industry development.
- A social and economic project titled 'Community well-being and attitudes to conventional gas'. This research aims to 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.
- A surface and groundwater project titled 'Water contamination: causes, pathways and risks'. This project investigates potential groundwater contamination causes, pathways and vulnerability to understand onshore gas water quality impacts for south east South Australia. The research aims to achieve a realistic quantification of groundwater contamination risks in gas development areas, providing improved knowledge for regulators, industry and community.

National Research Management Committee

The National Research Management Committee (NRMC) comprises of 4 industry, 3 CSIRO and 1 government representative including:

- Robert Hirst: Health, Safety and Environment, Manager (APLNG)
- Stephanie Stonier: Corporate Affairs Managers (Northern Australia) (Origin)
- Patrick McKelvey: Hydrogeology & Geology Operations Manager (QGC)
- Matthew Sherwell: Manager Policy & Regulatory Affairs (Santos)
- Michael Sheldrick: General Manager – Onshore Energy Branch, Resources Division (Department of Industry, Innovation and Science) – Government representative
- Peter Mayfield: Executive Director, Environment, Energy and Resources (CSIRO)
- Dr Paul Bertsch: Deputy Director-Science, Land and Water (CSIRO)
- Mike Grundy: Research Director, Agriculture (CSIRO)

Dr Damian Barrett, GISERA Director (CSIRO), is the NRMC Chair and has no voting rights.

The NRMC met 4 times during the 2017/18 financial year:

- Meeting #6 was held on 21 August 2017 at CSIRO offices
- Meeting #7 was held on 8 November 2017 at Origin offices
- Meeting #8 was held on 13 February 2018 at Shell/QGC offices
- Meeting #9 was held on 1 May 2018 at CSIRO offices

Stakeholder Roundtable Group

The inaugural SRG meeting of GISERA was held in Sydney on 13 November 2017 and the second meeting in Canberra on 28 June 2018. Representatives from the following stakeholder groups attended:

- Grattan Institute
- The Australia Institute
- ANU Energy Change Institute
- International Energy Agency
- National Farmers Federation
- Minerals Council of Australia
- Central Land Council
- The Ethics Centre
- Department of Industry, Innovation and Science
- Shell/QGC
- Australia Pacific LNG
- Santos
- CSIRO

I wish to thank all members of GISERA's committees for their input and commitment to GISERA's success. I would also like to thank the project researchers for their hard work, dedication and contribution towards achieving GISERA's objectives.

Looking ahead

Plans for the 2018-19 year include the development of the GISERA program into the Northern Territory. This will include an executed funding agreement between the Northern Territory Government and CSIRO, the establishment of a Northern Territory Regional Research Advisory Committee (RRAC), and the establishment of a research portfolio with projects that address community concerns, issues and potential impacts as a result of onshore gas development.

The year ahead will also see the development of the next tranche of research projects in New South Wales and South Australia.

The scale of GISERA research activity in CSIRO continues to increase, with the involvement of over 150 researchers across our Agriculture and Food, Health and Biosecurity, Energy, Land and Water, Oceans and Atmosphere and Data 61 business units over the life of GISERA. We seek to retain and recruit researchers of the highest distinction and potential, and we also explore broader research collaboration opportunities as we continue our planned expansion into the NT and WA.

Effective government engagement continues to assist in understanding relevant research challenges, to promote adoption of research outcomes and inform policy, and support positive impact from GISERA science. Negotiations regarding contributions from state/territory governments continue.

2 National Budget

This is the seventh *Annual research & development plan and budget* and covers the financial year 2018-19.

The *Annual research & development plan and budget*:

- Details the contribution of each Partner to GISERA.
- Includes the committed research investment and expenditure for existing projects.
- Identifies proposed research projects to be undertaken in the financial year, including draft project description and project budget.

2.1 National Budget

2.1.1 Contributions and Grants

The committed financial contributions received from membership, in-kind, grants, APPEA and other industry contributions (separate from membership) over the life of GISERA is outlined in Table 2.1.

Table 2.1 Incoming contributions and grants, by contributor, 2011/12-2017/18

GROUP	PAYMENT TYPE	CONTRIBUTOR	INITIAL ALLIANCE AGREEMENT (2011/12 – DEC 15)	NATIONAL ALLIANCE AGREEMENT (JAN 16 - 2017/18)	TOTAL
Industry	Membership	APLNG	$10,000,000	$300,000[2]	$10,300,000
		QGC	$1,250,000	$300,000[3]	$1,550,000
		Santos	$0	$450,000	$450,000[4]
		AGL	$0	$287,500	$287,500
		Origin	$0	$450,000	$450,000
	Contribution to water 11 (Air, water and soil impacts of hydraulic fracturing: Phase 1 project)	APLNG	$0	$245,670	$245,670
	Contribution to water 12 (Air, water and soil impacts of hydraulic fracturing: Phase 2 project)	APLNG	$0	$1,285,000	$1,285,000
	Contribution via APPEA (GHG 1 - Methane Seepage fluxes project)	APLNG, Santos, Arrow Energy & QGC	$1,121,707	$0	$1,121,707
Government[5]	Grant	Federal Government	$0	$5,500,000	$5,500,000
		NSW Government	$0	$1,500,000	$1,500,000
		SA Government	$0	$1,000,000	$1,000,000
		QLD Government[6]	$0	$500,000	$500,000
CSIRO	In-kind	CSIRO	$5,392,093	$3,354,809	$8,746,902
Other	In-kind (Agland 5 - Without a Trace project)	USQ	$79,990	$0	$79,990
TOTAL			$17,843,790	$15,172,979	$33,016,769

[2] The figure does not include APLNG's first annual contribution of $150,000 towards National GISERA. As per clause 7.1 (d) of National Alliance Agreement, the parties agreed that this contribution was made under the Initial Alliance Agreement.

[3] The figure does not include QGC's first annual contribution of $150,000 towards National GISERA. As per clause 7.1 (d) of National Alliance Agreement, the parties agreed that this contribution was made under the Initial Alliance Agreement.

[4] Santos has agreed to provide an additional $450,000 contribution to research activities in the NT. This was finalised after this reporting period and therefore not included in Table 2.1

[5] The Northern Territory Government has agreed to contribute $450,000 to research activities in the NT. The funding agreement was executed after this reporting period and therefore not included in Table 2.1.

[6] QLD Government's grant to go towards the 'Potential health impacts from CSG' project.

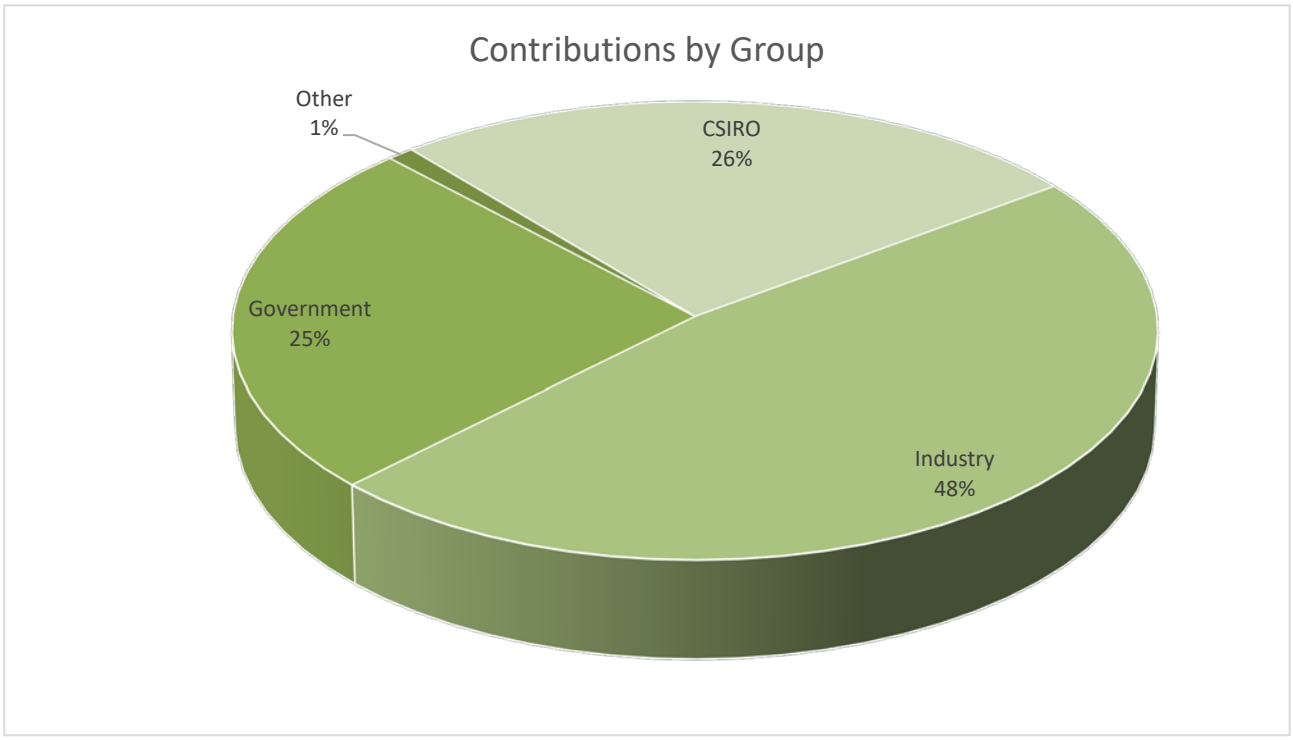


Figure 1 Committed contribution over life of GISERA, by group

2.1.2 Committed Research Investment

The committed budget for projects across all regions for 2011/12-2019/20 now stands at $22,831,314. A breakdown of the committed research budget for the various subject areas is illustrated in Table 2.2 and Figure 2.3 shows the percentage committed to each subject area.

Table 2.2 Committed research investment across all regions, by topic, 2011/12-2019/20

TOPIC / YEAR	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	TOTAL
Water	$1,102,043	$1,467,580	$712,245	$100,000	$579,672	$1,749,409	$2,563,862	$419,078	$111,794	$8,805,686
Greenhouse gas	$0	$0	$111,553	$627,286	$740,638	$991,891	$483,410	$0	$0	$2,954,776
Agriculture	$0	$732,594	$863,669	$533,301	$273,747	$245,384	$160,471	$175,133	$0	$2,984,299
Biodiversity	$0	$414,761	$663,163	$503,048	$290,265	$297,159	$130,162	$0	$0	$2,298,558
Marine	$0	$857,142	$357,143	$478,914	$0	$0	$0	$0	$0	$1,693,199
Social & economic	$0	$420,365	$434,000	$300,581	$266,933	$713,777	$270,413	$380,065	$185,845	$2,971,979
Health	$0	$0	$0	$0	$0	$224,424	$100,024	$494,004	$304,365	$1,122,817
Total	$1,102,043	$3,892,442	$3,141,773	$2,543,130	$2,151,253	$4,222,044	$3,708,342	$1,468,280	$602,007	$22,831,314[7]

[7] These figures do not include funds for the GISERA Director's office and communications.

