

Project Order

Proforma 2018

1. Short Project Title

Assessing the value of locally produced conventional gas in South Eastern South Australia

Long Project Title

Assessing the value of locally produced onshore conventional gas in South Eastern South Australia and situating its role in the evolution of other regional industries.

GISERA Project Number

S.12

Proposed Start Date

01 July 2018

Proposed End Date

30 December 2019

Project Leader

Tom Measham and Lavinia Poruschi (co-project leaders)

2. GISERA Region

- | | | |
|--|--|---|
| <input type="checkbox"/> Queensland | <input type="checkbox"/> New South Wales | <input type="checkbox"/> Northern Territory |
| <input checked="" type="checkbox"/> South Australia | <input type="checkbox"/> Western Australia | <input type="checkbox"/> Victoria |

3. GISERA Research Program

- | | | |
|--|--|---|
| <input type="checkbox"/> Water Research | <input type="checkbox"/> GHG Research | <input checked="" type="checkbox"/> Social & Economic Research |
| <input type="checkbox"/> Biodiversity Research | <input type="checkbox"/> Agricultural Land Management Research | <input type="checkbox"/> Health Research |

4. Project Summary

Objective

The conventional gas industry has formed part of the evolution of the regional economy in South-East South Australia for at least the last 30 years. For some of this time the gas industry has been an important energy supplier to other local industries such as the paper products factory. As a direct employer, the industry has been modest but its role within the broader economy of the region goes beyond the direct employment it has provided.

This project will address two important objectives. The first is to develop a profile of the industry and its role within the regional economy to date, considering how the availability of locally produced gas has influenced the development of other sectors. The project will consider how the role of the gas industry has evolved differently in South-East South Australia compared to other parts of the country where the industry has been focused on moving the gas to national and international markets. The outputs from this first objective will be useful for regional stakeholders and also serve as an important input into future social and economic research about the gas sector in South Australia.

The second objective will be to develop scenarios for how the regional economy may evolve in the future considering the utility role of gas within it. The scenarios will consider a suite of potential outcomes in terms regional direct and indirect employment, royalties and effects on other sectors from different levels of domestic gas use and gas exports.

The scientific objective of this research project is to determine what are the potential benefits from the conventional gas industry with a particular focus on how the use of conventional gas in host regions may support diversified regional economies. This focus is scientifically novel because, to date, economic research on the gas industry has tended to focus on benefits outside of the local communities where it is sourced. The results will be communicated in a written report aggregating output from Tasks 2-4:

- A socioeconomic and demographic baseline assessment of the South-East SA region and State
- Outlook of the economic impacts of potential onshore conventional natural gas extraction in SA.

The key messages and lessons learned from this research will provide rigorous analysis and valuable knowledge for policy makers and local businesses regarding the socio-economic value of gas activity for local communities. This work carries relevance for targeting issues associated with social acceptance of the gas industry and will contribute to more informed public discussion regarding the gas industry and community social and economic benefits. For the purposes of this document, we are not measuring economic costs of the gas industry at this time. Potential impacts on other sectors will be explored in stakeholder workshops when considering the scenarios. The project does not measure social impacts or grievances communities have with the gas industry which are addressed in other GISERA and CSIRO social impact work found on the GISERA online repository. We also note that other GISERA projects in South Australia focused on agriculture will consider issues of branding for other sectors therefore we do not seek to duplicate this effort in this project.

Description

The onshore gas industry in South-East South Australia (SESA) has developed in a distinctly different manner compared with the gas industry in parts of Australia where predominantly gas is exported beyond the region. From an economic perspective, a key characteristic of gas in SE South Australia is the role of local supply chains. Historically the industry has met local demand in addition to exporting the surplus of local production to other users beyond the region. The project will track how the availability of the gas has been associated with the development of other industries such as paper products and dairy products. Documenting how the industry has contributed to the regional economy, and in particular been associated with other sectors, will provide important lessons for the future of the region the utility role of gas within it.

