



CSIRO Gas Industry Social and Environmental Alliance

Narrabri Community Consultative Committee

Link: <https://gisera.csiro.au/project/states/nsw/>

Damian Barrett | 15 February 2022

Australia's National Science Agency

Key Environmental & Social Questions



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



GISERA Governance

New South Wales RAC Members

75%

Prof Alison Sheridan
Emeritus Professor,
UNE Business School,
University of New
England

Mr Jack Warnock
Lower Namoi Cotton
Growers' Association
& Managing Director,
Warnock Agronomics
Pty Ltd

Mr Ken Flower
General Manager,
Caputar Motors &
Chief Flight
Instructor, Namoi
Aviation

Community

25%

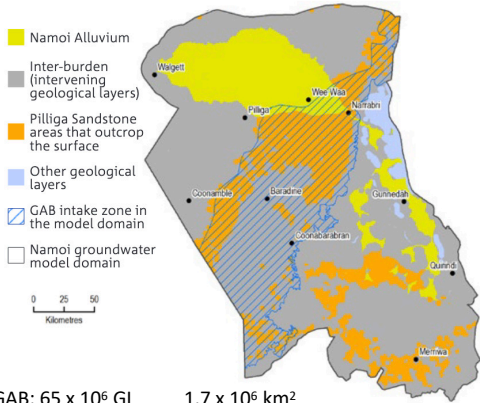
Dr Deb Hailstones
Manager Science
Strategy, NSW
Department of
Primary Industries

Government

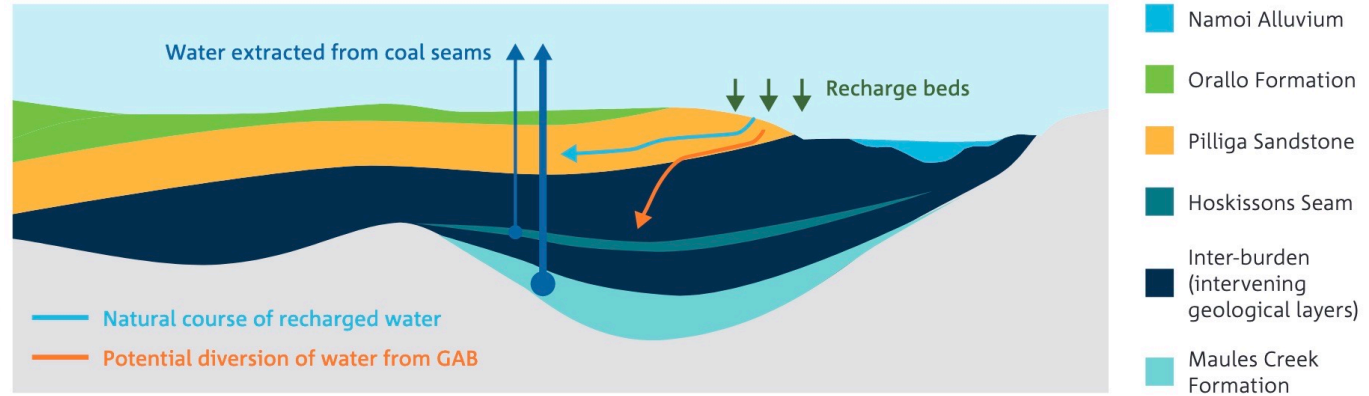
NSW Research Advisory Committee

- Contains no industry members (at present)
- Identify, develop, approve or stop projects
- Ensures research priorities are independent
- Ensure research is transparent
- Oversees conduct
- Internal documentation completely visible (<https://gisera.csiro.au>)
- Reports publicly available following CSIRO peer-review

Impacts of CSG depressurisation on GAB aquifers



The shaded area is the GAB intake zone in the groundwater model area for the region. This model was developed for the Namoi subregion as part of the Bioregional Assessments Programme.



Conceptual cross section showing the geological layers and potential water movement due to CSG through the GAB aquifer. Figure for illustrative purposes only.

Issue: What is the potential drawdown in the Pilliga Aquifer of CSG operations?

