

# Scientific inquiry into Hydraulic Fracturing in the Northern Territory Submission

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*The development of unconventional gas in the Northern Territory would reduce energy security by linking the Territory to volatile east coast or world markets. Considerable costs could be incurred, while the benefits of royalties are likely to be modest.*

Rod Campbell  
Bill Browne  
Hannah Aulby  
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Level 1, Endeavour House, 1 Franklin St  
Canberra, ACT 2601  
Tel: (02) 61300530  
Email: [mail@tai.org.au](mailto:mail@tai.org.au)  
Website: [www.tai.org.au](http://www.tai.org.au)

# INTRODUCTION

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The Australia Institute welcomes the opportunity to make a submission to the Scientific inquiry into hydraulic fracturing in the Northern Territory. Our submission focuses on Theme 7.7 of the Background and Issues Paper, economic impacts and also addresses other themes that the Institute has conducted research on.

## THEME 7.7 ECONOMIC IMPACTS - ENERGY SECURITY

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### *Comments on Northern Territory and east coast gas markets*

The Northern Territory has substantial supplies of conventional gas and is a small market. As a result, gas is currently cheap and available in the NT - a similar situation to what prevailed in eastern Australia for many years.

The tranquillity of the east coast gas market was broken by the construction of export LNG terminals in Gladstone, Queensland, which linked it to the world market and drove up prices. Worse still, the huge cost overruns of the export facilities, opaque market arrangements and lower than expected yields from Queensland coal seam gas fields<sup>1</sup> have seen gas prices increase to above world prices, even to the point where Australian gas can be cheaper to buy in Japan than in Australia.<sup>2</sup>

While the NT does export gas via the Darwin LNG Inpex terminal, this largely serves the offshore Bayu-Undan field, while other conventional reserves supply the NT. While this balance is maintained, NT gas supply security is unlikely to be affected. The biggest threat to security of gas supply in the Northern Territory is through potential connections to the chaos of the Eastern Australian market, or expansion of export facilities in Darwin.

The development of unconventional gas supply in the Territory would create incentive for exactly these kinds of links, presenting a risk for NT energy security. As unconventional gas is not needed to supply the local Northern Territory market, the

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<sup>1</sup> Chambers (2013) Export fears as gas wells fall short, <http://www.theaustralian.com.au/business/mining-energy/export-fears-as-gas-wells-fall-short/news-story/c38d5957fce9f8e34af9076d2b48c342>

<sup>2</sup> West (2017) Gas crisis? Or glut? Why Japan pays less for Australian LNG than Australians do, <https://theconversation.com/gas-crisis-or-glut-why-japan-pays-less-for-australian-lng-than-australians-do-74438>

proponents of unconventional projects will need infrastructure to take any production to eastern or overseas markets. Linking to these markets is unlikely to be in the interests of Territory gas consumers, exposing Territorians to volatile, higher prices and the need to compete against foreign or east coast consumers for NT gas.

### ***Surplus gas - consumption and supply in the NT***

NT gas consumption fell from 1,184 million cubic meters to 1,154 cubic meters between 2013-14 and 2014-15.<sup>3</sup> More recent data has not yet been released, but is likely to be well below earlier forecasts due to declining costs of renewable energy and abandonment of projects such as the pipeline to the Gove alumina refinery.

Power and Water Corporation (PWC) has signed long-term contracts with existing conventional gas supplies, as is made clear in its annual reports:

In 2015-16, Power and Water sourced close to 100 per cent of its natural gas from Eni Australia BV's Blacktip gas field in the Joseph Bonaparte Gulf, which lies some 110km off the Territory's northwest coast. The balance was secured from Darwin LNG pursuant to Power and Water's contingency gas supply arrangements.