In terms of onshore exploration, the Penola Trough in the Otway Basin hosts the Katnook Gas Processing Plant south of Penola which was built and commissioned in 1991 (Figure 1). The history of gas exploration and extraction in the region goes further than that, with one company, Beach Energy, noting they have operated in the region for more than 50 years. Through this plant and the Ladbroke Grove Power Station it is likely 70 Bcf of gas has been produced and supplied to the local industry in the past. The plant is connected to pipes with the capacity to deliver gas to Melbourne and Adelaide. Beach Energy, which owns the Katnook plant and operates the fields in the region, is currently assessing if discoveries in the region can be deemed to have commercial value. If extraction takes place, Beach Energy will negotiate agreements to provide part of the gas to the local market (Beach Energy, 2017). Considering the possibility of more gas becoming available, an important question is to what extent is it possible to supply gas more competitively in South East SA and what the obstacles are (e.g. current pipeline configuration).

Exploration Permits in the Otway Basin

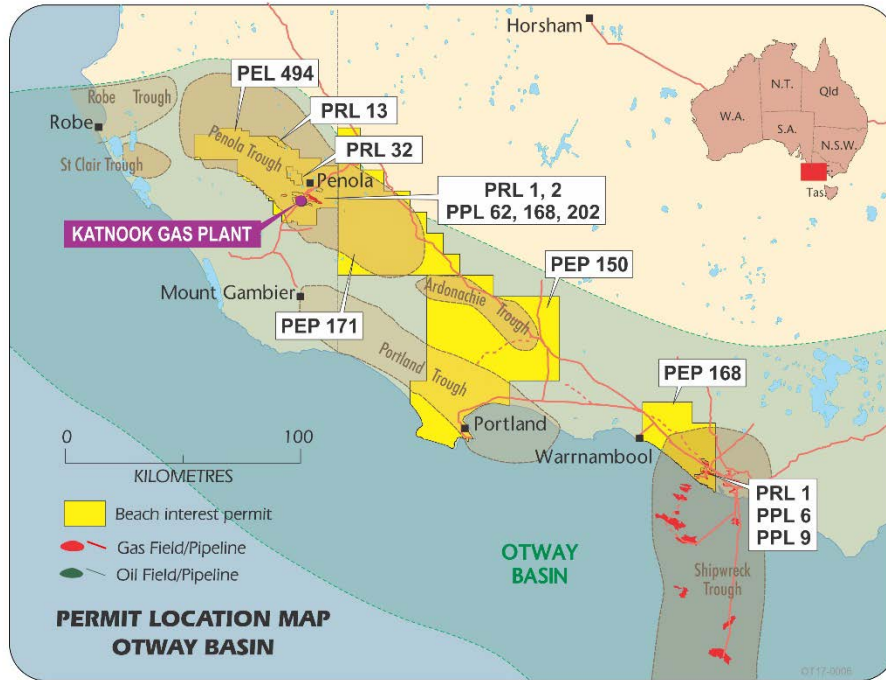


Figure 1. Exploration permits in the Otway Basin. Source: Beach Energy

This project aims to inform discussions and improve capacity to forecast outcomes from onshore conventional gas industry development where South Australian energy security is at the forefront of government policy and community concerns. The project will contribute to its aims through a historical overview on the gas industry activity in the region, its role in the local economy and potential future development scenarios.

Methodology

To begin, the project will develop a detailed understanding of the regional economy and the role of gas within it. In this initial phase, the project will take a historical perspective, describing how the region has developed differently compared to other regions, paying particular attention to the establishment of industries which have made use of the gas to date, such as the paper products plant. This phase will result in a historical economic overview which will be used to generate scenarios in a later phase of the project. In addition, this historical overview will inform other projects within the GISERA portfolio (e.g. considering social acceptance) will form a useful stand-alone review of the development of the industry in the region. The project will subsequently use development scenarios for the regional economy and estimate the potential outcomes for key economic indicators under different conditions. The purpose of the scenarios is to consider different potential futures for the region considering a suite of potential outcomes in terms of regional direct and indirect employment, royalties and effects on other sectors from different levels of domestic gas use and gas exports. Design of the development pathways for the gas industry will be informed by technical information from the SA government, industry and other GISERA projects, namely work carried out in the Groundwater balance in the development regions of south east of SA and GISERA Role of gas in South Australia's Energy Futures projects. Linkages with other GISERA projects and in particular the project led by Dr Paul Graham and Luke Reedman and through technical input from Dr Cameron Huddleston-Homes will result in technically accurate regional gas industry scenarios which consider the role of the gas sector in supporting the local community and industry.