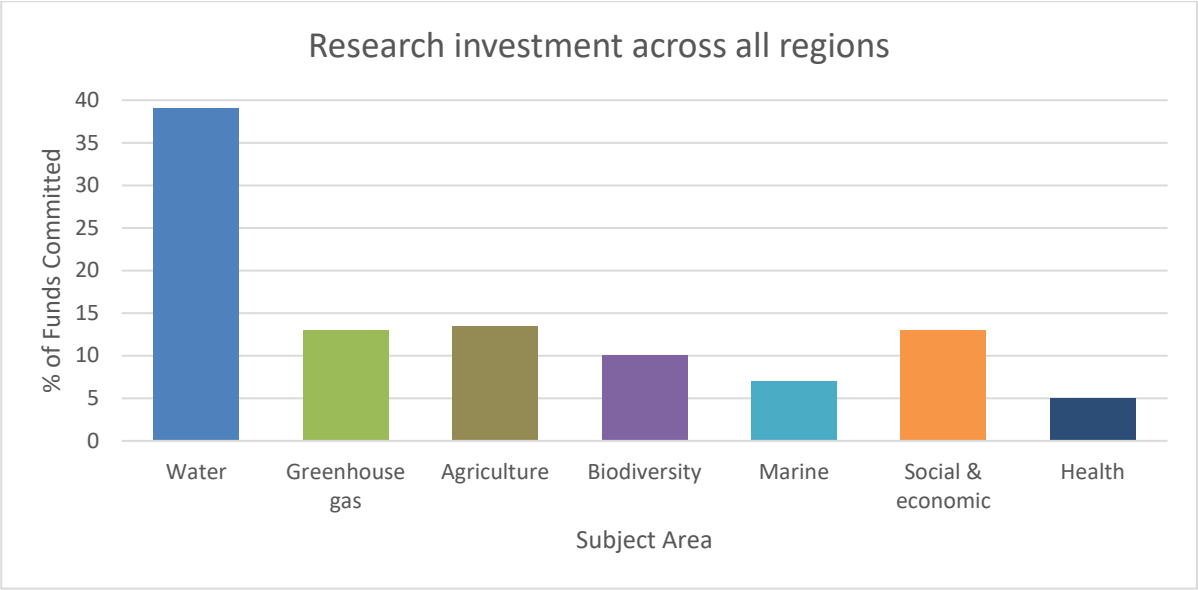


Figure 2 Committed research investment across all regions, by subject area, 2011/12-2019/20

3 Queensland R&D Plan & Budget

3.1 Queensland Investment profile

3.1.1 Committed research investment for 2011/12-2019/20

The committed budget for projects in Queensland for 2011/12-2019/20 now stands at $19,705,118. A breakdown of the committed research budget across the various subject areas is illustrated in Table 3.1 and Table 3.2 shows the investment committed by contributor.

Table 3.1 Committed research investment in Queensland by topic, 2011/12-2019/20

TOPIC / YEAR	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	TOTAL
Water (38%)	$1,102,043	$1,467,580	$712,245	$100,000	$579,672	$1,284,398	$1,975,116	$179,754	$0	$7,400,807
Greenhouse gas (14%)	$0	$0	$111,553	$627,286	$740,636	$836,528	$483,413	$0	$0	$2,799,416
Agriculture (14%)	$0	$732,594	$863,669	$533,301	$273,747	$245,384	$160,471	$0	$0	$2,809,166
Biodiversity (12%)	$0	$414,761	$663,163	$503,048	$290,265	$297,159	$130,162	$0	$0	$2,298,558
Marine (9%)	$0	$857,142	$357,143	$478,914	$0	$0	$0	$0	$0	$1,693,199
Social & economic (9%)	$0	$420,365	$434,000	$300,581	$266,933	$191,326	$118,001	$122,473	$0	$1,853,679
Health (4%)	$0	$0	$0	$0	$0	$0	$51,924	$494,004	$304,365	$850,293
Total	$1,102,043	$3,892,442	$3,141,773	$2,543,130	$2,151,253	$2,854,795	$2,919,087	$796,231	$304,365	$19,705,118

Table 3.2 Committed research investment in Queensland by contributor, 2011/12-2019/20

PARTNER	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	TOTAL
CSIRO (29.6%)	$220,410	$1,000,459	$862,590	$812,376	$682,819	$947,309	$1,060,160	$193,464	$53,693	$5,833,280
USQ (0.4%)	$0	$37,958	$42,032	$0	$0	$0	$0	$0	$0	$79,990
Australia Pacific LNG (55.5%)	$881,633	$2,854,025	$1,950,355	$987,982	$1,023,486	$1,012,279	$365,032	$47,803	$3,042	$9,125,637 (GISERA Membership)
	$0	$0	$18,574	$104,443	$52,470	$52,470	$52,470	$0	$0	$280,427 (Methane Seepage project)
	$0	$0	$0	$0	$0	$245,670	$0	$0	$0	$245,670 (HF phase 1 project)
	$0	$0	$0	$0	$0	$0	$1,174,821	$110,179	$0	$1,285,000 (HF phase 2 project)
QGC (8.2%)	$0	$0	$212,500	$325,000	$235,068	$439,656	$67,467	$47,803	$3,042	$1,330,537 (GISERA Membership)
	$0	$0	$18,574	$104,443	$52,470	$52,470	$52,470	$0	$0	$280,427 (Methane Seepage project)
Santos (1.4%)	$0	$0	$18,574	$104,443	$52,470	$52,470	$52,470	$0	$0	$280,427 (Methane Seepage project)
Arrow Energy (1.4%)	$0	$0	$18,574	$104,443	$52,470	$52,470	$52,470	$0	$0	$280,427 (Methane Seepage project)
Federal Government (0.9%)	$0	$0	$0	$0	$0	$0	$11,193	$106,491	$65,611	$183,295
Qld Government (2.5%)	$0	$0	$0	$0	$0	$0	$30,533	$290,490	$178,977	$500,000
Total	$1,102,043	$3,892,442	$3,141,773	$2,543,130	$2,151,253	$2,854,795	$2,919,087	$796,231	$304,365	$19,705,118

3.1.2 Queensland Current Research Portfolio

A summary of all approved research projects in Queensland is provided in table 3.3.

Table 3.3 Approved Queensland Research Projects

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
Surface and groundwater	Geochemical responses to re injection*	Understand and quantify aquifer reactions occurring due to re-injection of CSG water, and their impacts on water quality.	Methods for predicting water quality changes resulting from CSG water re-injection.
	Re-injection of CSG water*	Understand, quantify and manage clogging of injection wells during re-injection of CSG water permeates, brines and blends.	Strategies to manage clogging of re-injection wells to maximise re-injection volumes.
	High performance groundwater modelling*	Determine the feasibility of large scale re-injection schemes.	Models that assess the feasibility of large re-injection schemes and predict how re-injection may reduce impacts from CSG development.
	Isotope and geochemical groundwater baseline study*	Characterise the baseline geochemistry of groundwater and formation water prior to and during initial stages of development to understand groundwater age and origin.	Baseline measures of groundwater quality and protocols for monitoring changes in groundwater quality, during and after development.
	Hydrocarbons in groundwater, Surat and Bowen basins*	Review and assess the presence of organic compounds in groundwater found in the Surat and Bowen basins using existing open source and company held data.	Information and methods to assess possible sources of hydrocarbons in groundwater to help differentiate naturally occurring hydrocarbons and those potentially introduced during gas extraction process.
	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.	New data and modelling approach to assess flow rates and volumes of usable groundwater resources in CSG regions in Queensland.
	Groundwater contamination risk assessment*	Assess the likelihood of groundwater contamination from hydraulic fracturing and wellbore damage.	Quantitative estimate of the risk of groundwater contamination at a basin/sub-basin scale. This will help management plans and strategies to reduce the risk of surface and groundwater contamination and provide communities a better understanding of potential impacts to local water resources.
	Air, water and soil impacts of hydraulic fracturing (Phase 1) *	To design an intensive monitoring campaign that will measure the air, water and soil impacts of hydraulic fracturing of production wells in the Surat Basin.	A report summarising the current state of knowledge regarding sources of air, water and soil pollutants associated with CSG extraction using hydraulic fracturing, a peer-reviewed design for a measurement program that will provide enhanced information of the impacts of hydraulic fracturing and a

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
			report presenting an analysis of air, water and soil quality before commencement of hydraulic fracturing activity.
	Air, water and soil impacts of hydraulic fracturing (Phase 2)	This project 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.	A series of reports summarising the impacts of hydraulic fracturing on of air, water and soil quality, based on data from a comprehensive measurement program air, water and soil quality before, during and after hydraulic fracturing activity.
Social and economic	Monitoring regional transition*	Synthesise existing knowledge on the nature of rural socio-economic transitions occurring as a result of resource developments, and track the social impacts of regional economic change.	Identify ways to help local communities in responding to resource development in order to maximise social benefit.
	Community functioning and well-being*	Identify principal indicators of community function and well-being, the resources and strategies necessary for enabling and enhancing community responses, and how communities respond to major developments in their region.	Inform strategic investments that will help maintain or enhance community function and well-being.
	Economic assessment and forecasting project*	Understand future impacts on regional economies and how local businesses can respond.	Forecasts calculating likely economic effects during the operations phase and lessons to support local businesses.
	Understanding community aspirations*	Identify community aspirations and their overlaps and/or disparities with existing resources, industry, and policy trajectories. Specifically, to understand how different community segments see the future of the region and how these reflect the economic and policy avenues for the region.	Help inform sound industry and policy activities to satisfy the social licence to operate.
	Community function and well-being survey 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.	Identify strategies that can be enacted by local and state government to proactively reduce stresses associated with rapid change and also to take advantage of opportunities arising from resource development.
	Trends in community wellbeing and attitudes to CSG development – Survey 3	This project involves monitoring and communicating the changes and trends in community wellbeing, resilience and attitudes to CSG development across different phases of industry operation in south west Queensland, and identifies how these vary between the construction, post-construction, and operations phases of development.	The project will inform the community, industry and government understanding of how and why community wellbeing and attitudes to CSG vary between regions and phases of CSG activity for planning and approval purposes. A more comprehensive understanding of these dynamics across time and space will enable more strategic and proactive policy and planning around CSG development.
Marine environment	Sustaining turtles and their homes*	Understand how sediments from dredging and discharges affect seagrass and turtles.	Quantifying the risks to turtle populations from dredging and increased boat traffic.

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
Greenhouse gas footprint	Methane seepage in the Surat Basin*	Detect and measure methane seeping from underground in the Surat Basin, and identify sources of methane to provide a baseline of methane emissions on a regional scale.	A methane emissions data set that can be used to compare changes in methane concentrations as coal seam gas production in the Surat Basin increases.
	Greenhouse gas emission assessment of the Surat Basin Gas Reserve	Analysis of the whole of life cycle GHG emissions, including extraction, transportation and usage of CSG in the Surat Basin.	Assessments of benefits and risks related to the extraction, transport and usage of gas in terms of their GHG emission footprint.
	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.	Identify the impact of CSG production activities on air quality in the Surat region.
Agricultural land management	Preserving agricultural productivity*	Assist in the preservation of agricultural productivity during land use change.	Developing methods for most equitably and/ or cost-effectively preserving agricultural productivity.
	Shared space*	Understand how farmers from a range of production systems (extensive grazing to intensive cropping) perceive and value CSG developments on their and others' farms.	Information that assists farmers and developers to negotiate means of co-existence that maximise benefits and minimise social and economic costs.
	Gas farm design*	Understand how to design farms for a new mixed land use.	Design principles and practices that optimise farm and gas infrastructure and operations, minimising negative impacts and maximising benefits.
	Making tracks, treading carefully*	Understand the direct and indirect impacts of tracks and traffic on invasive species and erosion in agricultural landscapes.	Guidelines for quantifying, monitoring and managing weed and erosion threats.
	Without a trace*	Identify the nature and likely extent of damage to agricultural soils, and methods for avoiding and improving soils.	Methods for installing and operating gas infrastructure that avoids soil damage, and novel methods for rehabilitating damage that does occur.
	Telling the story*	Share understanding of changes on farms and in towns during CSG development in the Surat area.	Development of a detailed landscape map showing changes during CSG developments and face-to-face engagements at local shows or community events in the Surat region.
	CSG and Livestock – Inside the Herd	Monitoring grazing land with CSG infrastructure to better understand the impacts of CSG infrastructure, traffic and dust on animals and pastures.	A detailed study of livestock behaviour, pastures, soil processes, and dust deposition for a real CSG property.
Terrestrial biodiversity	Priority threat identification, management and appraisal*	Identify and understand the broad range of existing and new threats to biodiversity across a CSG development region.	Determine which conservation management activities will best mitigate the risks to biodiversity.