The Dingo Gas Supply Agreement was concluded with Magellan Petroleum prior to the company's onshore Australian assets being purchased by Central Petroleum Limited. The agreement allowed Power and Water to coordinate the tie-in of Central Petroleum's Gas Supply pipeline into the Owen Springs Power Station for the supply of high methane content gas, which will help improve efficiency to the power station's generators.<sup>4</sup>

These conventional gas supplies are able to supply the Territory in the long term. This was the purpose of an agreement with producer Eni in 2005-06:

It is pleasing to note that in addition to the challenges faced, the Corporation delivered a number of significant achievements over the 2005-2006 year. A reliable future gas supply was accomplished with the signing of a Gas Sales Agreement with Eni Australia B.V. for the purchase of some 750 petajoules (Pj)

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<sup>3</sup> Department of Industry, Innovation and Science (2016) *Australian Energy Statistics*, Table Q Australian consumption and production of natural gas, by state, physical units, <https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Australian-energy-statistics.aspx#>, note based on approximation of 1,000 million cubic metres to 40 Petajoules. See International Energy Agency (2011) *World Energy Outlook*, p304, Box 8.3: What's in a bcm?, <http://www.worldenergyoutlook.org/weo2011/>

<sup>4</sup> PWC (2016) *Annual Report*, p35, [https://www.powerwater.com.au/\\_data/assets/pdf\\_file/0017/133163/2016\\_Power\\_and\\_Water\\_Annual\\_Report.PDF](https://www.powerwater.com.au/_data/assets/pdf_file/0017/133163/2016_Power_and_Water_Annual_Report.PDF)

of gas over the next 25 years, commencing early in 2009. In addition, a Gas Transport Agreement was signed with the Australian Pipeline Trust to transport the gas from the processing plant near Wadeye to the existing Amadeus Basin Darwin Pipeline. This will ensure that the Corporation has sufficient gas to meet the future power needs of the Territory and to continue providing a reliable power supply.<sup>5</sup>

The power needs of the Territory have not increased since that agreement was signed, quite the opposite. In addition to the gas demand reduction mentioned above, the decommissioning of the Gove aluminium smelter, a major energy user, has seen Territory energy use decline:

The significant fall in energy use in the Northern Territory is mainly attributed to the closure of the Gove alumina refinery in May 2014.<sup>6</sup>

Expected demand from Gove was a major factor in the commissioning of supply from Eni.<sup>7</sup> Its closure has left PWC with large amounts of surplus gas which it hopes to sell via a new pipeline to the eastern Australian gas market:

### **Surplus gas**

The Northern Gas Inter-connector Pipeline (NGP) will enable the sale of Power and Water's surplus gas to the eastern seaboard.<sup>8</sup>

The Australia Institute has long opposed the Northern Gas Pipeline (NGP) project.<sup>9</sup> It risks exposing Territorians to the problems of the east coast market, problems it will do nothing to solve. The 25-35Pj of gas that would be sold through it represent less than 2 percent of the volume of the east coast market (including exports).<sup>10</sup> Further expansion of Territory gas supply through exploitation of unconventional resources

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<sup>5</sup> PWC (2006) Annual report 2006, p2, [https://www.powerwater.com.au/data/assets/pdf\\_file/0012/1515/2006\\_Annual\\_Report\\_-\\_web.pdf](https://www.powerwater.com.au/data/assets/pdf_file/0012/1515/2006_Annual_Report_-_web.pdf)

<sup>6</sup> Department of Industry, Innovation and Science (2016) *Australian Energy Statistics*, p14, <https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/aes/2016-australian-energy-statistics.pdf>

<sup>7</sup> Manning (2013) *Rio Tinto to keep Gove alumina refinery running*, <http://www.smh.com.au/business/rio-tinto-to-keep-gove-alumina-refinery-running-20130213-2edbo.html>

<sup>8</sup> PWC (2016) Annual report, p35, bold in original

<sup>9</sup> Campbell (2015) *Passing gas: Economic myths around the Northern Territory's North East Gas Interconnector pipeline*, <http://www.tai.org.au/content/passing-gas-economic-myths-around-northern-territorys-north-east-gas-interconnector-pipeline>, appended to this submission.