The scenarios will be presented to stakeholders in a series of workshops to discuss which scenarios meet their expectations about preferred outcomes and to consider likely flow-on effects. When conducting this work in the past, the research team have frequently observed that working through the implications of scenarios can be a very valuable experience for participants, with lessons learned along the way that are additional to the written report prepared by the researchers based on the workshops.

Potential future dynamics will be explored applying a method of scenario building in the form of the scenario-axes technique (van't Klooster and van Asselt, 2006). Scenario development will start with Technical Reference Group consultations to identify driving forces to establish plausible scenarios (Figure 2). Likely dimensions (to be developed in discussion with the Technical Reference Group) are:

- 1) The size of the industry (e.g. from low to high levels of industry activity)
- 2) The degree to which locally produced gas is used by other local industries

Drawing on previous scenario research the project will explore the interaction between these dimensions as set out in Figure 2, and populate each of the four quadrants with a rich picture considering a select set of characteristics which may include some or all of the following: potential infrastructure limitations such as current pipeline configuration vs potential alternative configurations; existing vs additional compression facilities needed to feed gas into the national pipeline; potential industry expansion and constraints to the industry development, as well as alternative industry operational models at constant levels of gas extraction

and relative costs of these operations such as opportunity costs. For example, scenarios can consider: a) the infrastructure requirements for potential growth in industry activity due to the additional gas resources being confirmed and an increase in extraction; b) potential modes of operation under a cap of gas resources extraction; c) alternative modes of natural resources use, such as cogeneration. When considering the scenarios with stakeholders, discussion will focus on a) how likely would the scenario be and b) how desirable would the scenario be.