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
	Fire ecology of grassy woodlands*	Determine the sensitivity of the region's flora and fauna to changed fire regimes, and the thresholds at which changed fire regimes cause substantial ecological impact.	Advice on how to best manage the biodiversity impacts of altered fire regimes associated with CSG development.
	Habitat selection by two focal species*	Study two species, the Golden-tailed gecko and Glossy black-cockatoo, to assess the range of impacts from CSG development in south-west Queensland on their habitat.	Management options for the Golden-tailed gecko and Glossy black-cockatoo habitats to ensure their long-term endurance.
	Ensuring biodiversity offset success: the right kind of seed for a rare daisy*	Identify genetic and demographic factors that may limit the success of establishing a rare daisy (*Rutidosis lantana*) in a new location.	Best practice guidelines for moving the *Rutidosis lantana*, a rare daisy, to a new location. The guidelines will help to minimise biological limits to reproductive success and maximise population viability of the daisy.
	Guidelines for offset population 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 by using computer models.	Evidence-based guidelines for the size of plant populations needed to maximise establishment and persistence of rare plant species.
Health	Potential health impacts from CSG	Establish processes and governance to ensure research quality, define the project boundary, conduct hazard identification and exposure pathways, and screen data.	Identify potential chemical and physical hazards and exposure pathways, assess the quality of existing data, and gaps in the data collected. Key issues will be selected for further in-depth assessment as part of the project to enable the health study framework to be demonstrated in its entirety.

**These projects have been completed and their reports are available at* www.gisera.csiro.au

3.1.3 Queensland Research Progress and Expenditure

The committed Queensland research budget, expenditure and milestones completed for each project is provided in table 3.4.

Table 3.4 Committed research investment, expenditure and progress in Queensland, by project

RESEARCH SUBJECT AREA	PROJECT	ALLOCATED BUDGET	EXPENDITURE UP TO 30 JUNE 2018	PERCENTAGE OF BUDGET SPENT UP TO 30 JUNE 2018	PERCENTAGE OF MILESTONES COMPLETED UP TO 30 JUNE 2018
Surface and groundwater	Geochemical responses to re-injection*	$1,061,242	$1,126,356	106%	100%
	Re-injection of CSG water*	$1,039,989	$1,085,085	104%	100%
	High performance groundwater modelling*	$928,215	$1,024,173	110%	100%
	Isotope and geochemical groundwater baseline study*	$667,053	$709,848	106%	100%
	Hydrocarbons in groundwater, Surat & Bowen basins*	$571,782	$568,722	99%	100%
	Constraining groundwater flow models*	$588,957	$728,765	124%	100%
	Water contamination risk assessment on hydraulic fracturing in unconventional gas extraction*	$290,624[8]	$290,628	100%	100%
	Air, water and soil impacts of hydraulic fracturing (Phase 1)*	$330,795[9]	$349,687	106%	100%
	Air, water and soil impacts of hydraulic fracturing (Phase 2)	$2,111,055[10]	$1,605,308	76%	29%
Social and economic	Monitoring regional transition*	$376,088	$404,084	107%	100%
	Community functioning and well-being*	$417,438	$457,314	110%	100%
	Economic assessment and forecasting project*	$296,508	$299,971	101%	100%
	Understanding community aspirations*	$342,692	$341,821	100%	100%
	Community function and well-being survey 2*	$180,479	$190,269	105%	100%

[8] This is a jointly funded QLD and NSW project. The figures presented in this table are for 'total project costs' and not split by region.

[9] This includes $245,670 contribution from APLNG (separate from membership)

[10] This includes $1,285,000 contribution from APLNG (separate from membership)

RESEARCH SUBJECT AREA	PROJECT	ALLOCATED BUDGET	EXPENDITURE UP TO 30 JUNE 2018	PERCENTAGE OF BUDGET SPENT UP TO 30 JUNE 2018	PERCENTAGE OF MILESTONES COMPLETED UP TO 30 JUNE 2018
	Trends in community wellbeing and attitudes to CSG development - Survey 3	$240,474	$116,242	48%	25%
Marine environment	Sustaining turtles and their homes*	$1,693,199	$1,802,905	106%	100%
Greenhouse gas footprint	Methane seepage in the Surat Basin*	$2,015,937	$2,293,353	114%	100%
	Greenhouse gas (GHG) emission assessment of the Surat Basin Gas Reserve	$241,708	$238,346	99%	33%
	Ambient air quality in the Surat Basin	$541,771	$543,854	100%	40%
Agricultural land management	Preserving agricultural productivity*	$547,756	$538,532	98%	100%
	Shared space*	$140,445	$138,805	99%	100%
	Gas farm design*	$651,329	$626,057	96%	100%
	Making tracks, treading carefully*	$564,089	$578,197	103%	100%
	Without a trace*	$339,990	$339,990	100%	100%
	Telling the story*	$332,224	$329,234	99%	100%
	CSG and Livestock- Inside the herd	$233,333	$211,715	91%	83%
Terrestrial biodiversity	Priority threat identification, management and appraisal*	$945,400	$995,144	105%	100%
	Fire ecology of grassy woodlands*	$789,042	$840,016	106%	100%
	Habitat selection by two focal species*	$167,432	$204,990	122%	100%
	Ensuring biodiversity offset success: the right kind of seed for a rare daisy*	$198,055	$225,232	114%	100%
	Guidelines for offset population sizes*	$198,630	$179,038	90%[11]	100%
Health	Potential health impacts from CSG	$850,293	$41,041	5%	0%
TOTAL ALLOCATED BUDGET		$19,705,118			

**These projects have been completed and their reports are available at* www.gisera.csiro.au

[11] Additional costs will be charged in 2018/19 associated with completion of knowledge transfer session.

3.1.4 Queensland Research Progress update

An approved research project consists of a Project Order and Budget that has been approved by the Regional Research Advisory Committee.

During the execution of an approved project, changes and modifications to the Project Order and Budget may be submitted to the Director for consideration. The Director may approve minor modifications to Project Orders that do not significantly alter the proposed outcomes, and do not have significant financial consequences for the project. The Director may consult the Regional Research Advisory Committee about these modifications.

Major modifications to Project Orders that may involve significant financial consequences or significant change in project scope will be prepared in consultation with the Director and presented to the Regional Research Advisory Committee for approval. Any changes made to Project Orders are available for public perusal.

Research updates and progress against project milestones are reported quarterly. Variations, if any, are also included as this allows any variations/modifications to the Project Order to be tracked easily. Summaries of each project's progress against milestones and variations, as well as the original Project Order, are available on the GISERA website: https://gisera.csiro.au/research/

3.2 Queensland proposed new research projects for 2018/19

Approximately $20,860[12] cash remains available for new project proposals to be initiated in FY 2018/19 and beyond.

The following projects ideas are being discussed, but are yet to be ratified and are subject to review by the relevant Regional Research Advisory Committee. Over coming months further stakeholder consultation will occur aiming to have CSIRO researchers draft project proposals based on these topics depending on resource capacity and also requiring RRAC approval to proceed.

Table 3.5 Proposed research investment in Queensland for 2018/19 and beyond, by project

SUBJECT AREA	TITLE	OBJECTIVE	POTENTIAL REGION	COMMENT	ESTIMATED COST
Communications	Communication wrap-up for Queensland	To provide a summary of the work undertaken and the lessons learnt in Queensland	QLD	A graphically designed Interactive summary of work in PDF or HTML format	$20K

[12] This figure is total GISERA funding for Queensland, less $19,705,117 already committed to research (tables 3.1 and 3.2) and less anticipated costs for the Director's Office/Communication for the life of GISERA. The remaining research budget does not include any future Federal or State Government contributions or CSIRO in-kind contributions.

4 NSW R&D Plan & Budget

4.1 NSW Investment profile

4.1.1 Committed research investment for 2016/17-2019/20

The committed budget for projects in New South Wales for 2016/17-2019/20 now stands at $2,230,078. A breakdown of the committed research budget across the various subject areas is illustrated in Table 4.1 and Table 4.2 shows the investment committed by contributor.

Table 4.1 Committed research investment in NSW by topic, 2016/17-2019/20

TOPIC / YEAR	2016-17	2017-18	2018-19	2019-20	TOTAL
Water (51%)	$465,011	$588,746	$73,571	$0	$1,127,328
Greenhouse gas (7%)	$155,363	$0	$0	$0	$155,363
Social & economic (30%)	$522,451	$152,412	$0	$0	$674,863
Health (12%)	$224,424	$48,100	$0	$0	$272,524
TOTAL	$1,367,249	$789,258	$73,571	$0	$2,230,078

Table 4.2 Committed research investment in NSW by contributor, 2016/17-2019/20

PARTNER	2016-17	2017-18	2018-19	2019-20	TOTAL
CSIRO (24%)	$331,472	$189,490	$18,392	$0	$539,354
Santos (13%)	$178,144	$104,135	$9,196	$0	$291,475
AGL (10%)	$178,144	$42,993	$0	$0	$221,137
Federal Government (26%)	$348,016	$202,010	$18,392	$0	$568,418
NSW Government (27%)	$331,473	$250,634	$27,588	$0	$609,694
TOTAL	$1,367,249	$789,258	$73,571	$0	$2,230,078

4.1.2 NSW Current Research Portfolio

A summary of all approved research projects in NSW is provided in table 4.3.

Table 4.3 Approved NSW Research Projects

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
Surface and groundwater	Impacts of CSG depressurization on 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.	Assess the chances of extreme changes in GAB groundwater flux (flow volumes) as a result of CSG development using state of the art uncertainty analysis and modelling.
	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.	Optimal spatial design of groundwater monitoring networks to improve confidence around predicted groundwater impacts, and help minimise the risk of environmental damage.
	Improving groundwater models to better represent coal seam gas extraction impacts in the Namoi region	Develop more representative models for estimating the groundwater impacts from coal seam gas well fields.	Improving the prediction of groundwater impacts by ensuring accurate representation of the effects of CSG production in the groundwater models being developed for the Namoi region.
	Groundwater contamination risk assessment *	Assess the likelihood of groundwater contamination from hydraulic fracturing and wellbore damage.	Quantitative estimate of the risk of groundwater contamination at a basin/sub-basin scale. This will help inform management plans and strategies to reduce the risk of surface and groundwater contamination and provide communities a better understanding of potential impacts to local water resources.
Social and economic	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 within NSW and analyse whether or not the CSG industry could change the trajectory of these variables.	Comprehensive baseline assessment of economic, social and demographic characteristics of CSG regions in NSW and the potential impacts of CSG on these characteristics.
	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.	Baseline information about the community's wellbeing, perceptions, expectations and resilience in relation to CSG development.
	Decommissioning pathways for CSG projects	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.	Recommendations for an integrated approach to improving the social, economic and environmental effectiveness of decommissioning of wells and well pads.