<sup>10</sup> Robertson (2015) *Pipe dream: a financial analysis of the Northern Gas Pipeline*, <http://ieefa.org/wp-content/uploads/2016/05/Pipe-Dream-A-Financial-Analysis-of-the-NEGI-MAY-2016.pdf>

would increase calls by these suppliers for links to the east coast market, bringing risk and instability to Territorians.

The factor driving the construction of the NGP is not a desire to ensure Territorians are paid top dollar for their gas. If that were the case the infrastructure would ensure gas could be delivered to more than one customer. The current proposal is to deliver gas only to Incitec Pivot in Mt Isa.<sup>11</sup> Instead, it appears that the rationale is to stop PWC from having to pay suppliers for gas it does not need and cannot use.

The NGP will cost NT gas users dearly, despite former Chief Minister Adam Giles' claim that taxpayers will not pay for it.<sup>12</sup> Taxpayers may not pay the capital costs, but the prices that the pipeline's owners will charge PWC will be recouped by charging more to its customers – almost every Territorian. As pointed out by the Institute for Energy Economics and Financial Analysis:

The [NGP] is being built to dispose of gas that was acquired by the Northern Territory government's Power and Water Commission under a take or pay arrangement. Essentially if the PWC can dispose of this gas for any return it is better off than just paying for the gas and not taking delivery.<sup>13</sup>

While this inquiry may not be directly concerned with gas infrastructure projects such as the NGP, it is important to understand that infrastructure investment can lead to increased demand for gas, particularly when excess capacity has been built due overly optimistic expectation of gas demand. Conversely, prospective gas producers will always call for more investment in infrastructure. This has certainly been the case in east coast Australia and is also the case with the NGP and would-be unconventional gas producers in the NT. Development of unconventional gas in the NT will lead to further calls for infrastructure investment in the interests of producers rather than the Northern Territory public.

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<sup>11</sup> Renault (2015) *Fertiliser giant Incitec Pivot a big winner in Northern Territory gas pipeline decision* <http://www.abc.net.au/news/rural/2015-11-18/nt-gas-pipeline-to-benefit-fertiliser-giant-incitec-pivot/6950326>

<sup>12</sup> MacDonald-Smith et al (2015) *Jemena to build NT gas pipeline to supply Incitec Pivot* <http://www.smh.com.au/business/energy/jemena-to-build-nt-gas-pipeline-to-supply-incitec-pivot-20151115-gkzpw8.html>

<sup>13</sup> Robertson (2015) *Pipe dream: a financial analysis of the Northern Gas Pipeline*, <http://ieefa.org/wp-content/uploads/2016/05/Pipe-Dream-A-Financial-Analysis-of-the-NEGI-MAY-2016.pdf>

## THEME 7.7 ECONOMIC IMPACTS - NET BENEFITS AND DISTRIBUTION

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From an economic perspective, the main benefit that would accrue to the NT community from developing unconventional gas resources would be royalties. Mining and gas royalties are not a major source of funding for Australian state and territory governments<sup>14</sup>. The arguable exception is Western Australia, which receives 15% of its revenue from mining royalties.<sup>15</sup> The NT Budget for 2016-17 is for \$132 million in royalty revenue from all mining, just 2% of its \$6.55 billion budgeted revenue. Revenue from the Commonwealth Government accounts for over 50% of Territory Revenue.<sup>16</sup>

Increasing gas production through unconventional developments will not change this balance. Claims that further gas production can bring “independence from Canberra” or that it is the Territory’s “only hope” are misguided.<sup>17</sup>

The inability of unconventional gas to make serious revenue for state governments is demonstrated by the experience of Queensland. Even after years of gas production and now several years of exports, Queensland gas royalties for this year are budgeted at \$68 million. This represents just 0.01 percent of Queensland government revenue.<sup>18</sup>

It should also be noted that the gas industry has a record of avoiding and minimising all payments to Australian governments. Despite Australian gas production increasing to the point where we will become the largest gas exporter in the world, payments received under the Petroleum Resource Rent Tax (PRRT) are declining. The recent LNG

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<sup>14</sup> Peel, Denniss and Campbell (2014) *Mining the age of entitlement: State government assistance to the minerals and fossil fuel sector*, <http://www.tai.org.au/content/mining-age-entitlement>

<sup>15</sup> WA Treasury (2017) Budget Paper 3 Economic and Fiscal Outlook, <http://static.ourstatebudget.wa.gov.au/16-17/2016-17-wa-state-budget-bp3.pdf>, p89.