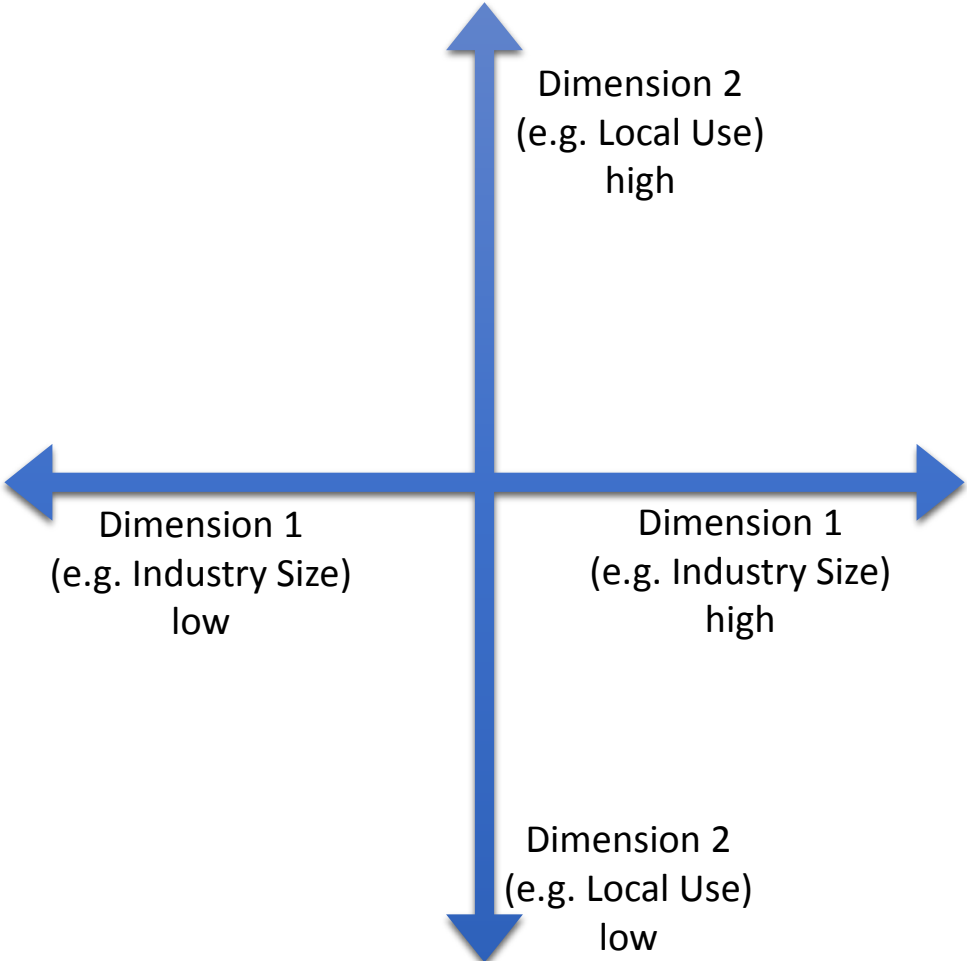


Figure 2. Future scenarios building based on identifying driving forces. Based on: (van't Klooster and van Asselt, 2006)

To maximize the impact of the work and the reach a broad range of stakeholders, the potential to develop custom visualisation and/or communication materials will be explored (e.g. video). In addition, the researchers will disseminate project findings to GISERA stakeholders and to the scientific community based on available funds (e.g. international conferences, journal publications). These activities are expected to contribute to an informed public discussion about the gas industry and what the community social and economic impacts might be.

Need & Scope

Understanding the past, present and future role of the gas industry in the local economy is a crucial part of supporting the region. Exploring the desirability of different scenarios is an important component to informing the debate on social license and help balance potentially conflicting policy settings (e.g. energy security, economic growth, environmental health, cultural heritage conservation). This is particularly relevant in the current context of increasing energy demand, economic and sustainability challenges in Australia.

The information and data produced by this research will substantially augment existing understanding based on other regions where the gas sector is strongly oriented towards exporting gas away from the region. It will be of central importance to stakeholders interested in the local effects of conventional gas development.

Building an understanding of the potential government revenue (e.g. through royalties), employment and potential other economic and demographic outcomes from the presence of the industry in the region is a key aspect of taking stock of the gas industry and considering the way it will contribute to the region in the future. Aside from a future outlook, examining past development and effects of the gas industry in South Australia, which has had operations from the 90s, can provide evidence of these benefits and costs.

The research will consider key economic variables, including:

- Family and personal income
- Income distribution
- Education
- Gender balance
- Age distribution
- Employment
- Gas-related industrial activity
- Royalties
- Industry gas use

The results will be communicated in a written report aggregating output from Tasks 2-4:

- State-specific SA socioeconomic and demographic baseline assessment, with a focus on the South-East of SA.
- Outlook of economic benefits/impacts of potential onshore conventional natural gas extraction in SA
- Communication products can include:
 - Factsheet summarizing effects or economic and demographic indicators for each state

- Knowledge transfer presentation to stakeholders
- Presentation at one or more scientific conferences

Initially, the project will develop a baseline assessment based on local data, which will be collected from relevant stakeholders and may involve travel to SA. This initial stage will result in a historical economic overview. The project will subsequently develop scenarios for the regional economy and assess the potential outcomes for key economic indicators under different conditions (Figure 3).