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
Greenhouse gas footprint	Regional Methane Emissions in NSW CSG Basins*	This project will identify and quantify methane emission sources such as CSG infrastructure, feedlots, coal mining, legacy bore holes in the Pilliga region.	This research will result in a detailed inventory and map of methane emissions for the Pilliga region that can be used to compare emissions once large scale gas extraction starts.
Health	Human health effects of coal seam gas*	Review current information to design a study on the health effects of CSG activities based on community stakeholder, governmental, expert consultation group, and industry input.	Comprehensive study design to investigate effects of CSG activity on human health, including development of a conceptual model to inform the study design.

**These projects have been completed and their reports are available at* www.gisera.csiro.au

4.1.3 NSW Research Progress and Expenditure

The committed New South Wales research budget, expenditure and milestones completed for each project is provided in table 4.4.

Table 4.4 Committed research investment, expenditure and progress in NSW, by project

RESEARCH SUBJECT AREA	PROJECT	ALLOCATED BUDGET	EXPENDITURE UP TO 30 JUNE 2018	PERCENTAGE OF BUDGET SPENT UP TO 30 JUNE 2018	PERCENTAGE OF MILESTONES COMPLETED UP TO 30 JUNE 2018
Surface and groundwater	Impacts of CSG depressurisation on the Great Artesian Basin flux	$420,910	$356,720	85%	83%
	Data- worth analysis and spatial design of groundwater monitoring networks in the Narrabri Gas Project area*	$216,218	$201,036[13]	93%	100%
	Improving groundwater models to better represent coal seam gas extraction impacts in the Namoi region	$301,295	$232,900	77%	67%
	Water contamination risk assessment on hydraulic fracturing in unconventional gas extraction*	$290,624[14]	$290,628	100%	100%
Social and economic	Analysing economic and demographic trajectories in NSW regions experiencing CSG development and operations*	$103,694	$103,694	100%	100%
	Social baseline assessment of the Narrabri region of NSW in relation to CSG development*	$272,292	$320,467	118%	100%
	Decommissioning CSG Wells	$298,876	$280,591	94%	88%
Greenhouse gas footprint	Regional methane emissions in NSW CSG basins*	$155,363	$155,363	100%	100%
Health	Human Health effects pf Coal Seam Gas Activity Study Design	$272,524	$317,002	116%	100%
TOTAL ALLOCATED BUDGET		$2,230,078			

**These projects have been completed and their reports are available at* www.gisera.csiro.au

[13] Additional costs will be charged to this project in 2018/19 for completion and submission of two journal papers

[14] This is a jointly funded QLD and NSW project. The figures presented in this table are for 'total project' and not split by region.

4.1.4 NSW Research Progress update

An approved research project consists of a Project Order and Budget that has been approved by the Regional Research Advisory Committee.

During the execution of an approved project, changes and modifications to the Project Order and Budget may be submitted to the Director for consideration. The Director may approve minor modifications to Project Orders that do not significantly alter the proposed outcomes, and do not have significant financial consequences for the project. The Director may consult the Regional Research Advisory Committee about these modifications.

Major modifications to Project Orders that may involve significant financial consequences or significant change in project scope will be prepared in consultation with the Director and presented to the Regional Research Advisory Committee for approval. Any changes made to Project Orders are available for public perusal.

Research updates and progress against project milestones are reported quarterly. Variations, if any, are also included as this allows any variations/modifications to the Project Order to be tracked easily. Summaries of each project's progress against milestones and variations, as well as the original Project Order, are available on the GISERA website: https://gisera.csiro.au/research/.

4.2 NSW proposed new research projects for 2018/19

Approximately $1,008,206[15] cash remains available for new project proposals to be initiated in FY 2018/19 and beyond.

The following projects ideas are being discussed, but are yet to be ratified and are subject to review by the relevant Regional Research Advisory Committee. Over coming months further stakeholder consultation will occur aiming to have CSIRO researchers draft project proposals based on these topics depending on resource capacity and also requiring RRAC approval to proceed.

Table 4.5 Proposed research investment in NSW for 2018/19 and beyond, by project

SUBJECT AREA	TITLE	OBJECTIVE	POTENTIAL REGION	COMMENT	ESTIMATED COST
Surface & Groundwater	Fault permeability in Gunnedah Basin	To investigate the potential permeability of faults in the Gunnedah Basin.	NSW	To assess the permeability of faults in the Gunnedah Basin	$100-150K
Greenhouse Gas	Assessment of the total and local gas emissions potential from NSW coal basins: application for quantifying fugitive and natural gas seepage through subsurface strata	To improve our understanding of gas release from coal, its movement through the subsurface and its emission into the atmosphere. This understanding will provide the necessary tools to quantify expected emissions from the subsurface, which can be matched against measurements conducted at the ground surface.	NSW	Some key outcomes of this project includes: - a method to assess the emissions potential of a coal seam reservoir under in situ conditions and after industrial development; and, - the application of this method to quantify the total emissions potential from NSW coal basins.	$300K
Biodiversity	Optimal management strategies for plant population offsetting	Evaluate and quantify optimal population offsetting management strategies for different plant groups accounting for lack of biological information.	NSW	This is a follow up of the population offsetting project to optimise management strategies to increase offset success which could be applied in NSW or any other geographical area where biodiversity offsetting is taking place.	$200K

[15] This figure is total GISERA funding for NSW, less $2,230,078 already committed to research (tables 4.1 and 4.2) and less anticipated costs for the Director's office/Communications for the life of National GISERA. The remaining research budget does not include future CSIRO in-kind contributions.

5 South Australia R&D Plan & Budget

5.1 South Australia Investment profile

5.1.1 Committed research investment for 2018/19 - 2019/20

The committed budget for projects in South Australia for 2018/19-2019/20 now stands at $896,120[16]. A breakdown of the committed research budget across the various subject areas is illustrated in Table 5.1 and Table 5.2 shows the investment committed by contributor.

Table 5.1 Committed research investment in South Australia by topic, 2018/19-2019/20

TOPIC / YEAR	2018-19	2019-20	TOTAL
Water (31%)	$165,753	$111,797	$277,550
Agriculture (20%)	$175,133	$0	$175,133
Social & economic (49%)	$257,592	$185,845	$443,437
Total	$598,478	$297,642	$896,120

Table 5.2 Committed research investment in South Australia by contributor, 2018/19-2019/20

PARTNER	2018-19	2019-20	TOTAL
CSIRO (25%)	$149,620	$74,410	$224,030
Federal Government (37.5%)	$224,429	$111,616	$336,045
SA Government (37.5%)	$224,429	$111,616	$336,045
Total	$598,478	$297,642	$896,120

[16] An additional two projects have been approved by the SA RRAC, but are not included in table 5.1 and 5.2 as they were approved after this reporting period. These two projects are listed in proposed projects in table 5.4.

5.1.2 South Australia Current Research Portfolio

A summary of all approved research projects in South Australia is provided in table 5.3.

Table 5.3 Approved South Australia Research Projects

RESEARCH SUBJECT AREA	PROJECT	SCOPE	OUTCOMES
Surface and Groundwater	Onshore gas and water contamination: causes, pathways and risks	Investigate potential groundwater contamination causes, pathways and vulnerability to understand onshore gas water quality impacts for southeast SA.	Achieve a realistic quantification of groundwater contamination risks in gas development areas of southeast SA.
Social and Economic	Community wellbeing 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 South Australia's south east, and develop baseline data on community values, well-being and future expectations.	Baseline information about community well-being, perceptions, expectations and resilience for conventional gas development, to improve awareness and knowledge.
	Assessing the value of locally produced conventional gas in SA's South East	Develop a profile of the gas industry and its role within the regional economy and develop scenarios for how the local gas industry may evolve.	Knowledge for policy makers and local businesses regarding the socio-economic value of gas activity for local communities, and an improved capacity to forecast outcomes from industry development.
Agricultural land management	Gas impacts and opportunities on primary industries	Analyse possible impacts and opportunities from gas development for rural areas in South Australia's south east.	Information to assist community understanding and inform policy development of potential impacts and opportunities from conventional gas development on primary industries.

**These projects have been completed and their reports are available at* www.gisera.csiro.au

5.1.3 South Australia Research Progress and Expenditure

The committed South Australia research budget, expenditure and milestones completed for each project is provided in table 5.4.

Table 5.4 Committed research investment, expenditure and progress in South Australia, by project

RESEARCH SUBJECT AREA	PROJECT	ALLOCATED BUDGET	EXPENDITURE UP TO 30 JUNE 2018	PERCENTAGE OF BUDGET SPENT UP TO 30 JUNE 2018	PERCENTAGE OF MILESTONES COMPLETED UP TO 30 JUNE 2018
Surface and Groundwater	Onshore gas and water contamination: causes, pathways and risks	$277,550	$0	0%	The first milestone is expected to be completed by October 2018.
Social and Economic	Community wellbeing and attitudes to conventional gas development in the South East of South Australia	$204,957	$0	0%	The first milestone is expected to be completed by April 2019.
	Assessing the value of locally produced conventional gas in SA's South East	$238,480	$0	0%	The first milestone is expected to be completed by August 2018.
Agricultural land management	Gas impacts and opportunities on primary industries	$175,133	$0	0%	The first milestone is expected to be completed by September 2018.
TOTAL ALLOCATED BUDGET		$896,120			

**These projects have been completed and their reports are available at* www.gisera.csiro.au

5.1.4 South Australia Research Progress update

An approved research project consists of a Project Order and Budget that has been approved by the Regional Research Advisory Committee.

During the execution of an approved project, changes and modifications to the Project Order and Budget may be submitted to the Director for consideration. The Director may approve minor modifications to Project Orders that do not significantly alter the proposed outcomes, and do not have significant financial consequences for the project. The Director may consult the Regional Research Advisory Committee about these modifications.

Major modifications to Project Orders that may involve significant financial consequences or significant change in project scope will be prepared in consultation with the Director and presented to the Regional Research Advisory Committee for approval. Any changes made to Project Orders are available for public perusal.

Research updates and progress against project milestones are reported quarterly. Variations, if any, are also included as this allows any variations/modifications to the Project Order to be tracked easily. Summaries of each project's progress against milestones and variations, as well as the original Project Order, are available on the GISERA website: https://gisera.csiro.au/research/.

5.2 South Australia proposed new research projects for 2018/19

Approximately $594,026[17] cash remains available for new project proposals to be initiated in FY 2018/19 and beyond.

The following projects ideas are being discussed, but are yet to be ratified and are subject to review by the relevant Regional Research Advisory Committee. Over coming months further stakeholder consultation will occur aiming to have CSIRO researchers draft project proposals based on these topics depending on resource capacity and also requiring RRAC approval to proceed.

Table 5.5 Proposed research investment in South Australia for 2018/19 and beyond, by project

SUBJECT AREA	TITLE	OBJECTIVE	POTENTIAL REGION	COMMENT	ESTIMATED COST
Surface and Groundwater	Groundwater balance in the development regions of south east of SA[18]	This research aims to improve groundwater balance models in the onshore gas development regions of south east South Australia	SA	Through this study, an improved understanding of groundwater flow regimes in selected gas development areas of the Otway Basin will help inform decision making and community understanding of water takes by the gas industry in relation to other water uses and management measures required for optimal water use.	$326K
Surface and Groundwater	Microbial degradation of chemical compounds used in onshore gas production[19]	The aim is to better understand the impacts and residual risk of the chemical compounds used in onshore gas production to environmental contamination over time in natural environments.	SA	This project seeks to understand whether compounds used in the production of onshore gas are degraded by microbes in relevant southeast South Australian soils and subsurface aquifers, in both oxic and anoxic conditions. In addition, the project seeks to examine the impact of these compounds on microbial communities	$235K

[17] This figure is total GISERA funding for South Australia, less $896,120 already committed to research (tables 5.1 and 5.2) and less anticipated costs for the Director's office/Communications for the life of National GISERA. The remaining research budget does not include future CSIRO in-kind contributions.