<sup>16</sup> NT Department of Treasury and Finance (2016) Budget Paper 2 Fiscal Outlook and Strategy, <http://www.treasury.nt.gov.au/PMS/Publications/BudgetFinance/BudgetPapers/l-BP2-1617.pdf>, p17.

<sup>17</sup> Chlanda (2017) Fracked gas our only hope: Northern Institute professor, <http://www.alicespringsnews.com.au/2017/04/21/fracked-gas-our-only-hope-northern-institute-professor/>; Herbert (2015) *Bidders for North East Gas Interconnector named*, <http://www.abc.net.au/news/rural/2015-04-02/gas-pipeline-interconnector/6367606>

<sup>18</sup> Queensland Treasury (2016) Budget Paper 2: Budget Strategy and Outlook 2016-17, <https://s3-ap-southeast-2.amazonaws.com/s3-media-budget/pdfs/budget+papers/bp2/4.%20Revenue.pdf>

projects are not projected to pay any PRRT for decades.<sup>19</sup> Large gas companies also routinely pay no company tax in Australia, despite generating huge revenues here.<sup>20</sup>

Balanced against the modest increases in revenue, costs that accrue to the state through infrastructure provision and other forms of subsidy need to be considered. The Northern Territory government and community incur costs in building infrastructure for the mining and fossil fuel industries. Between 2008-09 and 2013-14 the Territory government spent \$381 million on measures that wholly benefited the mining and fossil fuel industries.<sup>14</sup> The NT government's expenditure focused on the Inpex gas development. Such expenditure would likely continue with unconventional development as discussed above. This has major implications for the distribution of costs and benefits from mining and gas projects, directing more costs onto the community.

The NT is not unusual in this respect. Western Australia's Treasury noted in 2011 in relation to the development of the Northwest Shelf gas project:

In 2010 net present value terms, the cost of Western Australia's assistance to the North West Shelf project (e.g. payment of subsidies to the State's power utility to help cover the losses it initially incurred under crucial 'take or pay' gas contracts) is estimated to be around \$8 billion.<sup>21</sup>

Queensland Treasury's comments are aimed at mining, but the principle is the same for gas projects:

Governments face budget constraints and spending on mining related infrastructure means less infrastructure spending in other areas, including social infrastructure such as hospitals and schools. For many projects directly related to assisting mining industry development, such as land acquisitions for state development areas, the expected timeframes for cost recovery are extremely long (sometimes decades). The opportunity cost of this use of limited funds is a real cost to government and the community.<sup>22</sup>

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<sup>19</sup> Aston (2015) Multinational oil and gas giants paying no petroleum resource rent tax, <http://www.smh.com.au/business/the-economy/multinational-oil-and-gas-giants-paying-no-petroleum-resource-rent-tax-20151217-glpusi.html>

<sup>20</sup> Kenny (2017) Global gas giants use loophole to avoid tax on billions from Australian operations, <http://www.smh.com.au/federal-politics/political-news/global-gas-giants-use-loophole-to-avoid-tax-on-billions-from-australian-operations-20170425-gvrwn9.html>

<sup>21</sup> WA Treasury (2011) *GST Distribution Review: WA Submission*, [http://www.gstdistributionreview.gov.au/content/submissions/downloads/issues\\_paper/wa\\_gov.pdf](http://www.gstdistributionreview.gov.au/content/submissions/downloads/issues_paper/wa_gov.pdf), page 13.

<sup>22</sup> Queensland Treasury (2013) *Queensland Treasury Response to Commonwealth Grants Commission*



While the costs of assisting mining and gas projects can often be found in budget papers, other costs are more difficult to assess. Environmental costs associated with unconventional gas development also need to be considered. The Australia Institute's research on some of these issues is outlined in the following sections.

