

GISERA Project S.13: Assessing and projecting onshore gas effects on regional economic activity in NSW

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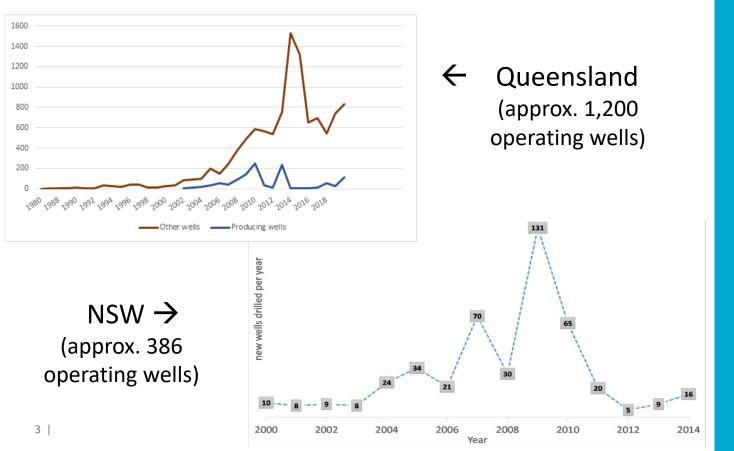


Presentation overview

- Introduction and rationale of project
- Methods employed
- Previous research base for this analysis
- Findings from gas expansion
- Findings from manufacturing
- Implications and conclusion

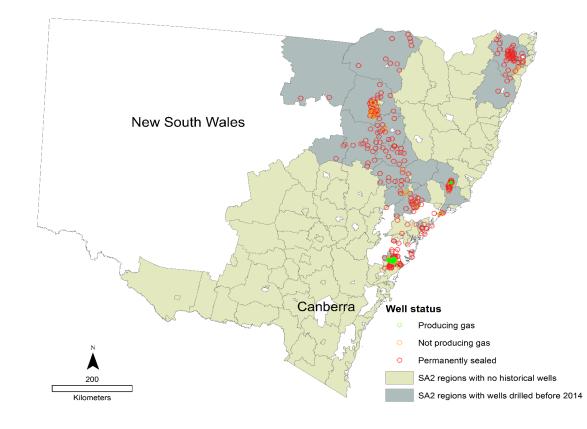


Introduction and rationale





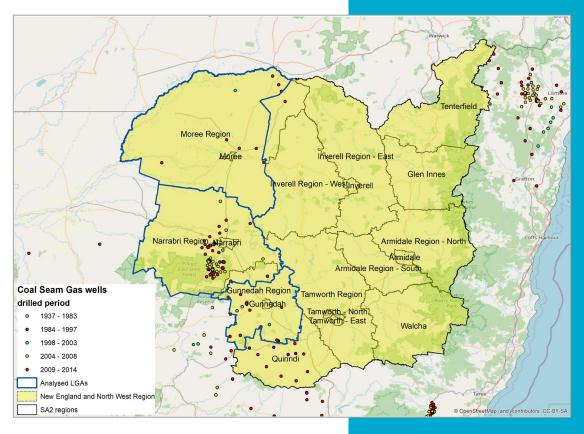
Introduction and rationale





Introduction and rationale

What are the socioeconomic prospects in the Narrabri region, beyond gas activity?





Previous economics research

Limited evidence for Narrabri region...

diversion from traditional boomtown social impacts observed in previous energ

the results show signs of mitigating and reversing rural community decline. © 2014 CSIRO. Published by Elsevier Ltd. This is an open access article under t

