

3 August 2020  
Office of the Independent Planning Commission NSW  
Level 3, 201 Elizabeth Street, Sydney, NSW 2000  
P: (02) 9383 2100 E: [ipcn@ipcn.nsw.gov.au](mailto:ipcn@ipcn.nsw.gov.au)

Dear Independent Planning Commission,

This is a submission objecting to the Narrabri Gas Project.

Thank you for the opportunity to provide a submission into the Narrabri Gas Project and taking the time to consider my submission.

I live in the Lake Macquarie / Newcastle region in NSW. I work for the University of Newcastle, School of Environment and Life Sciences as a Project Officer and previously worked at the Tom Farrell Institute for the Environment. My current role involves conducting an environmental assessment for Norfolk Island. In a volunteer capacity, I am a committee member of several organisations including the Hunter Environmental Institute, Richmond Vale Rail Trail Inc., Newcastle Climate Change Response, Hunter Innovation and Science Hub, and the Clean Energy Association of Newcastle and Surrounds. I am also a member of the Charlestown chapter of The Wilderness Society. I am involved in what could be termed environmental outreach, informing the public on environmental information, news, and activities through newsletters, conducting seminars, events, and conferences. I have helped run the annual Mined Land Rehabilitation Conference and the Hunter Valley Electric Vehicle Festival over the last 4 years. On the ground I am involved with Landcare work for the Richmond Vale Rail Trail.

Growing up in NSW I enjoyed camping holidays with my family in the area visiting the many beautiful places including Warrumbungle National Park, Siding Spring Observatory, Coonabarabran, and further north to Walgett, Lightning Ridge and Grawin. The natural beauty of the area is stunning and as a new immigrant to these shores (at the time) it made a lasting impression on me. Whether it be the beautiful fields of Sunflowers that stretch to the horizon, the emus matching the pace of the car as you drive down the road or the stunning natural architecture of the Warrumbungles.

The Narrabri Gas project will have significant Groundwater impacts, Ecological impacts, Climate Change impacts, and the economics and energy security reasons behind the proposal are flawed, and the project should be refused development consent.

The Narrabri Gas Project, that is estimated to result in 94.2 million tonnes of greenhouse gases over the life of the project, cannot be permitted because its approval would be inconsistent with the remaining carbon budget and the Paris Agreement climate target. This project is not consistent with NSW's climate change policy, the principle of inter-generational equity nor the public interest, as it clearly assumes failure to meet the Paris Agreement temperature goals and worsening climate change impacts for New South Wales.

Both Renewable Hydrogen and Biogas/Biomethane can displace or replace natural gas as a fuel significantly reducing GHG emissions. No new gas is needed.

Furthermore, the project is not critical for energy security and reliability in NSW as:

- Narrabri Gas project high production costs and resulting high gas prices will not put downward pressure on gas prices.
- Domestic market forecast shortfalls by 2024 are unlikely due to a drop in domestic demand, a flattening on international demand freeing up supply, and LNG import terminals coming on-line prior to 2024.
- Transition of the National Electricity Market away from a long-term reliance on coalfired power stations to a greater reliance on renewable energy will not be dependent on gas-fired power stations.

This submission is focused on economics, gas supply and demand, climate change impacts, gas as a transition fuel and alternative fuels to natural gas. However, it would be remiss of me if I did not briefly mention some of the other potential impacts of the Narrabri Gas Project.