## THEME 7.3 AIR - CLIMATE CHANGE

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The Australia Institute has conducted and commissioned research on methane emissions from unconventional gas extraction. These emissions have been severely underestimated thus far in Australia. Development of unconventional gas in the Northern Territory is likely to lead to significant increases in Territory emissions, but unless Australian methodology changes, these emissions may not be accounted for.

The current methodology for measuring greenhouse gas emissions from unconventional gas extraction is based on assumed and outdated methane emissions factors, rather than direct measurement of wells, pipelines and other gasfield infrastructure. The estimate used by the Australian Government is 0.058 tonnes of methane leaked per kilotonne of methane produced, or 0.0058%. This estimate is based on a historic US emissions factor designed for measuring conventional gas emissions and is no longer used in the USA. Actual measurements by 16 peer reviewed research projects, using improved technology to take direct measurements from gas fields in the US, have ranged from 2-17% of production.<sup>23</sup>

The impact of these unaccounted-for methane emissions is seen in recent research showing that US methane emissions have risen 30% in the last decade. The study used evidence from atmospheric observations to trace the largest rise of these emissions to the central part of the US, where oil and gas extraction has expanded dramatically over the same time period.<sup>24</sup>

In addition to higher emissions from gasfield operations, new research has found that below ground dewatering of aquitards required for unconventional gas extraction may

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*Response to Terms of Reference for Commonwealth Grants Commission 2015 Methodology Review,*  
[https://cgc.gov.au/index.php?option=com\\_attachments&task=download&id=1727](https://cgc.gov.au/index.php?option=com_attachments&task=download&id=1727)

<sup>23</sup> Lafleur et al, 2016, *A review of current and future methane emissions from Australian unconventional oil and gas production*, Melbourne University Melbourne Energy Institute,  
<http://energy.unimelb.edu.au/library/a-review-of-current-and-future-methane-emissions>

<sup>24</sup> Turner et al, 2016, *A large increase in U.S. methane emissions over the past decade inferred from satellite data and surface observation*, *Geophysical Research Letters*, Volume 43, Issue 5, 16 March 2016, p 2218-2224

have caused methane emissions from underground gas deposits to be released into rivers and other weak areas.<sup>25</sup>

As well as the obvious implications of underestimated methane emissions and the ability to meet our Paris climate commitments, there are also cost implications as producers capture a lower portion of reserves than anticipated.

Further information on the fugitive and migratory emissions of unconventional gas emissions can be found in two recent reports from the Melbourne Energy Institute, commissioned by the Australia Institute, *A review of current and future methane emissions from Australian unconventional oil and gas production* and *The risk of migratory methane emissions resulting from the development of Queensland coal seam gas*. Both reports are attached as appendices to this submission.

## THEME 7.6 SOCIAL IMPACTS - INSURANCE

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Insurance companies have refused to insure against risks associated with unconventional gas extraction, both in Australia and in the US.

In the US, 'homeowners can be confronted with uninsurable property damage for activities that they cannot control. And now a growing number of banks won't give new mortgage loans on homes with gas leases because they don't meet secondary mortgage market guidelines.'<sup>26</sup>

In the north west of NSW, farmers have been refused insurance cover for risks and contamination associated with unconventional gas extraction.<sup>27</sup>

## THEME 7.7 ECONOMIC IMPACTS - PROPERTY VALUES

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The presence of unconventional gas wells on properties in Queensland have led to banks refusing to accept those properties as securities to give bridging loans. A 2016 letter from the Commonwealth Bank to property owners in Chinchilla, Queensland,

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<sup>25</sup> Lafleur et al, 2017, *The risk of migratory methane emissions resulting from the development of Queensland coal seam gas*, Melbourne Energy Institute, <http://tai.org.au/content/risk-migratory-methane-emissions-resulting-development-queensland-coal-seam-gas>