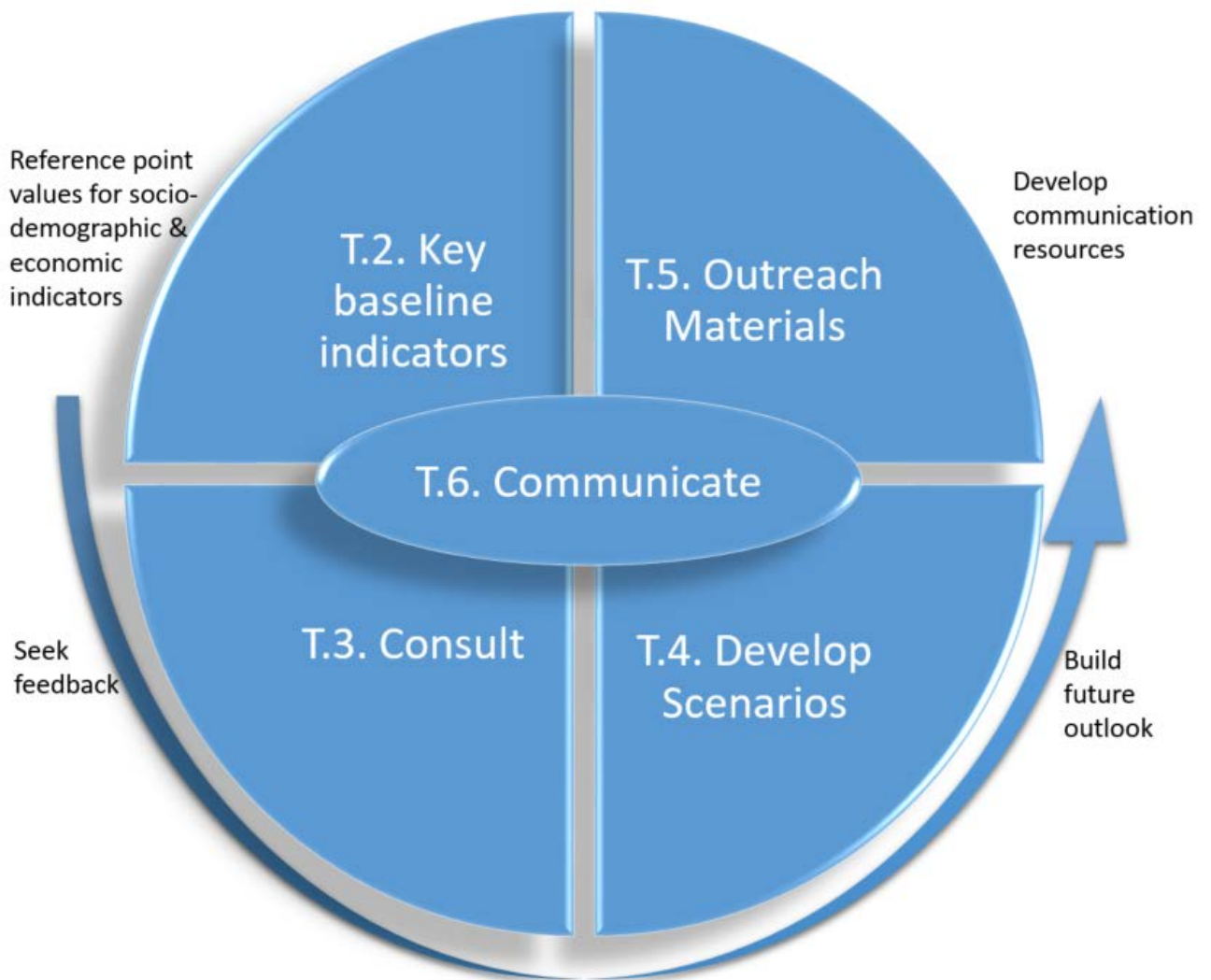


Figure 3. Schematic diagram of Tasks' goal and sequence

5. Project Inputs

Research

The focus of this project has been shaped by the needs of policy makers, local industry and the community of South-East South Australia. The project team has used input from government, industry and GISERA representatives to create this document which has evolved over the course of the last several months. The development of the research questions and tasks was particularly aided by the GISERA South Australia workshop (April 2018) where government and industry met with CSIRO researchers to discuss what the priorities for research are. The workshop brought together stakeholders from the South Australian Department of Environment, Beach Energy, Water and Natural Resources (DEWNR), SA Environment Protection Authority, SA Water, Department of Primary Industries and Regions SA and the SA Department of the Premier and Cabinet.