... so we draw on evidence from Queensland, adapted for the NSW context

	Journal of Rural Studies 36 (2014) 376-385			Energy Research & Social Science 56 (2010) 101221	
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ELSEVIER	journal homepage: www.elsevier.com/locate/jrurstud	Local economic impacts of an unconventior	Original research article		
Impacts of unconventional gas development on rural community		energy boom: the coal seam gas industry i Australia*	Living with resource booms and busts: Employment scenarios and resilience to unconventional gas cyclical effects in Australia		
decline Thomas G. Measham ^{a,b,*} , David A. Fleming ^a		David A. Fleming and Thomas G. Measham [†]	Thomas G. Measham ⁺ , Andrea Walton, Paul Graham, David A. Fleming-Muñoz GREG GPD Res 2581, Induses, OLD 4001, Augusta		
	nak Down Under Haghlip, Calo Box 1700, Canberra, ACT 2001, Australia Australian National University, Canberra, Australia				
ARTICLE INFO	ABSTRACT	Complementing the scarce economic literature about local impacts of ener	A R TICLE IN FO	A B S T R A C T Recert research on unconvertional oil and gas development (UOGD) proposes differences compared	
Article history: hvalable online 26 April 2014	This paper looks at the impact of a new extractive industry, namely unconventi decline. Rural decline is defined as comprising loss of rural youth, reduced hum rural powerk. Since the start of the current century, the unconventional natur	extraction booms, this paper empirically investigates economic outcomes related the new coal scam gas (CSG) industry located across southern Queensland. The Australian state has seen an unprecedented inflow of investments into the extraction	Republic Restlience Commodity cyclas Rydraulic fracturing Coalbad methane	sector results on inconventional on any gas development (UAAD) proposes interence compares tablished extends on conventional energy, including the rise of short recycles of min boons and bus paper builds on recent UOGD research discussing mini-bocens/busts of the industry and considers far feeting resilience of local businesses to cyclical effects using a case study of coabbe mechane (coal sear Australia. The paper takes a mini endends approach, combining qualitative interviews with local	ats. Thi ctors al n gas) is
Rywordt: Unconventional natural gas CCS Coal-bed methane Ranal dedine Regional development Ranal youth	equadria, securited the welds, when is close proving an other more testing approximation and approx of these relativity spectra growing and of there then its properties approximation a	this previously unreplained associational mixing gas over the first details. In analyse errors also is took process of endpointer effective model and the first previously of the start of the start of the start of the start of the forestament regions in all regions without this details details are start on a start 2016-2011 for function regions were have the details are start on a start of 2016-2011 for function regions were have a start of the start of the start of the start of the start of the start of the start of the employment is not a start of the start basis in all GML areas where maining units may maining biology (the Start basis) and GML areas where maining units with different field in the start basis in a start of the start of the start of the start of the start of the start of the start basis in a start of the start of the start of the weight of the start basis in a start of the start basis in a start of the start of the start of the start of the start basis in a start of the star		commutes and economic modeling in quantitatively forming proteinal darges is higher equipation of the protein strate strate in the protein strate strate of the protein strate strate of the protein strate strate strate strates and the protein strates and the protein strates and the protein strates strates strates and the protein strates strates strates and the protein strates strates and the protein strates strates strates and the protein strates strates strates strates strates strategies and the protein strates stratest stratest stratest stratest stratest stratest stratest stra	loymen s all sce the bes itry ove iditiona cyclica d out fo e result terature : flexibl

multiplien are also analyzed for Surat havin CSG areas, where positive impacts

spillovers) are restricted to construction and professional services jobs, w

Key words: Australia, coal seam gas, mining, resource boom, unconventional natural gas

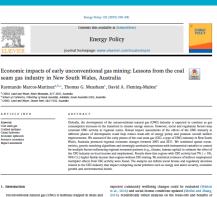
agricultural jobs have decreased

can vary considerably, noting that timing plays an important role as to how industry cycles play out and whether

busts are relatively small corrections that can be absorbed by local economies or whether they are outside the realms of local resilience. We also draw attention to the role of intermediaries who play a critical role in pro-

viding trusted advice at a time of information overload and coefficience perspectives. We emphasize the need for

their adaptive resilience towards fluctuatine periods of promerity and recession.



rock formations and takes the form of shale easy coal seam eas (also nown as coalbed methane) and tight gas (Measham et al. Vright, 2012). In a global context of increasing energy demand and sustainability challenges, the growth of the UNG industry is expected to continue and play a significant role in the transition to cleaner energy ources (AEMO, 2016; De Silva et al., 2016; Lacev and Lamont, 2014) such growth could result in increased economic activity and flow-on emographic and environmental effects at different temporal and spaal scales (Balley and Kookana, 2012; Hamawand et al., 2013; scales (solicy and Roonana, 2012, Hanaward et al., 2013, scham and Elemine 2014; Sherval and Handiman 2014) However iders' expectations on the net balance of positive and negative effects can result in social and regulatory challenges limiting or stopping UNG development at regional and local scales (Lacey and Lamont, 2014; Moriat and Zhang, 2014). Social license challenges are likely to be more relevant during initial phases of the UNG industry when the net stare impacts for local communities are highly uncertain. Once the