<sup>26</sup> New York State Bar Association Journal Nov/Dec 2011, pg 12

<sup>27</sup> Caskey, 2015, *CSG too risky for insurers*, <http://www.farmonline.com.au/story/3365648/csg-too-risky-for-insurers/>

shows that the presence of coal seam gas wells on the property is the reason their application for a bridging loan to buy another property was refused.<sup>28</sup>

A 2014 study by the NSW Valuer Generals on links between property values and unconventional gas industry did not make firm conclusions as a result of the lack of available data on house sales in the period since the industry commenced. It did, however, note anecdotal evidence that ‘negative perceptions of CSG led to a reduction in the number of potential purchasers and an increase in the time taken to sell properties.’<sup>29</sup>

## THEME 7.7 ECONOMIC IMPACTS - OTHER INDUSTRIES

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The rapid expansion of unconventional gas projects has damaged Australia’s manufacturing industry through its labour market impacts and effect on gas prices. The unconventional gas industry has also damaged local economies where it operates, impacting small business, agriculture, and local government sectors.

Economic modelling by the Queensland unconventional gas company Arrow LNG for its Economic Impact Assessment found that this project would displace \$441.5 million worth of manufacturing output and 1,000 manufacturing jobs in Queensland.<sup>30</sup>

The most detailed examination of the economic impacts of unconventional gas development on local economies was conducted in the Darling Downs. The study was carried out between 2008 and 2013 by the industry-funded Sustainable Minerals Institute (SMI) at the University of Queensland.<sup>31</sup>

This study surveyed stakeholders from different sectors in the local community including the local business community, agriculture, local government, advocacy groups and environmental consultants, as well as the mining and unconventional gas industries.

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<sup>28</sup> Robertson, 2016, *Commonwealth Bank: coal seam gas makes property ‘unacceptable’ as loan security*, <https://www.theguardian.com/environment/2016/sep/30/commonwealth-bank-coal-seam-gas-makes-property-unacceptable-as-loan-security>

<sup>29</sup> Office of the Valuer General, *Study on the impact of the coal seam gas industry on land values in NSW*

<sup>30</sup> See Grudnoff, M (2015) *An analysis of the economic impacts of Arrow Energy’s Gladstone LNG Plant*.

<sup>31</sup> Everingham, J, Collins, N, Rodriguez, D, Cavaye, J, Vink, S, Rifkin, W & Baumgartl, T (2013) *Energy resources from the food bowl: an uneasy co-existence. Identifying and managing cumulative impacts of mining and agriculture. Project report*, CSRM, The University of Queensland: Brisbane.

Far from mining and unconventional gas providing economic benefits, local businesses felt that it had reduced financial capital, human capital, infrastructure, social capital and natural capital.

Local businesses have to compete with inflated gas industry wages in order to recruit and retain staff and they experience increased rent and competition for services (particularly trade and mechanical repairs). There are also disruptions to farmers from the rollout of access roads, pipelines, water treatment plants and other infrastructure. Big increases in truck traffic tend to disrupt other forms of transport and damage roads.

Further information about the economic and social impacts can be found in our 2015 report on the impacts of the Queensland unconventional gas industry, *Be careful what you wish for*, attached as an appendix to this submission.

## THEME 7.6 SOCIAL IMPACTS - EMPLOYMENT

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Gas extraction is a capital-intensive industry; gas companies employ few people relative to the capital invested. Despite this, Australia's gas industry has a history of exaggerating the jobs that will be created from gas projects.

A 2011 report prepared for Santos by Allen Consulting Group found that a potential coal seam gas development in Northwest NSW would increase employment opportunities in NSW by "around 2,900 ongoing full time positions", even though the project would only create about 30 gas industry jobs. Over 500 jobs would apparently be created in the public sector, at taxpayer expense.<sup>32</sup>

A 2012 report prepared for the Australian Petroleum Production and Exploration Association (APPEA) by Deloitte found that the "economy-wide impacts" of new oil and gas projects included increasing Australia's employment by 103,000 full-time equivalent jobs in 2012.<sup>33</sup> APPEA used this research to justify its claim that the natural gas industry (oil was not mentioned) was responsible for 100,000 jobs in 2012.<sup>34</sup>