Resources and collaborations

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Tom Measham	0.07 FTE 27 days	Geography	22	CSIRO
Lavinia Poruschi	0.24 FTE 84 days	Applied economics	7	CSIRO
Raymundo Marcos-Martinez	0.11 FTE 34 days	Applied economics	10	CSIRO

Subcontractors (clause 9.5(a)(i))	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
N/A				

Budget Summary

Source of Cash Contributions	2017/18	2018/19	2019/20	% of Cash Contribution	Total
GISERA	-	\$128,280	\$50,580	75%	\$178,860
- SA Government	-	\$64,140	\$25,290	37.5%	\$89,430
- Federal Government	-	\$64,140	\$25,290	37.5%	\$89,430
Total Cash Contributions	-	\$128,280	\$50,580	75%	\$178,860
Source of In-Kind Contribution	2017/18	2018/19	2019/20	% of In kind Contribution	Total
CSIRO	-	\$42,760	\$16,860	25%	\$59,620
Total In-Kind Contribution	-	\$42,760	\$16,860	25%	\$59,620

6. Project Impact Pathway

The following indicators are proposed to demonstrate the ex-post impact of the project:

- Project outputs are used in policy and/or industry decisions about the gas industry in SE South Australia
- Project outcomes contribute to discussions about social license for the gas industry in SE South Australia

Activities	Outputs	Short term Outcomes	Long term outcomes	Impact
1. Establish the Technical Reference Group	A group of experts is established in order for them to provide technical input into the research	Project outcomes contribute to discussions about social license for the gas industry in SE South Australia	Governments, regulators & policy-makers are better informed on issues regarding policy & legislative framework for the gas industry	Increased efficiency and effectiveness in energy generation
2. Establish demographic and economic key indicators for SA	Factsheets with summary information of the baseline indicators		More efficient, less disruptive placement & operation of gas infrastructure	
3. Consult stakeholders on scenario development	Insight for scenario development			
4. Develop industry and regional economy scenarios	Written report on regional economy scenarios	Project outputs are used in policy and/or industry and/or local community to inform decisions on the gas industry in SE South Australia	Improved community awareness about the economic and social effects of onshore gas development	Increased job & business opportunities
5. Develop outreach materials	Communication materials to enable knowledge transfer to GISERA stakeholders and the broader community		Industry better aligned to community expectations	Maintain and increase trust in the industry and the way it is managed and regulated
6. Communicate outputs to stakeholders and the scientific community	Knowledge transfer presentation to GISERA stakeholders. Scientific knowledge advancement through outputs targeted to international scientific conferences		Improved capacity to forecast & negate social & commercial risks	

7. Project Plan

Project Schedule

ID	Activities / Task Title (should match activities in impact pathway section)	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Establish the Technical Reference Group	Tom Measham	1/07/2018	30/08/2018	N/A
Task 2	Establish demographic and economic key indicators for SA	Lavinia Poruschi	1/09/2018	30/12/2018	Task 1
Task 3	Consult stakeholders on scenario development	Tom Measham	1/1/2019	28/02/2019	Task 2
Task 4	Develop potential industry and regional economy scenarios	Lavinia Poruschi	1/03/2019	30/05/2019	Task 3
Task 5	Develop outreach materials	Tom Measham	1/06/2019	30/09/2019	Task 4
Task 6	Communicate outputs to stakeholders and the scientific community	Tom Measham	1/10/2019	30/12/2019	Tasks 2-5

Task Description

Task 1

TASK NAME: Establish the Technical Reference Group

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: 2 months

BACKGROUND: In order to ensure high quality of work, a group of experts will be nominated. Feedback on work carried out under other tasks will be sought.

TASK OBJECTIVE: Seek agreement of relevant experts to be part of the Technical Reference Group.

TASK OUTPUTS: Technical Reference Group established.

SPECIFIC DELIVERABLES: A group of experts is established in order for them to provide technical input into the research.

Task 2

TASK NAME: Establish demographic and economic key indicators for SA

TASK LEADER: Lavinia Poruschi

OVERALL TIMEFRAME: 4 months

BACKGROUND: The study is expected to include information on current and past employment, income and demographic factors and evolution of the gas industry in the context of the local economy.

TASK OBJECTIVE: Provide baseline indicators of the current levels of economic, social and demographic variables with a focus on the South-East of SA.

TASK OUTPUTS: Baseline assessment of economic and socio-demographic indicators.

SPECIFIC DELIVERABLES: Factsheets with summary information of the baseline indicators.