- Freshwater source: Irrigation stock domestic use
- Independent modelling: 2 x 500 simulations
- GW recharge (Southern Recharge Zone): 42.4 GL/yr
- Loss from Pilliga Aquifer (CSG depressurization): 85ML/yr
- Loss from Namoi River alluvial aquifer: 0.89 ML/yr

- Pilliga forest: GAB recharge area
- Constrained by bore obs. and hydraulic characteristics.
- CSG development does not extract water from GAB
- 0.3% Long Term Annual Average Extraction Limit (30GL/yr)
- 0.001% average annual extractions



Contaminant transport

Potential for GW contamination?

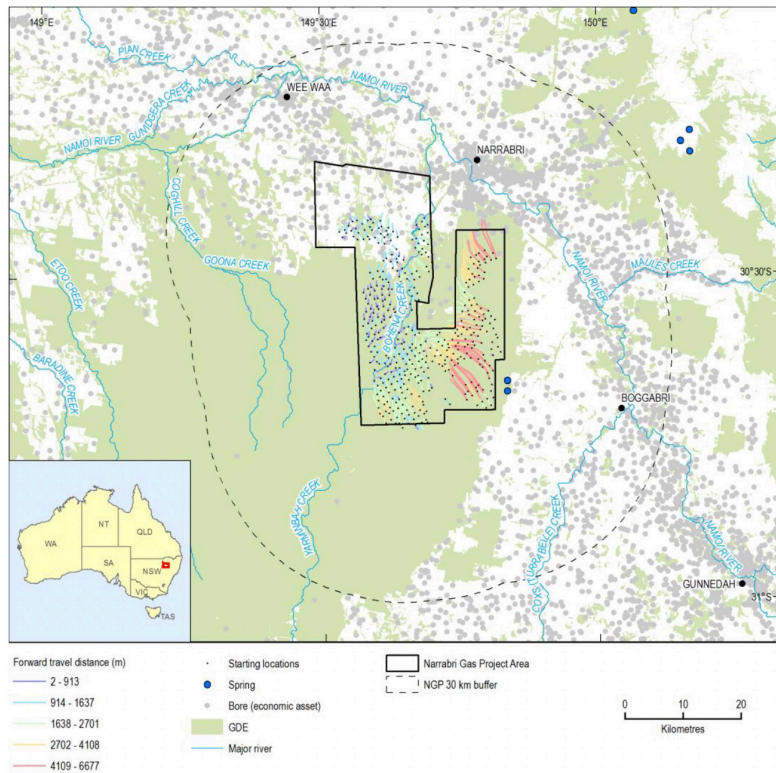
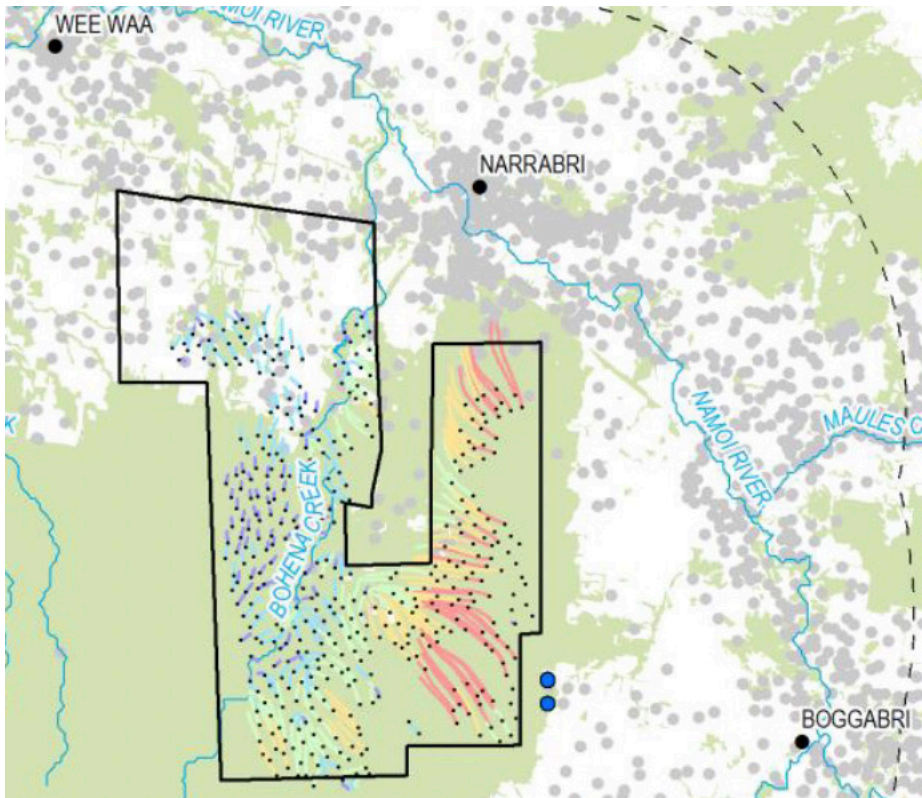