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<sup>32</sup> Lamacraft, Brown and Claughton (2014) *Santos "a first class operator"*, <http://www.abc.net.au/news/rural/programs/nsw-country-hour/2014-06-20/nsw-santos-on-jobs-and-water/5538608>, The Allen Consulting Group (2011) *The economic impacts of developing coal seam gas operations in Northwest NSW*, [http://www.acilallen.com.au/cms\\_files/acgeconomicimpactcoalseam2011.pdf](http://www.acilallen.com.au/cms_files/acgeconomicimpactcoalseam2011.pdf)

<sup>33</sup> Deloitte Access Economics (2012) *Harnessing our comparative energy advantage*, p 31

<sup>34</sup> APPEA (n.d.) *Campaign messages*, <https://www.ournaturaladvantage.com.au/campaign-messages/>

In fact, the ABS found that employment in oil and gas extraction increased by 9,400 between May 2012 and May 2013 (to 24,700). Even when temporary construction jobs created to build the projects are taken into account (about 40,805),<sup>35</sup> that would still be 49,795 jobs short of APPEA’s 100,000 jobs claim.

Employment in the gas industry is in decline. As of February 2017, there are 19,200 total employed people in oil and gas extraction, 16,900 fewer than the peak in August 2015 (36,100).<sup>36</sup>

Far from creating many additional jobs, the coal seam gas industry has been found to reduce employment in certain sectors. A study of Queensland’s unconventional gas expansion by CSIRO’s Gas Industry Social and Environmental Research Alliance found that for every 10 additional people employed in coal seam gas, 18 agricultural jobs were lost. The expansion did cause a growth in construction and professional service jobs (jobs related to short-term construction) but virtually no additional retail or manufacturing jobs.<sup>37</sup>

**Figure 1: Coal seam gas (CSG) employment spillovers over different sectors**

	Elasticity	Additional job for each new CSG job
<b>Local goods sector</b>		
Construction	0.832 (0.426)*	1.414
Professional services	0.704 (0.259)**	0.422
Retail trade	0.011 (0.140)	0.024
Accommodation and food services	0.375 (0.263)	0.471
Other services	-0.385 (0.247)	-0.890
<b>Tradable goods sector</b>		
Manufacturing	0.068 (0.199)	0.160
Agriculture	-0.314 (0.182)*	-1.790

Source: Fleming and Measham (2014) *Local economic impacts of an unconventional energy boom*, p 90

Territorians seeking employment for any unconventional project in the Northern Territory will have to compete with experienced workers from interstate, including the 16,900 fewer people employed now than they were at the industry’s employment peak. These thousands of highly-qualified workers are more likely to fill positions than

<sup>35</sup> Calculation by The Australia Institute based on available Bureau of Resources and Energy figures: The Australia Institute (2013) *Did the gas industry create 100,000 jobs last year?*, <http://www.factsfightback.org.au/did-the-gas-industry-create-100000-jobs-last-year-check-the-facts/>

<sup>36</sup> ABS (March 2017) *Labor Force, Australia, Detailed, Quarterly*, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Feb%202017?OpenDocument>

<sup>37</sup> Fleming and Measham (2014) *Local economic impacts of an unconventional energy boom*, p 78-94

unskilled Territorians with no experience in gas field construction and operation. When the gas industry employs local people, they tend to be skilled workers who relocate from local manufacturing and agriculture.

Experience in Queensland has shown that construction workforces are almost entirely male non-residential workers living in workers camps on the outskirts of towns. These workers are often referred to as fly-in, fly-out (FIFO) or drive-in, drive-out (DIDO). Few people from local regional communities are likely to be employed in either the construction or the operational phases of the gas fields.

## CONCLUSION

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The development of unconventional gas would present the Northern Territory community with considerable risks and few benefits. It is likely to reduce energy security by linking the Territory to volatile east coast or world markets. Considerable costs could be incurred in relation to gas infrastructure, while the benefits of royalties are likely to be modest.