• Onshore Gas challenges & opportunities
  • Unevenly distributed in space + time and among stakeholders
  • Uncertainty $\rightarrow$ tension + public discontent
  • Science improves understanding of challenges & opportunities

• CSIRO’s GISERA seeks to develop
  • Integrated, regional, systems-based portfolio of research
  • Provide community trusted, evidence based knowledge

• Benefits
  • New knowledge + reduced uncertainties for relevant stakeholders
  • Foster collaboration between communities, government, industry
  • Synthesize data & knowledge at a regional scale
GISERA National Research

- Surface & groundwater
- Greenhouse gas & air quality
- Health
- Agricultural land management
- Terrestrial biodiversity
- Marine environment
- Social & Economic

Future opportunities
Areas of current research
GISERA Model

Regional Research Advisory Committees (RRAC)

Individual Projects

National Research Management Committee (NRMC)

RRAC 1

RRAC 2 ...

P1 P2 P3 P4 P5 P6

Project Approval

Strategic Priorities and Performance

National Research Management Committee

GISERA Director

Stakeholder Roundtable Group
Key environmental & social questions

- Does gas production affect quality/quantity of water?
- What are impacts on agricultural production and amenity?
- Does gas contribute to regional GHG & climate change?
- What are costs/benefits for communities?
- What are impacts on regional flora/fauna?
- Does gas make people sick or affect ecosystems?
- Decommissioning issues?
Groundwater balance and contamination risk

- Probabilistic assessment of regional groundwater balance
  - Incorporates prior research: SA DEW, NCGRT, GOYDER, industry
  - Focus: Tertiary unconfined and confined sand aquifers

- Causal pathways & plausible events
  - Assess likelihood of potential contamination risks
  - Recharge, water table depth, hydraulic characteristics of aquifer
  - soil and vadose zone processes
  - Particle tracking and transport solutes
  - Uncertainties and risks assessed
Groundwater balance and contamination risk
Microbial degradation of ‘chemicals’

• Three factors of environmental risk:
  • Source: volume/location of spill
  • Pathway: solute transport - soil and aquifer
  • Receptor: concentration/compounds

• Microbial transformation/biodegradation reduce environmental risk
  • Relevant SESA soils and aquifers in oxic and anoxic conditions: ~20 compounds
  • Impacts on microbial community profiles
  • ID specific microbes responsible for degradation
  • Microbes as environmental health indicators?
Community attitudes and value of gas

- Community wellbeing/resilience/attitude to gas
  - Include questions on misconceptions about conventional gas
  - Accurate determination of community attitudes towards gas
- Assessing value of locally produced conventional gas in SESA
  - Profile of gas industry and role in regional economy
  - Scenarios: How regional economy may evolve considering role of gas
  - Developed with Technical Reference Group (Workshop 2019)
Natural gas impacts and opportunities

• Potential impacts by conventional gas on existing primary industries

• Beef cattle (20%), forestry (17%), sheep/lamb (14%), wine (13%), dairy (8%)

• 10 year potential development scenario

• Lessons learned from other gas regions

• Analyses of costs/benefits and ways forward

• Brand value protection

• Advice on future monitoring programs
Thank you