Figure 10: Forward particle tracking analysis over 3000 years from CSG wells to risk receptors

- Concern: impacts to GW resources from hydraulic fracturing/wellbore delamination?
- Spatially variable GW model
- Constrained by bore observations/hydraulic chrs.
- Particle tracking
 - GW flow velocity (Pilliga Aquifer) is very slow
 - ~100's m in 100 years
- GW velocity confirmed by isotope tracer measurements
- 3000 year simulation: Max distance travelled 6.5km
- Risk of contaminant reaching farmer bores: Very unlikely
- Further risk reduction:
 - Microbial degradation
 - Adsorption/desorption reactions
 - Chemical transformation



Contaminant transport

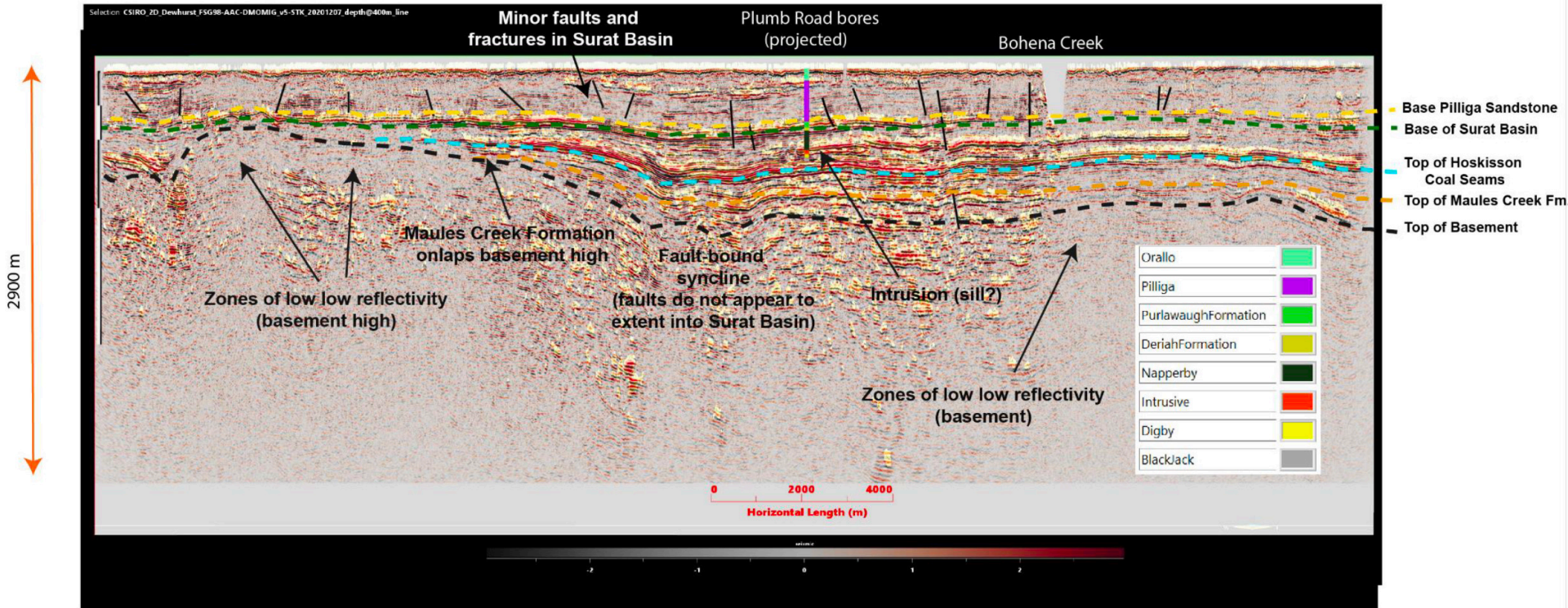


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Potential connectivity pathways

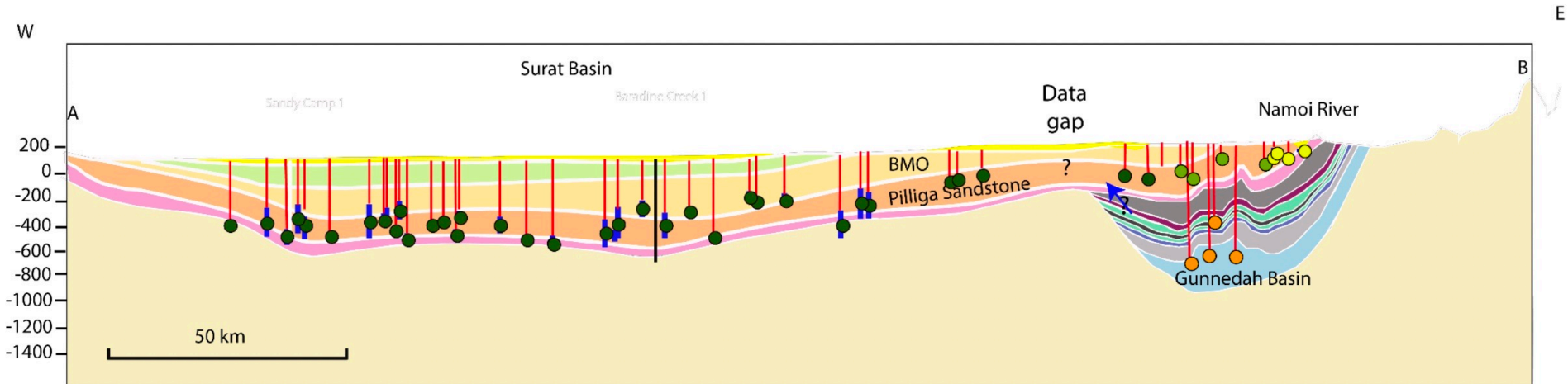


We know possess significant information on the Surat/Gunnedah Basins stratigraphy

Link: Report to be released in the next few weeks. Progress report: <https://gisera.csiro.au/wp-content/uploads/2021/10/W19-website-progress-October-2021.pdf>