Task 3

TASK NAME: Consult stakeholders on scenario development

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: 2 months

BACKGROUND: Stakeholder input into scenario development is important to insuring that scenarios are useful and relevant. This is a preliminary step in developing potential industry and regional economy scenarios.

TASK OBJECTIVE: Elicit stakeholder input into defining scenarios to be developed in task 4.

TASK OUTPUTS: Insight for scenario development.

SPECIFIC DELIVERABLES: Meetings with stakeholders completed.

Task 4

TASK NAME: Develop industry and regional economy scenarios

TASK LEADER: Lavinia Poruschi

OVERALL TIMEFRAME: 3 months

BACKGROUND: The aim is to understand what is the value of the gas industry to the South-East of SA in and the value of the gas industry to the SA in the context of the local economy. The goal of these scenarios is to assess potential outcomes for key economic indicators under different conditions.

TASK OBJECTIVE: Develop an outlook of potential future outcomes for SA South-East communities where the gas industry will be active.

TASK OUTPUTS: Scenario assessment of economic and socio-demographic indicators

SPECIFIC DELIVERABLES: Written report on regional economy scenarios.

Task 5

TASK NAME: Develop outreach materials

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: 4 months

BACKGROUND: In order to enable better communication of research outputs regarding the value of the onshore gas industry to the local industry and economy, specific communication materials are developed.

TASK OBJECTIVE: Development of visualisation and/or communication resources for stakeholders and the wider public are developed (e.g. video).

TASK OUTPUTS: Communication materials to enable knowledge transfer to GISERA stakeholders and the broader community.

SPECIFIC DELIVERABLES: Communication materials including factsheets and visualisations (e.g. animation video) in consultation with GISERA communications advisers.

Task 6

TASK NAME: Communicate outputs to stakeholders and the scientific community

TASK LEADER: Tom Measham

OVERALL TIMEFRAME: 3 months

BACKGROUND: The researchers disseminate project findings to GISERA stakeholders in order to share the insights from the project subject to funding availability (i.e. if trips have been purposely budgeted for). In line with GISERA's focus on high-quality research, communication of outputs from the project will target scientific outlets, such as national and internationally relevant conferences and journals.

TASK OBJECTIVE: Present outputs from Tasks 2-5 and methods to GISERA stakeholders and scientific audiences through workshops and conferences and journal papers.

TASK OUTPUTS: Knowledge transfer presentation to GISERA stakeholders. Scientific knowledge advancement through outputs targeted to international conferences and/or journal articles.

SPECIFIC DELIVERABLES: Presentations to stakeholders and at international scientific conferences.

Project Gantt Chart

Task Leader	Task	FY 2018-19												FY 2019-20						
		July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	
Tom Measham	1	█																		
Lavinia Poruschi	2			█																
Tom Measham	3						█													
Lavinia Poruschi	4								█											
Tom Measham	5											█								
Tom Measham	6																█			

8. Technical Reference Group

The project will establish a Technical Reference Group (TRG) aimed at seeking peer-to-peer technical advice on contextual matters and to discuss research needs as well as outputs as the project progresses. The TRG will include the project leader and a group of different stakeholders as appropriate.

9. Communications Plan

Communication of the results will be managed in accordance with GISERA's communication strategy. This strategy includes presentations at community and industry meetings, factsheets, conferences and peer-reviewed publications. The strategy detailed below includes communication with the relevant State and Federal government departments to ensure they are aware of the outcomes of the research and its policy implications.

Stakeholder	Objective	Channel	Timeframe
SA Government (e.g. SA Environment Protection Agency, Department of the Premier and Cabinet), Local industry (e.g. Beach Energy, Vintage, Rawson), NGOs or other local stakeholders	Technical Reference Group establishment	Meetings / Online Communication	At the beginning of the project
SA Government (e.g. SA Environment Protection Agency, Department of the Premier and Cabinet), Local industry (e.g. Beach Energy, Vintage, Rawson)	Consultation on scenario development	Meetings / Workshop	During Project
SA Government (e.g. SA Environment Protection Agency, Department of the Premier and Cabinet), Local industry (e.g. Beach Energy, Vintage, Rawson), other stakeholders and the wider public	Knowledge transfer	Report	During Project
Wider public	Communicate key messages from research	Factsheets and/or other forms of visualisation	During Project
SA Government (e.g. SA Environment Protection Agency, Department of the Premier and Cabinet), Local industry (e.g. Beach Energy, Vintage, Rawson) and other GISERA stakeholders	Communicate outputs to stakeholders	Knowledge transfer session	At completion of research
Scientific community	Scientific knowledge advancement	Conferences and/or Scientific Journals	At completion of research