ional deficiencies, guide the debate on social licenses to UNG mining and help balance potentially conflicting policy settings (e.g. energy security, economic growth, environmental health, cultural heritage conservation) (N Evidence from different countries shows that the balance over perceived costs and benefits from unconventional gas extraction varies within and between regions (Brasier et al., 2011; Evensen et al., 2017; Komarek, 2016; Marchand and Weber, 2017). For instance, the Marcollas Shale formation spanning the States of Pennsylvania and New York, U.S.A., is faced with markedly different social and economic responses (Coserove et al., 2015). In Pennsylvania, a substantial UNC industry has developed since the late 1990's. By contrast, a moratorium

on development was declared in New York. Stedman et al. (2012) found

impacts of UNG activity, more engaged in related public participation

LING activity during the early stages of the industry, could reduce in-

that New York residents were more concerned about potential negative industry enters an operational phase, differences between real and processes, and overall more opposed to unconventional energy

nding author at: CSIRO, Land and Water, Black Mountain, ACT 2601, Australia E-mail address: mar77v@estro.au (R. Marcos-Martinez)

Engley - Volkage (IC-1005) Engles. Joint 10000/ Received 17 April 2018; Received in revised form 19 October 2018; Accepted 30 October 2018 Available online 11 December 2018 0001-4215/ Cosens Copyright & 02108 Published by Elsevier Ltd. All rights reserved.



Methods - Data

- Data from various sources: Census, NSW government, past studies, Santos (2020)
- We use the local job estimates in the updated report from Santos
- Given the limited experience in the Narrabri region, we also use multipliers derived from the experience in Queensland
- Estimates from *Perdaman* (fertiliser company) are also used



Methods - Modelling

- Statistical specifications
- Econometric models
- Economic Impact (Input-Output) Analysis Tool (EIAT tool from AURIN)



Findings – Comparing regions

Variable	State SA2s (n=556)		Control SA2s (n=145)		Narrabri region (n=7)		T-test Control vs CGS regions	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	
Median family income 2006	1,251	432	974	204		995	108	
Median family income 2011	1,507	509	1,166	281		1,197	104	
Median family income 2016	1,784	568	1,411	283		1,491	112	
Proportion of Ag employment 2006	4.66	9.12	13.15	11.41		27.15	17.28	***
Proportion of Ag employment 2011	4.07	8.39	11.44	10.60		25.23	17.96	***
Proportion of Ag employment 2016	4.23	8.50	11.50	10.34		24.02	17.64	***
Prop. of Manufacturing emp. 2006	9.62	4.19	8.46	3.74		5.75	1.98	*
Prop. of Manufacturing emp. 2011	8.53	3.78	7.80	3.72		5.28	1.85	*
Prop. of Manufacturing emp. 2016	5.99	2.77	6.03	3.30		3.40	1.18	**
Prop. of Mining emp. 2006	0.86	2.40	1.68	3.49		0.94	1.09	
Prop. of Mining emp. 2011	1.24	3.02	2.53	4.57		3.53	3.32	
Prop. of Mining omp. 2016	1 23	3.07	2.50	4.56		5.51	E.79	*
Prop. of jobs in basic services 2006	63.04	6.87	59.76	9.07		51.44	13.31	**
Prop. of jobs in basic services 2011	63.94	6.77	61.10	8.87		51.85	12.55	**
Prop. of jobs in basic services 2016	63.32	7.23	60.67	8.56		51.19	12.25	***
Prop. of jobs in skilled services 2006	19.14	5.76	14.47	3.80		11.26	3.09	*
Prop. of jobs in skilled services 2011	19.71	6.12	14.85	3.59		11.21	3.44	**
Prop. of jobs in skilled services 2016	20.54	6.26	15.16	4.02		11.26	3.23	*
Prop. of people with a bachelor's degree 2006	19.41	10.04	13.47	4.17		10.90	1.04	
Prop. of people with a bachelor's degree 2011	22.32	10.87	15.58	4.82		12.04	0.88	*
Prop. of people with a bachelor's degree 2015	25.64	11.47	18.13	5.30		14.13	1.02	**



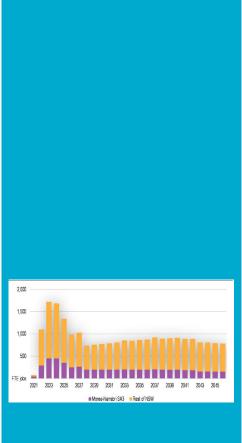
Findings – Gas activity

From econometric models...