Potential connectivity pathways



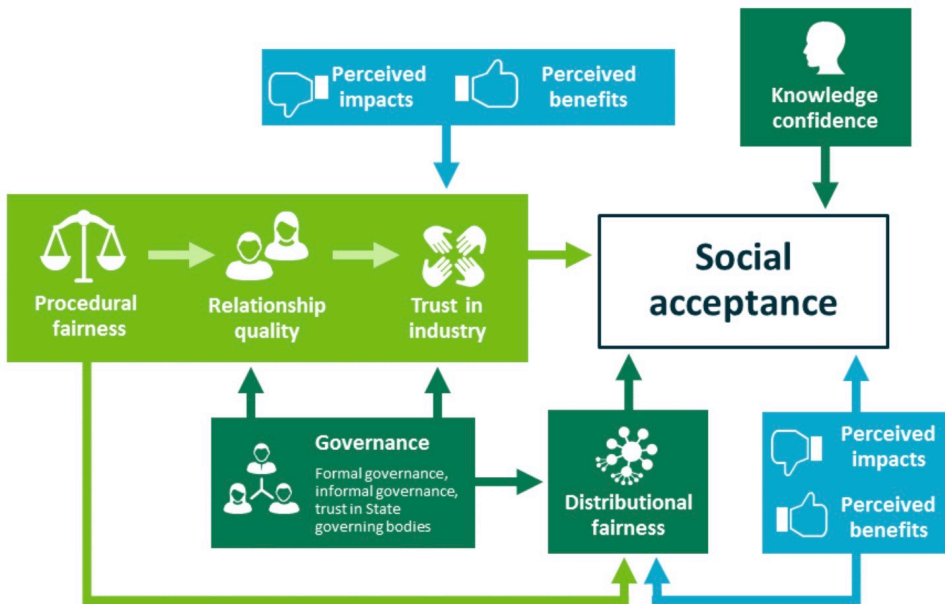
- Surat Basin**
- Alluvium
 - Rolling Downs Group
 - Bungil, Mooga and Orallo (BMO)
 - Pilliga Sandstone
 - Purlawaugh Formation (Base of Surat Basin)

- Gunnedah Basin**
- Napperby Formation
 - Digby Formation
 - Black Jack Group
 - Hoskissons Coal (secondary CSG target)
 - Watermark Formation
 - Porcupine Formation
 - Maules Creek Formation (primary CSG target)
 - Pre-Surat/Pre-Gunnedah basins strata undifferentiated

- Groundwater Bore
 - Groundwater Bore Screen
 - Exploration/stratigraphic well
- Hydrochemical cluster (median EC)
- Cluster 1 (11085 $\mu\text{S}/\text{cm}$)
 - Cluster 2 (121 $\mu\text{S}/\text{cm}$)
 - Cluster 3 (550 $\mu\text{S}/\text{cm}$)
 - Cluster 4 (972 $\mu\text{S}/\text{cm}$)



Social Acceptance



Community attitudes towards CSG development

- Community Acceptance: single biggest risk to large-scale technology and energy development after FID
- Free, prior, informed consent: Social License
- Procedural fairness: A key driver
- Ensuring community benefits:
 - Benefits/Disbenefits and how they are distributed?
- Strong positive drivers of social acceptance are:
 - Procedural fairness
 - Fair distribution of benefits
 - Trust govt will hold industry to account

Link: <https://gisera.csiro.au/wp-content/uploads/2018/05/Social-7-Final-Report-correct.pdf>