[18] This project was approved by the SA RRAC after this reporting period.

[19] This project was approved by the SA RRAC after this reporting period.

6 Proposed management and communication budget for 2018/19

Table 5.1 shows GISERA's actual management and communications expenditure during the 11-12 to 17-18 financial years and the proposed management and communications budget for 18-19.

Table 6.1 Proposed management and communications budget, 2018/19 with actual expenditure for 2011/12-2017/18

ITEM	SUB-ITEM	ACTUAL EXPENDITURE								2018-19	TOTAL
		Initial Alliance Agreement					National Alliance Agreement				
		2011-12	2012-13	2013-14	2014-15	2015-16 (Jul-Dec 15)	2015-16 (Jan-Jun 16)	2016-17	2017-18		
Comms	Comms salary & OH	$188,899	$214,378	$259,429	$110,422	$95,405	$86,480	$163,470	$192,714	$238,784	$1,549,981
	Travel & accommodation	$0	$0	$4,116	$3,490	$8,787	$11,039	$20,951	$14,868	$20,000	$83,251
	Factsheets, brochures infographics, videos etc.	$11,300[20]	$0	$600	$489	$0	$7,110	$19,537	$21,706	$35,000	$95,742
	Public info. sessions	$0	$0	$0	$0	$3,145	$0	$3,312	$21,925[21]	$1,500	$29,882
	Vodcasts	$0	$0	$3,000	$0	$0	$0	$0	$0	$0	$3,000
	Printing	$4,520	$0	$296	$555	$2,109	$2,038	$1,324	$3,246	$2,500	$16,588
	General Expenses & Annual report	$8,303	$21,937	$511	$3,507	$372	$2,922	$5,277	$4,632	$5,000	$52,461
	Media training	$7,530	$689	$7,327	$10,741	$0	$0	$0	$0	$0	$26,287
Comms total		$220,552	$237,004	$275,279	$129,204	$109,817	$109,589	$213,870	$259,091	$302,784	$1,857,191

[20] Includes design & artwork for GISERA launch

[21] Includes GISERA's contribution and presence at CSIRO booth at APPEA Conference

ITEM	SUB-ITEM	ACTUAL EXPENDITURE								2018-19	TOTAL
		Initial Alliance Agreement					National Alliance Agreement				
		2011-12	2012-13	2013-14	2014-15	2015-16 (Jul-Dec 15)	2015-16 (Jan-Jun 16)	2016-17	2017-18		
Director's office	Director salary & OH	$104,671	$148,924	$101,727	$204,799	$62,688	$61,827	$237,765	$336,191[22]	$439,651[23]	$1,698,243
	Admin support	$0	$25,801	$18,416	$167,848	$63,488	$68,411	$252,594	$409,412[24]	$330,415	$1,336,385
	Contractor	$0	$0	$0	$0	$0	$61,584	$168,292	$48,754	$0	$278,630
	Travel & accommodation	$28,384	$13,653	$23,760	$48,129	$15,853	$42,619	$46,297	$48,282	$50,000	$316,977
	Conferences	$0	$0	$0	$0	$0	$30,315	$10,524	$10,448	$10,000	$61,287
	Annual GISERA Workshop	$0	$0	$1,859	$13,410	$10,279	$417	$4,848	$22,759[25]	$10,000	$63,572
	Office supplies	$0	$0	$0	$0	$1,089	$7,648	$2,650	$292	$2,500	$14,179
	Auditor	$0	$0	$0	$0	$0	$0	$0	$0	$2,975	$2,975
Director's office total		$133,055	$188,378	$145,762	$434,186	$153,399	$272,821	$722,970	$876,138	$845,541	$3,772,248
TOTAL (Director's office & Comms)		$353,607	$425,382	$421,041	$563,390	$263,216	$382,411	$936,841	$1,135,229	$1,148,325[26]	$5,629,440

[22] Includes Director and Deputy Director's time to GISERA

[23] Includes Director and Deputy Director's time to GISERA

[24] Includes Executive Officer and two Administration Assistants' time to GISERA.

[25] Includes two National Stakeholder Roundtable Group meetings

[26] This figure is the anticipated Director's office and Communications costs up to 30 June 2019 (not over life of National GISERA).

Table 6.2 Partner contributions – Initial Alliancement Agreement 2011/12-2015/16

	COMMS & MNGT COSTS CONTRIBUTIONS	2011-12	2012-13	2013-14	2014-15	2015-16 (JUL-DEC 15)	2015-16 (JAN-JUN 16)	2016-17	2017-18	2018-19	TOTAL
Initial GISERA	CSIRO	$176,804	$212,691	$210,520	$281,695	$131,608	$0	$0	$0	$0	$1,013,318
	APLNG/QGC	$176,804	$212,691	$210,520	$281,695	$131,608	$0	$0	$0	$0	$1,013,318
TOTAL		$353,607	$425,382	$421,041	$563,390	$263,216	$0	$0	$0	$0	$2,026,636

Table 6.3 Partner contributions – National Alliance Agreement 2015/16-2018/19

	COMMS & MNGT COSTS CONTRIBUTIONS	2011-12	2012-13	2013-14	2014-15	2015-16 (JUL-DEC 15)	2015-16 (JAN-JUN 16)	2016-17	2017-18	2018-19	TOTAL
National GISERA	CSIRO	$0	$0	$0	$0	$0	$172,083	$421,579	$540,891	$447,847	$1,582,400
	DoIIS	$0	$0	$0	$0	$0	$45,889	$112,421	$267,161	$310,048	$735,519
	NSW Government	$0	$0	$0	$0	$0	$68,834	$168,631	$151,862	$80,383	$469,710
	SA Government	$0	$0	$0	$0	$0	$0	$0	$60,071	$114,833	$174,904
	APLNG	$0	$0	$0	$0	$0	$19,121	$46,842	$28,711	$22,967	$117,641
	QGC	$0	$0	$0	$0	$0	$19,121	$46,842	$28,711	$22,967	$117,641
	Origin	$0	$0	$0	$0	$0	$19,121	$46,842	$28,711	$22,967	$117,641
	Santos	$0	$0	$0	$0	$0	$19,121	$46,842	$28,711	$68,900	$163,574
	AGL	$0	$0	$0	$0	$0	$19,121	$46,842	$400	$0	$66,363
	NT Government	$0	$0	$0	$0	$0	$0	$0	$0	$57,416	$57,416
TOTAL		$0	$0	$0	$0	$0	$382,411	$936,841	$1,135,229	$1,148,325	$3,602,806

7 Communication

7.1 Overview

As gas exploration and development increases in regions around Australia, information about the onshore gas industry is being sought by local communities, governments, land-use industries (especially farmers), environmentalists and the wider public. GISERA's accessible, transparent research outcomes are well placed to contribute constructively and objectively to this need.

CSIRO GISERA plays an important role in providing trusted information about the challenges and opportunities associated with the onshore gas industry. Details of GISERA's communication goals are summarised in Section 8.2 Communication goals and KPIs.

Since launching CSIRO's GISERA in July 2011, the GISERA Director and CSIRO research staff have participated in 947 engagements with a range of stakeholders, such as federal and state Members of Parliament, industry associations, community groups, research organisations, gas developers, journalists and consultants. A breakdown of this activity can be found in Table 8.3 Summary of Engagement over the life of GISERA.

CSIRO GISERA presentations at conferences, community information sessions and seminars continue to be key opportunities to inform stakeholders about research outcomes which address the social and environmental impacts and opportunities arising from onshore gas development. Examples of presentations can be found at Presentations.

Communication of CSIRO GISERA research has occurred through the use of traditional and online media channels, as appropriate, to reach wider community audiences. While the GISERA Director and CSIRO research staff provided 24 media interviews with traditional media channels, including print, television and radio in 2017-18, a key communication focus was development of innovative online communication products accessible directly by public audiences.

Communication highlights during this period include development of a range of communication products to showcase CSIRO GISERA research, including:

- A factsheet called About us which provides an overview of CSIRO GISERA's aims, partners, communication and governance processes;
- A brochure called Summary of research projects which provides a progress summary of research by GISERA.
- A factsheet called New South Wales coal seam gas research projects: Update Summary provides a progress summary of research by GISERA in regional NSW;
- A factsheet called Air quality assessment in the Surat Basin, providing a summary of key findings from the analysis of data collected during September 2014 – December 2016.
- A factsheet called Human Health and CSG development; a framework to investigate possible health effects which outlines a framework for research into possible health effects associated with coal seam gas activity;
- A video titled Air, water and soil impacts of hydraulic fracturing of CSG wells;
- A video titled Gas Industry Social and Environmental Research Alliance: an overview
- Fast facts factsheet on GISERA and the Otway;
- GISERA Newsletter

CSIRO GISERA's reputation as a provider of trusted advice to community has been enhanced by the past year's engagements with landowners, farmers and the local communities at a range of community and industry forums and rural shows, including:

- Katherine Food Futures Roadshow (NT Farmers Roadshow), Damian Barrett hosted a long discussion about GISERA and fracking in the Katherine region, Katherine, July 2017;
- Presentation on GISERA's NSW research preliminary results to key community stakeholders within the Narrabri Community including representatives from EPA, NW Courier, North West Local Land Services, Narrabri Shire Council, Lower Namoi Cotton Growers Association, CFI Namoi Aviation, Member for Barwon, Yes2Gas, NSW Farmers, Narrabri CCC, Narrabri and District Chamber of Commerce, ABC Media, People for the Plains, Narrabri. September 2017;
- Showcasing GISERA's agricultural research to CSIRO AgCatalyst, CSIRO's premier showcase of the latest innovations and technologies in agriculture, food and fibre sectors, Sydney, December 2017;
- Presentation to Northern Territory Cattlemen's Association on NT fracking inquiry draft recommendations and potential research questions;
- Chinchilla Show 2018, Neil Huth and Brett Cocks managed the CSIRO stand with GISERA collateral available. There were over 100 interactions with farmers and local businesses, May 2018;
- GISERA provided background information and comment for an SBS Insight episode exploring the debate around a coal seam gas proposal near Narrabri in NSW. The episode aired on 29 May 2018 and broadcast excerpts from GISERA's coal seam gas animation as part of the segment. The GISERA Director also contributed an opinion piece on the role of science in the CSG debate, which was published online in conjunction with the SBS Insight program.

Increased understanding of research results occurred through GISERA's knowledge transfer sessions for:

- Social project 7 - Social baseline assessment of the Narrabri region of NSW in relation to CSG development, Brisbane, December 2017;
- Social project 8 - Analysing economic and demographic trajectories in NSW regions experiencing CSG development and operations, Brisbane, December 2017;
- Health project 1 - Potential human health effects of coal seam gas, Brisbane and Sydney, March 2018;

Media interviews with lead CSIRO GISERA scientists discussed topics including:

- GISERA's overall research
- SBS insight program, Power Divide
- Regional methane emissions in NSW CSG basins project
- Analysing economic and demographic trajectories in NSW experiencing CSG development and operations project
- Social baseline assessment of the Narrabri region of NSW in relation of CSG development project
- Potential CSG impacts on the Great Artesian Basin in Narrabri, NSW
- What is unconventional gas?