10. Budget Summary

Expenditure	2017/18	2018/19	2019/20	Total
Labour	-	\$131,040	\$60,440	\$191,480
Operating	-	\$40,000	\$7,000	\$47,000
Subcontractors	-	-	-	-
Total Expenditure	-	\$171,040	\$67,440	\$238,480

Expenditure per Task	2017/18	2018/19	2019/20	Total
Task 1	-	\$21,339	-	\$21,339
Task 2	-	\$50,065	-	\$50,065
Task 3	-	\$18,387	-	\$18,387
Task 4	-	\$41,957	-	\$41,957
Task 5	-	\$39,292	\$44,895	\$84,187
Task 6	-	\$0	\$22,545	\$22,545
Total Expenditure	-	\$171,040	\$67,440	\$238,480

Source of Cash Contributions	2017/18	2018/19	2019/20	Total
SA Government (37.5%)	-	\$64,140	\$25,290	\$89,430
Federal Government (37.5%)	-	\$64,140	\$25,290	\$89,430
Total Cash Contributions	-	\$128,280	\$50,580	\$178,860

In-Kind Contribution from Partners	2017/18	2018/19	2019/20	Total
CSIRO (25%)	-	\$42,760	\$16,860	\$59,620
Total In-Kind Contribution from Partners	-	\$42,760	\$16,860	\$59,620

	Total funding over all years	Percentage of Total Budget
SA Government Investment	\$89,430	37.5%
Federal Government Investment	\$89,430	37.5%
CSIRO Investment	\$59,620	25%
TOTAL	\$238,480	100%



Task	Milestone Number	Milestone Description	Funded by	Start Date (mm-yy)	Delivery Date (mm-yy)	Fiscal Year Completed	Payment \$ (excluding CSIRO contribution)
Task 1	1.1	Establish the Technical Reference Group	GISERA	1/06/2018	31/07/2018	2018/19	\$16,004.25
Task 2	2.1	Establish demographic and economic key indicators for SA	GISERA	1/08/2018	30/11/2018	2018/19	\$37,548.75
Task 3	3.1	Consult stakeholders on scenario development	GISERA	1/12/2018	31/01/2019	2018/19	\$13,790.25
Task 4	4.1	Develop potential industry and regional economy scenarios	GISERA	1/02/2019	30/04/2019	2018/19	\$31,467.25
Task 5	5.1	Develop outreach materials	GISERA	1/05/2019	31/08/2019	2019/20	\$63,140.25
Task 6	6.1	Communicate outputs to stakeholders and the scientific community	GISERA	1/09/2019	30/11/2019	2019/20	\$16,909.50

11. Intellectual Property and Confidentiality

Background IP (clause 11.1, 11.2)	Party	Description of Background IP	Restrictions on use (if any)	Value
				\$
				\$
Ownership of Non-Derivative IP (clause 12.3)	CSIRO			
Confidentiality of Project Results (clause 15.6)	Project Results are not confidential.			
Additional Commercialisation requirements (clause 13.1)	Not Applicable			
Distribution of Commercialisation Income (clause 13.4)	Not applicable			
Commercialisation Interest (clause 1.1)	Party	Commercialisation Interest		
	CSIRO	Not applicable		
	Other	Not applicable		

12. References

- Beach Energy (2017) ASX Release: Beach Energy to Commence Conventional Gas Exploration in the Onshore Otway Basin in South Australia.
- van't Klooster SA and van Asselt MBA (2006) Practising the scenario-axes technique. *Futures* 38(1), 15-30.
DOI: <https://doi.org/10.1016/j.futures.2005.04.019>.