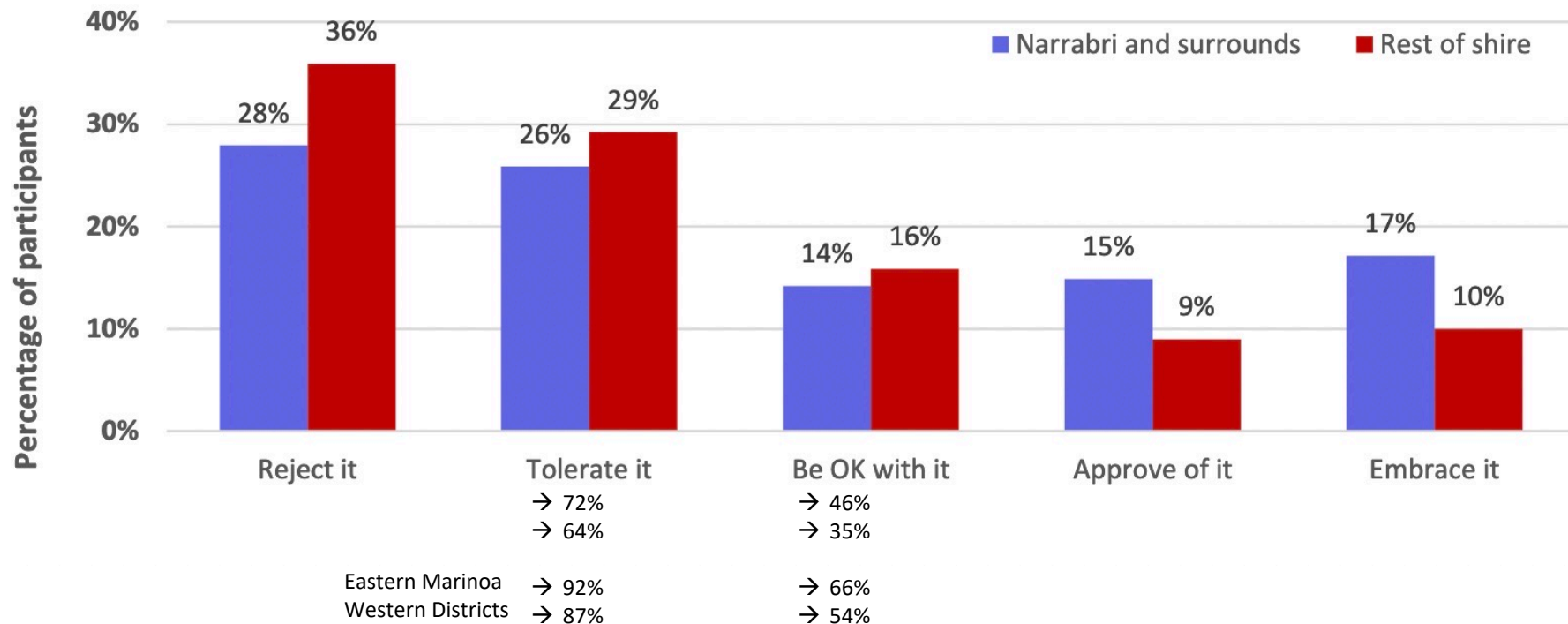
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https://gisera.csiro.au/wp-content/uploads/2021/09/21-00386_GISERA_FACTSHEET_NSWNarrabriCommunityWellbeing_WEB.pdf



Community wellbeing & attitudes to CSG

Figure 13 Attitudes towards CSG development: Subregions 2017



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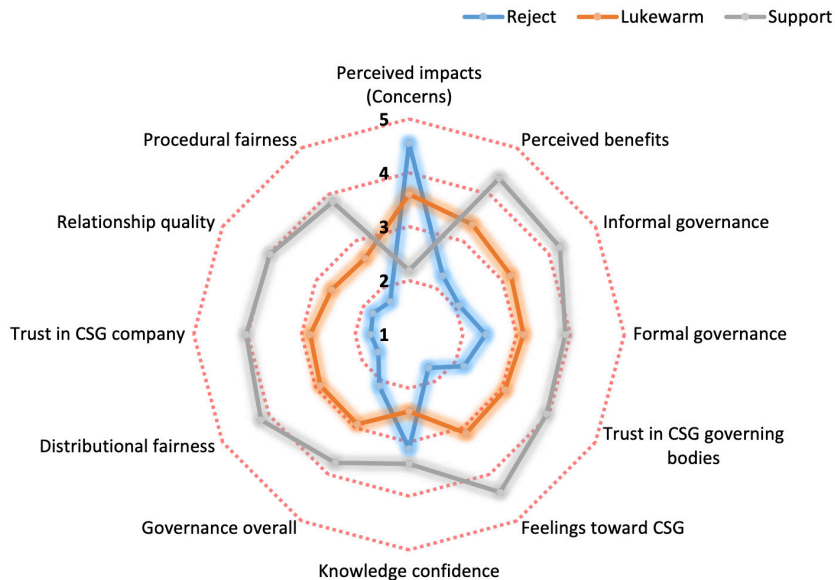
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Social Acceptance

Figure 18 Underlying drivers of trust and acceptance of CSG development by three attitude groups



Note: The higher the perception score the more favourable the perception except for *perceived impacts* where the higher the score the greater the level of concern; a score of 3 represents the midline

Factors driving community acceptance:

- Existing community resilience
- Environmental management
- Job/business opportunities
- Services and facilities
- Community trust

Opportunities to invest in wellbeing:

- Building trust
- Employment & business
- Decision making & citizen voice
- Planning and access to information
- Leadership

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Thank you

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