- GISERA's expansion into South Australia
- Development of the Northern Territory gas industry

Table 7.1 Scientific presentations, poster presentations and interactions promoting GISERA research during 2017-18

EVENT	NAME OF PRESENTATION	PRESENTER(S)	LOCATION	DATE
Energy Impacts Symposium 2017	Rural communities and unconventional gas development: impacts on community wellbeing and resilience over time in Surat Basin Queensland	Andrea Walton	Ohio	Jul-17
NHMRC Centre of Research Excellence (CAR)	GISERA Health Study	Melita Keywood	Via webinar	Jul-17
Goldschmidt Conference, European Association of Geochemistry and the Geochemical Society	A multi-tracer study in the Surat Basin, Australia: "wrong ages" in Hutton Sandstone give deeper insights into aquifer structure and effective deep recharge, and chasing the fate of the fresh water of Precipice Sandstone	Axel Suckow	Paris	Aug-17
The 10th International Carbon Dioxide Conference (ICDC10)	CSIRO Greenhouse Gas Monitoring Network, mentioning GISERA the Surat Basin monitoring stations	Zoe Loh and Paul Kimmel	Massachusetts	Aug-17
Groundwater Roundtable (Conservation Farmers Inc.	GISERA's groundwater research	Neil Huth	Toowoomba	Aug-17
23nd Clean Air Society of Australia and New Zealand Conference	Coal seam gas and air quality in the Surat Basin, Queensland	Sarah Lawson	Brisbane	Oct-17
IAH QLD branch meeting	Overview of the GISERA water research portfolio	Sreekanth Janardhanan	Brisbane	Oct-17
QUPEX Forum	Overview of GISERA and how the industry is currently engaged	Damian Barrett	Brisbane	Oct-17
2017 Atmospheric Composition and Chemistry Observations and Modelling Conference	GISERA project 'Ambient Air Quality in Surat Basin' including comparison of pollutant levels with air quality standards and a preliminary exploration of some pollution events observed	Sarah Lawson	South Durras, NSW	Nov-17
2017 Atmospheric Composition and Chemistry Observations and Modelling Conference	GISERA project 'Air, water and soil impacts of hydraulic fracturing phase 2' study design for the air quality measurement program within the project	Erin Dunne	South Durras, NSW	Nov-17
Roundtable for Oil and Gas Projects in South Australia	Overview of GISERA and project results	Damian Barrett	Adelaide	Nov-17
Coordination of Government Geoscience Programs (CCGGP)	GISERA and its potential interaction with NSW agencies	Damian Barrett	Sydney	Nov-17
The Australian Meteorological and Oceanographic Society and the American Meteorological Society, Joint 25th AMOS National Conference and 12th International Conference for Southern Hemisphere Meteorology and Oceanography, AMOS-ICSHMO 2018	Monitoring areal sources of fugitive fossil fuel emissions	David Etheridge	Sydney	Feb-18

EVENT	NAME OF PRESENTATION	PRESENTER(S)	LOCATION	DATE
ACS National Meeting & Expo-Nexus of Food, Energy & Water	Arsenic mobilization and attenuation during injection of treated CSG co-produced water into deep aquifers	Henning Prommer	New Orleans	Mar-18
14th Australasian Environmental Isotope Conference (AEIC)	A multi-tracer study in a complex aquifer system: Surat Basin, Queensland	Axel Suckow	Wellington	Mar-18
15th International Public Communication of Science and Technology conference	Risky Business: the role of communicating science stories in emotionally-charged debates	Helen Beringen	Dunedin	Apr-18
European Geosciences Union General Assembly 2018	Environmental tracer studies to characterise and quantify groundwater flow and recharge in aquifers of the Surat Basin, Queensland Australia	Axel Suckow	Vienna	Apr-18
APPEA national conference	A showcase of GISERA research and instrumentation featured. An innovative virtual reality booth which took delegates on a virtual tour of a coal seam gas well, supported by researchers, videos and fact sheets	N/A	Adelaide	May-18

Table 7.2 GISERA key engagements with community, government and industry during 2017/18

AUDIENCE	TOPIC	DATE
Panel for Scientific Inquiry into Hydraulic Fracturing in the Northern Territory	Community well-being and responding to change survey	Jul-17
Panel for Scientific Inquiry into Hydraulic Fracturing in the Northern Territory	Briefing on CSIRO/GISERA's Alliance Agreement with resource companies exploring the Beetaloo to establish a coordinated research approach into methods and establishment of baseline values of groundwater. Presentation on Agriculture, Water, Greenhouse, Health and Air research	Jul-17
QLD Department of Natural Resources, Mines and Energy, landholders (including members of the Basin Sustainability Alliance), GasFields Commission Queensland, Western Downs Regional Council and Chinchilla Family Support Centre, Origin, QGC/Shell	GISERA Social Project 9 - Decommissioning wells, Surat Basin Workshop: A workshop was conducted to consider how the CSG industry and regulators are responding to evolving best practices and to community expectations regarding decommissioning in the Surat Basin. The purpose of the discussion was to explore the views, perceptions and concerns of diverse stakeholders.	Aug-17
NSW Government's Expert Water Advisory Panel	GISERA NSW research preliminary results	Sep-17
Santos, NSW Environment Protection Authority and community representatives from the Santos Community Consultative Committee	GISERA Social Project 9 - Decommissioning wells, Workshop, Narrabri, NSW: A workshop was conducted to consider how the CSG industry and regulators are responding to evolving best practices and to community expectations regarding decommissioning in Narrabri Shire. The purpose of the discussion was to explore the views, perceptions and concerns of diverse stakeholders.	Sep-17
NSW Department of Planning & Environment, NSW Department of Health, NSW Ministry of Health, NSW Treasury, NSW Department of Primary Industries Water and Science, Department of Industry, Innovation and Science, Planning NSW and NSW Department of Premier and Cabinet	GISERA NSW research preliminary results	Sep-17
QLD Department of Agriculture and Fisheries, QLD Department of Natural Resources and Mines, QLD Department of Environment and Heritage Protection,	Annual GISERA Symposium - Provided an opportunity for CSIRO's lead researchers, GISERA partners and key stakeholders to hear directly about our latest science,	Oct-17

AUDIENCE	TOPIC	DATE
Department of Industry, Innovation and Science, University of Southern Queensland, University of Queensland, Queensland GasFields Commission, Origin, QGC/Shell, APLNG, Santos	and share perspectives to ensure our research is focused and impactful. It featured presentations from Government, Industry and the QLD RRAC, alongside presentations from our research areas.	
Grattan Institute, International Energy Agency, The Australia Institute, National Farmers Federation, Minerals Council of Australia, Central Land Council, The Ethics Centre, APLNG, Santos, QGC/Shell	National Stakeholder Roundtable Group - Meeting purpose was for CSIRO to clarify priorities under GISERA and for stakeholders to provide counsel to GISERA on the direction and strategy of GISERA.	Nov-17
University of Queensland, University of Newcastle, NSW Department of Planning and Environment, NSW Ministry of Health, NSW Department of Premier and Cabinet, Lower Namoi Cotton Growers Association, Queensland GasFields Commission, QLD Department of Health, SA Department of the Premier and Cabinet), NSW Environment Protection Authority, NSW Department of Health, QLD Department of Natural Resources and Mines, Department of Industry, Innovation and Science, APLNG, Shell/QGC	GISERA Health Effects of Coal Seam Gas Project, Phase 2 - A briefing on CSIRO's Human Health effects of Coal Seam Gas Activity Study	Dec-17
NT Department of Environment and Natural Resources, NT Department of the Chief Minister	NT Inquiry recommendations and identified research opportunities	Apr-18
QLD Department of Environment and Science, QLD Department of Natural Resources, Mines and Energy, QLD Department of Health, QLD Department of State Development Manufacturing Infrastructure and Planning, University of Queensland, QLD GasFields Commission	GISERA CSG/Health Study workshop - project update, site selection discussion including site representatives, stakeholders and communities, data availability and gaps. Discussion also on project stock take, risk management, and data repository	Apr-18
WA Department of Mines, QLD Department of Natural Resources, Mines and Energy, VIC Department of Economic Development, Jobs, Transport and Resources, NT Department of Primary Industry and Resources, SA Department of Premier and Cabinet, NSW Department of Planning and Environment, TAS Department of State Growth, Department of Industry, Innovation and Science,	Gas Supply Strategy Stakeholder Consultation Workshop: The Steering committee invited GISERA to participate and contribute to this workshop	May-18
QLD Department of Environment and Science, QLD Department of Transport and Main Roads, University of Sunshine Coast, QGC/Shell, GHD	GISERA Biodiversity project 5 workshop - discussed research results and their implications for: 1) the offsetting work in Queensland CSG areas; and 2) to improve current plant population offsetting policies at Federal and Queensland Government	May-18
Department of Industry, Innovation and Science, The Ethics Centre, National Farmers Federation, Minerals Council of Australia, Central Land Council, Australia Institute, ANU Energy Change Institute, QGC/Shell, APLNG, Santos	National Stakeholder Roundtable Group - A presentation from The Ethics Centre's Victoria Whitaker about Trust and Legitimacy at the start of the day set the scene for open and constructive discussion about GISERA, its research, communication and engagement activities. CSIRO researchers presented information on projects within GISERA's Agricultural land management and Socio-economic portfolios, and highlighted their engagement with farmers, landholders and regional communities throughout the research process. A broad overview of GISERA's communication and engagement strategy was also presented and discussed. Explaining how GISERA's communication and stakeholder engagement process begins with consultation before the research commences, as well as during the research process, and at its conclusion.	Jun-18

7.2 Communication outputs

A suite of communication tools have been used to ensure effective and meaningful communication of research outcomes. Table 7.1 shows a range of communication outputs GISERA has achieved over the last 7 years.

Table 7.3 Summary of multi-media communication outputs – Newsletters & Videos

COMMUNICATION TOOL	NAME OF COMMUNICATION PRODUCT	DATE FIRST PUBLISHED	LATEST EDITION	NUMBER OF VIEWS
Newsletter	GISERA e-newsletter (for both external and internal stakeholders)	December 2013 (bi-annual publication)	June 2018	N/A 298 subscribers Total audience reach 75,788. This includes Twitter, subscribers, website visits, internal and cross organisational promotion.
Videos - CSIRO	Unearthing shale gas	October 2014	-	5,153
	Unearthing coal seam gas	September 2014	-	15,714
Videos - GISERA	Gas Industry Social and Environmental Research Alliance: an overview	March 2018	-	126
	Air, water and soil impacts of hydraulic fracturing of CSG wells	March 2018	-	144
	Looking to the Future: Job forecasts for the Surat Basin, 2014 to 2034	Mach 2017	-	232
	Assessing the air quality in the Surat Basin	August 2016	-	387
	Telling the story	August 2016	-	147
	Methane seeps in the Surat Basin	September 2014	-	594
	Understanding groundwater movement	January 2014	-	596
	Collecting ants in coal seam gas development regions	June 2013	-	221
	Tagging turtles in Gladstone Harbour	May 2013	-	155
	Over view of surface and groundwater projects	March 2013	-	387
	Over view of agricultural land management projects	March 2013	-	457
	Over view of terrestrial biodiversity projects	March 2013	-	311
	Over view of marine environment projects	March 2013	-	188
	Over view of social and economic projects	March 2013	-	327

Table 7.4 Summary of multi-media communication outputs – Brochures and Factsheets