- CSG exploration activity is related to lower agricultural jobs
- Slight positive effect income
- Negligible effects on other indicators

Given small effects from exploration, we use the experience of QLD to project impacts

We also consider numbers from Santos (2020), where we assume that gas activity would employ ~170 people, on average, during the life of the project (till 2046)

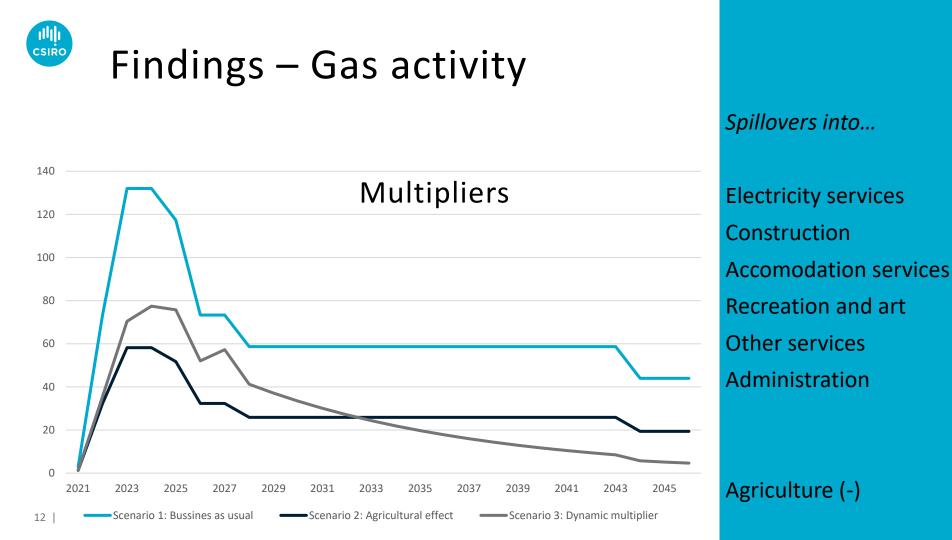




Findings – Gas activity

Sector	Elasticity	p-value	
Manufacturing	0.003	0.951	
Electricity services	0.168	0.008	***
Construction	0.124	0.003	***
Wholesale	-0.053	0.377	
Retail	0.029	0.49	
Accommodation services	0.151	0.002	***
Transport	0.041	0.465	
Media	0.051	0.332	
Finance	0.013	0.823	
Rental	0.101	0.098	
Public	0.014	0.789	
Education	-0.025	0.584	
Health	0.049	0.280	
Recreation and arts	-0.107	0.024	**
Other services	0.114	0.034	**
Scientific professionals	0.001	0.983	
Administration	0.123	0.031	**
Agriculture	-0.069	0.116	

Note: *** p<0.01, ** p<0.05. *Source:* Adapted from Measham et al. (2019)





Findings – Potential fert. plant

• Perdaman projects

"at least 70 jobs during construction, and sustain 100 direct and 100 ongoing indirect jobs during operations"

- Econometric models show the effect of manufacturing could generate multipliers of:
 - 1.42 in basic services
 - 0.4 in skilled services

These number mean that the '100 on going jobs' could generate around 142 basic services jobs and 40 skilled services jobs

🐘 Findings – Potential fert. plant

Average effect on employment and gross regional product per million dollar invested in manufacturing:

- Narrabri's GRP could grow \$0.79 million and create around 6 jobs
- ~ 50% of the GRP and employment effect would remain in the manufacturing sector
- The GRP of Retail and wholesale trade could increase 12%. Agriculture, Forestry and Fishing could increase 9%
- Most of the total benefits (60%) will be through indirect increases in GRP and employment
- These estimates suggest that a new fertiliser industry may need to spend around \$35million per year to generate 200 jobs per year in Narrabri

Implications for Narrabri region

- Employment spillovers from gas activity could range between 60 and 130 jobs in the peak of the project, and then gradually reduce to zero by 2046.
 - mostly services related to gas, electricity and construction
 - plus some local services: accommodation, recreation and arts
- The economic gains from the gas industry could be increased if gas supply triggers investments in other sectors:
 - e.g. a potential new fertiliser plant in the region would lead to
 - 100 new jobs in the fertiliser industry, potential 180 in other sectors
 - Approx. \$35 m per year to the GRP of Narrabri
- Each new job in the manufacturing sector, could generate 1.4 jobs in basic services and 0.4 jobs in skilled services.

Thank you



Australia's National Science Agency