COMMUNICATION TOOL	NAME OF COMMUNICATION PRODUCT	NATIONAL OR REGIONAL	DATE FIRST PUBLISHED	LATEST EDITION
Brochures / info-graphics	Looking to the Future: Job forecasts for the Surat Basin 2014 to 2034	National	March 2017	-
	Community wellbeing and adapting to coal seam gas: Survey highlights and key messages	QLD	March 2017	-
	Research Progress Infographic	National	August 2013 (updates are ongoing)	June 2018
	Summary of research projects	National	May 2012 (updated as required)	May 2018
Fact sheets	Air quality assessment in the Surat Basin	QLD	May 2018	
	Attitudes to CSG development in the Narrabri shire - Factsheet	NSW	April 2018	-
	GISERA and the Otway: Fast facts	National	March 2018	-
	Human health and CSG development: a framework to investigate possible health effects	NSW	February 2018	-
	Potential impacts of coal seam gas development on water flows to the Great Artesian Basin	NSW	October 2017	-
	New South Wales coal seam gas research projects: Update summary	NSW	September 2017	-
	What does science tell us about fugitive methane emissions from unconventional gas?	QLD	May 2017	-
	About Us	National	April 2017	
	Methane Seeps in the Condamine River	QLD	March 2017	-
	Groundwater flows in the Hutton Sandstone and Precipice Sandstone aquifers	QLD	March 2017	-
	Surat Basin regional air quality, Queensland	QLD	February 2017	-
	Soil Compaction	QLD	May 2016	December 2016
	Understanding the way farmers see their farm.	QLD	May 2016	December 2016
	Access tracks and soil erosion.	QLD	May 2016	December 2016
	Community Wellbeing in the Western Downs: 2014 and 2016	QLD	May 2016	April 2017
	Community attitudes towards CSG development: 2014 and 2016	QLD	May 2016	April 2017
	Ensuring biodiversity offset success: the right kind of seed for a rare daisy (Rutidosis lanata)	QLD	January 2016	May 2016
	Characteristics of methane seeps	National	April 2015	April 2017
	Coal seam gas regions reverse rural decline trend	National	January 2014	-
	Community resilience	National	July 2013	-

COMMUNICATION TOOL	NAME OF COMMUNICATION PRODUCT	NATIONAL OR REGIONAL	DATE FIRST PUBLISHED	LATEST EDITION
	Rural change as a result of CSG developments and the associated economic impacts	National	July 2013	-
	Social licence to operate	National	May 2013	-
	Five fact sheets on coal seam gas extraction and some potential environmental impacts. Now incorporated on the FAQs page	National	April 2012 (updated as required)	April 2017

Table 7.5 Summary of multi-media communication outputs – Media releases, Presentations and Articles

COMMUNICATION TOOL	NAME OF COMMUNICATION PRODUCT	NATIONAL OR REGIONAL	DATE FIRST PUBLISHED	LATEST EDITION
Media Releases / Statements	Coal seam gas is divisive, how can science help? SBS	National	June 2018	
	South Australian Government partners with CSIRO on South East Gas study	National	February 2018	-
	New NSW study to understand economic impact of gas in regional communities	NSW	November 2017	-
	Community wellbeing and attitudes to CSG around Narrabri, NSW	NSW	November 2017	-
	Australia Institute "discussion paper"	National	October 2016	-
	Live stream air quality data from coal seam gas regions	QLD	August 2016	-
	CSIRO research alliance expands into New South Wales	NSW	March 2016	-
	CSIRO conducting world's best practice methane emissions research	National	May 2015	-
	Landmark report reveals how regional communities really feel about coal seam gas	QLD	September 2014	-
	First ever coal seam gas scientific research alliance established	National	July 2011	-
Presentations	Briefings, seminars, workshop forums and conference presentations on unconventional gas have been given to scientists, students, teachers, the general public, government departments and members of parliament	National	Published as required	-
Articles	111 media articles have been published on GISERA and its research projects in the print media and online media portals. These have included Brisbane's Courier Mail, The Narrabri Courier, the Northern Leader (Tamworth), The Land, Australian Mining, Chinchilla News, Dalby Herald, Stock Journal, Rural Press, ECOS, Conversation, ABC Science, GasFields Commission e-newsletter, Australian Oil and Gas Review, AusIMM Bulletin, Australian Resources Magazine, Investment and Resourceful Magazine and Energy Magazine.	National	Ongoing	Ongoing

7.3 Stakeholder Engagement

GISERA aims to achieve credibility, trust and respect from all stakeholders through the open and transparent conduct and communication of its research and synthesis activities. Table 7.2 outlines the engagements for 2017-18 and Figure 7.1 shows stakeholder interactions over the last 7 years.

Table 7.6 Summary of GISERA engagements for 2017-18

STAKEHOLDER	NUMBER OF ENGAGEMENTS FOR 2017-18
Regional community	11
Gas Industry	32
Federal, State and Local Departments and Agencies	64
Media (includes print, TV and radio)	24
School/Educational institutions/Students	0
Research organisations	19
Industry associations	9
Business groups	5
Total	164[27]

[27] It is important to note here that these numbers of interactions do not take into account the number of individuals engaged in that interaction. For example regional community group interactions can range from 20-360 participants and a gas industry interaction can be a technical meeting with only 1-10 participants

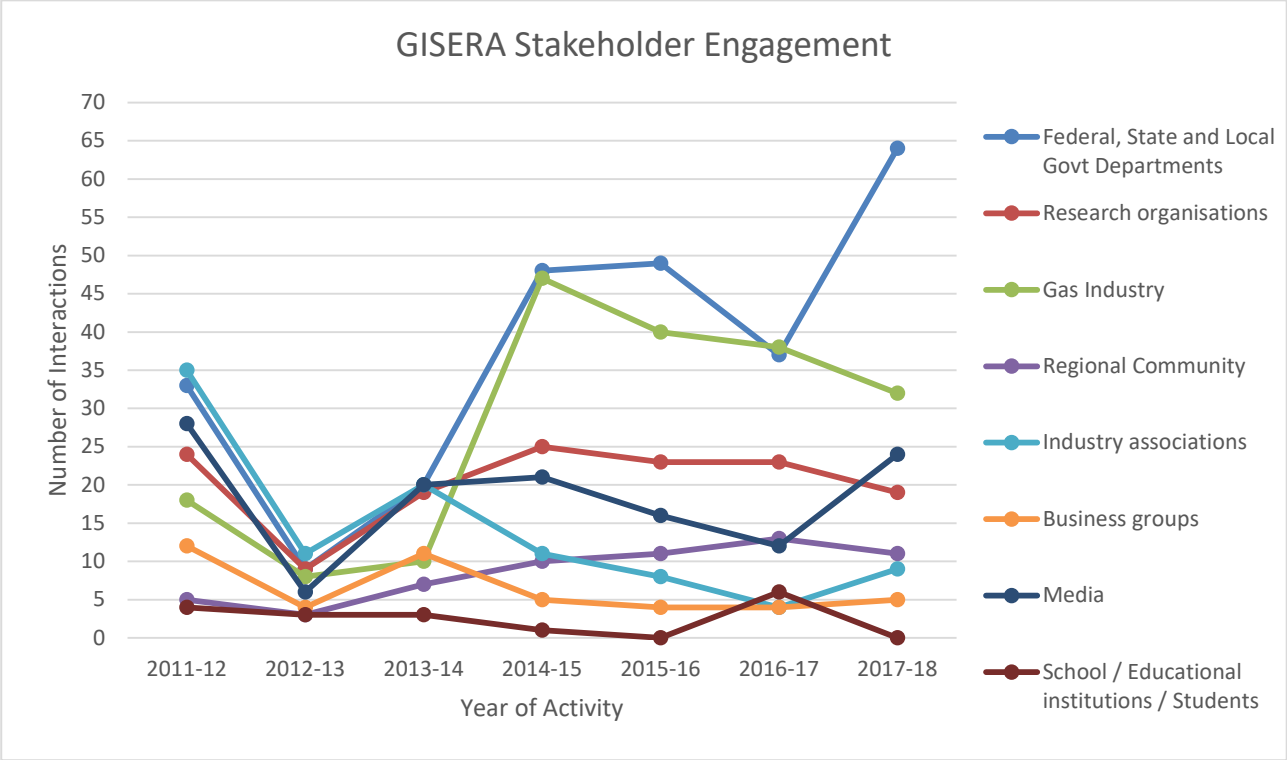


Figure 7.1 Stakeholder interactions from 2011/12 to 2017/18 - These numbers do not take into account the number of individuals engaged in that interaction. Regional community group interactions can range from 20-360 participants and a gas industry interaction only 1-10 participants.

8 Performance against KPIs

8.1 Overall KPIs

GISERA's key performance indicators are:

- Impact
- Capacity building
- Leverage
- Management.

Table 8.1 illustrates GISERA's performance against each KPIs specific assessment criteria from 2011/12-2017/18.

Table 8.1 GISERA's performance against its overall KPIs

KPIS	ASSESSMENT CRITERIA	PERFORMANCE (OVER LIFE OF GISERA)
Impact	Formal government, industry and community request for technical advice	GISERA's communication goals and KPIs tie in with this objective. GISERA has made significant impact in this area as detailed in Section 8.2
	Industry and institutional awards for innovative research	The 2015 Agriculture Director's Awards in CSIRO recognise the achievements of individuals and teams across 11 different categories. The GISERA Agricultural Land Management Team were nominated for and received the Collaboration Award. Team members included staff from CSIRO and USQ/NCEA.
	Publication of papers	Journal – 22 Conference – 33
	Citation of publications	340
	Conference invitations and presentations	238
Capacity building	Total number of research studentships	3
	Number of research studentships for residents of CSG and LNG operational areas	2
	Number of Masters and PhD theses awarded	1
	Number of Publication authorships by industry staff	Nil
Leverage	Participation from industry developers	Australia Pacific LNG, QGC, Origin, AGL, Santos through membership to GISERA and Arrow Energy (through Industry Leader's Group, APPEA)
	Participation from government departments and agencies	QLD Department of Natural Resources and Mines; QLD Department of Science, Information Technology and Innovation; NSW Environment Protection Authority; NSW Health; North West Local Land Services; NSW Department of Industry; NSW Department of Primary Industries; Department of Industry Innovation and Science; SA Department of the Premier and

KPIS	ASSESSMENT CRITERIA	PERFORMANCE (OVER LIFE OF GISERA)
		Cabinet, SA Department for Energy and Mining; ANU Energy Change Institute; and CSIRO
	Participation from non-government organisations	AgForce, Basin Sustainability Alliance, Australian National University, University of Queensland, University of Southern Queensland, University of New England, Lower Namoi Growers' Association, Country Women's Association of NSW, Livestock SA, South Australian Dairyfarmers' Association, Nature Foundation SA, Limestone Coast Grape and Wine Council Inc., Central Land Council, The Ethics Centre, National Farmers Federation, The Grattan Institute, The Australia Institute
	Number of universities, particularly those local to CSG and LNG activity, participating in research projects	University of Queensland, University of Southern Queensland, Queensland University of Technology, University of Sydney, University of Heidelberg, University of Newcastle, University of New England, University of Tasmania, University of Colorado.
	Financial leverage, or the ability to multiply the research value of contributions	See section 2.1.1
Management	Percentage of research projects achieving target deliverables	71% of projects are complete and have achieved deliverables (31 projects) 18% of projects are currently meeting or exceeding target deliverables (8 projects) 9% of projects have only just commenced with milestones not yet due (4 projects) 2% of projects are not meeting target deliverables due to negotations regarding access to commercial in confidence data (1 project). It is anticipated that this will be resolved before December 2018.
	Percentage of research projects meeting schedule	71% of projects are complete (31 projects) 23% pf projects are currently meeting schedule (10 projects) 4% of projects currently have an amber light against a milestone (2 projects). It is expected that these milestones will be completed before December 2018. 2% of projects are not meeting research schedule due to negotations regarding access to commercial in confidence data (1 project). It is anticipated that this will be resolved before December 2018.
	Percentage of research project meeting budget	66% of projects were completed within 5% of budget (based on aggregate average across the 29 projects). 14% of current projects are within budget (6 projects) 4% of projects are over budget (2 projects).

KPIS	ASSESSMENT CRITERIA	PERFORMANCE (OVER LIFE OF GISERA)
		7% of projects are currently overspent due to phasing issues (3 projects). This issue is expected to be rectified by the end of project.[28] 9% of projects are new (4 projects) with expenditure expected to commence in early 2018/19.

8.2 Communication goals and KPIs

GISERA works to achieve credibility, trust and respect from all stakeholders through the open and transparent conduct and communication of its research and synthesis activities.

The strategic communication and engagement goals for GISERA are to:

- Engage with and build landholder, community, government and industry understanding of the impacts, risks, challenges and opportunities associated with onshore gas development
- Communicate information in plain English that helps to address knowledge gaps in environmental, social and economic impacts from onshore gas development, whether that is through original research or synthesis of existing independent and peer reviewed knowledge
- Raise awareness of CSIRO's public good research and its outcomes to inform public discourse, government policy development and gas industry best practice through GISERA
- Ensure GISERA's website is a trusted and citable source of information on gas development, social and environmental impacts, and opportunities.

A separate Communications and Stakeholder Engagement Plan guides GISERA communication and engagement outputs. Engagement plans are developed for new states where research is being undertaken, such as South Australia, as required. Effective government engagement also assists in identifying relevant processes and channels for communication, to promote adoption of research outcomes and positive impact from GISERA science.

Table 8.2 provides an overview of the performance to date in achieving GISERA's strategic communication goals.

Table 8.2 Performance against key communication goals

STAKEHOLDER	KPI (TARGET)	PERFORMANCE OVER LIFE OF GISERA
Government	Advice provided to senior bureaucrats / ministers / policy makers	Since July 2011, 237 invitations to provide advice, briefings and presentations were received from senior ministers and policy makers.
	Requests by policy makers for advice	These include Prime Minister and Cabinet Office, Queensland Premiers Office, NSW Department of Premier and Cabinet, and ministerial departments, the Independent Expert Scientific Committee on CSG and Large Coal Mining Development, state expert panels, Qld Agriculture Resources and Environment Committee, and a range of briefings to Queensland, NSW, South Australia, Northern Territory and federal parliamentarians,

[28] CSIRO is responsible for any budget overspend at completion of project.

STAKEHOLDER	KPI (TARGET)	PERFORMANCE OVER LIFE OF GISERA
		departments and agencies. GISERA input has been acknowledged in reports from inquiries, including the specific citing of GISERA publications in the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory Final Report, April 2018 and Interim Report, June 2017, and the Independent review of the national electricity market by Australian Chief Scientist Dr Alan Finkel, June 2017. The Queensland Department of Environment and Science have requested more science information and (potential) research in rehabilitation, financial assurance and residual risk reforms through GISERA's Knowledge Transfer Sessions. GISERA input has previously been sought by a range of governments and policy makers, including: During development of the Commonwealth's Government Domestic Gas Strategy GISERA and University of Queensland provided a briefing to Queensland Parliamentarians on 'The Science of GSG and Onshore Gas'. The Bureau of Resources and Energy Economics' (BREE) 2014 Gas Market report drew strongly on GISERA research, in particular the research on employment effects, household income and demographic change. Three GISERA publication outputs were specifically cited. Briefings on results from GISERA's community wellbeing and responding to change survey were provided to local government in the Surat Basin region, Chambers of Commerce, State members of Parliament and Queensland Resources. Stakeholder workshop involving SA Government bureaucrats and policy makers held in April 2018, instigating ongoing communications and relationship building with key government contacts.
Community	GISERA seen as trusted source of information by community	GISERA has had over 947 engagements with a wide range of stakeholders over the last seven years (See Figure 7.1 and Table 8.3). As the onshore gas industry increases its exploration activities in Australia, this demand from GISERA is expected to increase. Continued requests from local and national media outlets on the science around potential social, economic and environmental impacts associated with onshore gas development (for example SBS Insight and ABC regional radios). CSIRO researchers through GISERA have engaged with landowners, farmers and the local communities at a range of community and industry forums and rural shows, including: Showcasing GISERA's agricultural research to CSIRO AgCatalyst, CSIRO's premier showcase of the latest innovations and technologies in agriculture and food, Sydney, December 2017 and December 2016; Presentations from GISERA Director Damian Barrett at several Northern Territory presentations, meetings, and community information sessions across NT, including Kalkaringji,

STAKEHOLDER	KPI (TARGET)	PERFORMANCE OVER LIFE OF GISERA
		Maningridge, Darwin, and Alice Springs, from July 2016 to March 2017; Groundwater research presentation on 'Innovative solutions to water challenges in WA', Perth, October 2016; Presentation of research findings from 2016 CSIRO Community Wellbeing to a range of forums, including the AgForce – UQCCSG Community Forum, to the Western Downs and Maranoa regions including local government, Gasfields Commission Qld, special interest groups interested in CSG issues, and other community representatives, throughout 2016-17; GasFields Commission Queensland Community Leaders Breakfast: Dan O'Sullivan, Roma, June 2016; Stakeholder workshops on biological traits and ecological aspects for plant population viability, Health and CSG, Brisbane, May 2017; CSG well decommissioning workshop; and Expert workshop on health impacts of CSG scoping study, Brisbane, May 2017. Previously, CSIRO researchers through GISERA engaged with landowners, farmers and the local communities at the Miles Show (May 2016) and CRT Farmfest (June 2016) in Toowoomba. GISERA is sought as trusted source of advice to community on hydraulic fracturing at the Katherine Food Futures Roadshow (NT Farmers Roadshow), in July 2017; GISERA is sought as trusted source of advice on hydraulic fracturing and shale gas development at the Central Land Council Information Session in April 2016 (CLC represents the indigenous communities of the southern half of the Northern Territory). GISERA sought as a trusted source of advice on the drilling and proposed development of the deep gas project nearby (Warro Gasfield) managed by Latent Petroleum during the Badgingarra Community Forum in September 2015. GISERA sought as a trusted source of advice on impacts of gas development by KRED and Yamatji Marlpa (representatives of 33 Traditional Owner groups in WA) – community workshops for Yamatji were undertaken in July 2014. The Social and economic CSG research forum was held on November 2014 in Chinchilla and attracted stakeholders from state government departments, local government, service providers, local businesses, gas companies and community groups. The GHG and Agricultural CSG research forum was held on 22 April 2015 in Chinchilla and attracted 48 stakeholders from government departments, industry, Council, service providers, research organisations, landowners and community groups. The Marine environment CSG research forums were held in Brisbane and Gladstone on 11 and 12 August 2015 with 70 stakeholders from community groups, Council, service providers, research organisations, government and industry.

STAKEHOLDER	KPI (TARGET)	PERFORMANCE OVER LIFE OF GISERA
	Demand for GISERA's engagement is maintained as development progresses	GISERA has had over 947 engagements with a wide range of stakeholders over the last seven years (See Figure 7.1 and Table 8.3). As the onshore gas industry increases its exploration activities in Australia, this demand from GISERA is expected to increase. Community members willing to participate in GISERA's Regional Research Advisory Committees across Australia. Local community members willing to be involved in GISERA research projects, for example Potential health impacts from CSG. Katherine Food Futures Roadshow (NT Farmers Roadshow), Damian Barrett hosted a long discussion about GISERA and fracking in the Katherine region, Katherine, July 2017; Presentation on GISERA's NSW research preliminary results to key community stakeholders within the Narrabri Community including representatives from EPA, NW Courier, North West Local Land Services, Narrabri Shire Council, Lower Namoi Cotton Growers Association, CFI Namoi Aviation, Member for Barwon, Yes2Gas, NSW Farmers, Narrabri CCC, Narrabri and District Chamber of Commerce, ABC Media, People for the Plains, Narrabri. September 2017; Presentation to Northern Territory Cattlemen's Association on NT fracking inquiry draft recommendations and potential research questions GISERA continues to be a trusted source of advice on issues related to onshore gas development, including: Supplying management guidelines for biodiversity offset processes through knowledge transfer sessions for a translocation research project providing recommendations for rare daisy *Rutidosis lantana*, Brisbane, September 2016 and guidelines for population offset, July 2018 Advice to the agricultural sector regarding managing changes in rural areas brought on by the introduction of a CSG industry, through "Telling the story' project knowledge transfer session, Toowoomba, December 2016; Socialising outcomes of GISERA research on community functioning and wellbeing 2, various meetings across councils and regional community groups in Toowoomba, Chinchilla, Tara, throughout November, 2016, and Brisbane, February 2017; Knowledge transfer sessions on economical assessment and forecasting research to community and government groups in Toowoomba, December 2016, and Brisbane, February 2017; Previously, GISERA advice has been sought on issues such as the drilling process, well integrity, water safety and fracking by Badgingarra Community Association - community forum held on 2 September 2015. The Social and economic CSG research forum, held on November 2014 in Chinchilla, attracted stakeholders from state government departments, local government, service providers, local businesses, gas companies and community groups. The Greenhouse Gas and Agricultural CSG research forum was held on 22 April 2015 in Chinchilla and attracted 48 stakeholders

STAKEHOLDER	KPI (TARGET)	PERFORMANCE OVER LIFE OF GISERA
		from government departments, industry, Council, service providers, research organisations, landowners and community groups. The Marine environment CSG research forums were held in Brisbane and Gladstone on 11 and 12 August 2015 and attracted 70 stakeholders from community groups, Council, service providers, research organisations, government and industry.
Industry	GISERA members adopt practice change	CSIRO through GISERA has provided policy related advice to industry on a range of topics including groundwater reinjection strategies, agricultural engagement, socioeconomic advice and information for stakeholders of Gladstone Harbour. Furthermore, advice to Queensland and Federal governments has been incorporated into development of the regulatory environment towards improved industry best practice. Geochemical response to re-injection project work informed GISERA members and regulators about the required level of injectant pre-treatment to minimise adverse impacts on groundwater quality by reinjection
	Industry adopts methods for improving community engagement	In September 2018, industry representatives at the Knowledge Transfer Session for Inside the herd, discussed how they could change/improve engagement with landholders when discussing gas infrastructure design by using GISERA's water flow model results. In mid 2017, industry members indicated the implementation of new policies relating to management of farm gate closures in gasfield operations, following feedback emanating from research outcomes. In July 2016, researchers from the Community Wellbeing project met with Origin's Manager for Public Policy to discuss indicators of community wellbeing, resilience and social licence to operate. Origin were planning to conduct their own survey to monitor the community 'pulse'. After discussing findings, methods and measures from the CSIRO community wellbeing surveys, Origin planned to use 5 or 6 of the same items in their own survey to allow for comparison with CSIRO's 2014 and 2016 research findings. In this way, the community wellbeing research is feeding into industry benchmarks, standards and policies.

Continued demand for information and advice from GISERA shows that GISERA is meeting the needs of a range of stakeholders (see Table 8.3) and that it is seen as a source of trusted information and advice.

Table 8.3 Summary of engagements over life of GISERA

STAKEHOLDER	NUMBER OF ENGAGEMENTS OVER LIFE OF GISERA
Regional community	60
Gas Industry	195
Federal, State and Local Departments and Agencies	260
Media (includes print, TV and radio)	127
School/Educational institutions/Students	17
Research organisations	145
Industry associations	98
Business groups	45
Total	947[29]

[29] It is important to note here that these numbers of interactions do not take into account the number of individuals engaged in that interaction. For example regional community group interactions can range from 20-360 participants and a gas industry interaction can be a technical meeting with only 1-10 participants

GISERA
Gas Industry Social and Environmental Research Alliance

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