## Groundwater Impacts

The project exposes the following major environmental risks impacting groundwater:

- Long term risk of depressurisation and leakage from key water supply aquifers.
- Groundwater and surface water contamination, particularly with CSG produced wastewater from the Project.
- Fugitive gas migration into aquifers overlying the target coal seams (a groundwater contamination and safety hazard).<sup>1</sup>

The Pilliga Sandstone Aquifer is a high-quality shallow groundwater that local communities rely on for water for stock, domestic and irrigation purposes and is one of the main aquifers in the southern Great Artesian Basin. The Pilliga Sandstone is also the main outcropping aquifer in the Pilliga forest region within the project area, and this region and along with outcropping along the Warrambungle Range are recharge beds for the Great Artesian Basin in NSW.<sup>2 3</sup> A near-

---

<sup>1</sup> EDO (2020, July 22) CSG: The public hearing into the Narrabri Gas Project. Retrieved from <https://www.edo.org.au/2020/07/22/csg-public-hearing-narrabri-gas-project/>

<sup>2</sup> CSIRO (2018, August) Potential water impacts of coal seam gas in the Pilliga Sandstone. Retrieved from [https://gisera.csiro.au/wp-content/uploads/2018/08/18-00384\\_GISERA\\_FACTSHEET\\_SGW-GABFluxFinalReport2pp\\_WEB\\_180807.pdf](https://gisera.csiro.au/wp-content/uploads/2018/08/18-00384_GISERA_FACTSHEET_SGW-GABFluxFinalReport2pp_WEB_180807.pdf)

<sup>3</sup> Sreekanth, J., Cui, T., Pickett, T. & Barrett, D. (2017) Uncertainty analysis of CSG-induced GAB flux and water balance changes in the Narrabri Gas Project area. CSIRO, Australia. Retrieved from <https://publications.csiro.au/rpr/download?pid=csiro:EP173269&dsid=DS3>

surface aquifer, the Namoi Alluvium, is also a major water resource for agriculture in the region. Together these form the main source of water these communities rely on for their livelihoods.

The contamination of groundwater is a major environmental risk with Coal Seam Gas, with the major potential contamination from 'produced water' which is pumped from the underlying coal seams to depressurize the seams and allow gas to be released and be extracted. CSG produced water is typically of poor quality due to being located within the coal seams. The Narrabri region produced water is high in salinity and contains high levels of heavy metals, boron and fluoride and presents a major risk to groundwater contamination in the area.

Given a number of leaks and/or spills of produced water have already occurred within the 70 appraisal and exploration wells in the area, there is a strong likelihood with 850 wells that significant leaks and/or spills of produced water will occur throughout the life of the project risking contamination of the aquifers / recharge beds for the Great Artesian Basin and affecting the livelihoods of those that depend on this valuable resource.

Furthermore, the project has no approved plan to deal with the 840,000 tonnes of salt waste contaminated with heavy metals than will be produced over the life of the project, as no local landfill can accept this waste.

The potential contamination of the aquifers and lack of waste management of the contaminated salt waste flies in the face with the assessment that the project will "not result in significant impacts on people or the environment".

## Ecological Impacts – Koalas

The Pilliga Forest has been classified as a priority area for koala conservation. Energy and Environment Minister Matt Kean recently set a goal of doubling the number of koalas by 2050 in a bid to defy projections the marsupial could become extinct in the wild in NSW by mid-century.<sup>4</sup> The Narrabri Gas project will result in the fragmentation of 85,000 hectares of the Pilliga Forest. Fragmented islands of koala habitat such as will result from this development which will result in unhealthy koala populations. Koalas need wide corridors to spread out to ensure effective breeding. Koala corridors are vital and are recognised generally as such in the new Koala SEPP and acknowledged by the NSW Chief Scientist (2016):

---

<sup>4</sup> Hannam, P. (2020, July 26). Matt Kean aims to double koala population by 2050. Retrieved from <https://www.smh.com.au/environment/conservation/matt-kean-aims-to-double-koala-population-by-2050-20200725-p55fdc.html>

*“Koala populations need large areas of connected habitat to maintain their viability. Habitat loss and fragmentation has resulted in population decline and has been identified as a significant threat to the species persistence in NSW.”<sup>5</sup>*

Recent studies within the project area suggest a dramatic decline in koala populations. Surveys of the Pilliga forests in the 1990s suggest that the forests were carrying the largest population of koalas west of the Great Dividing Range in NSW, with the population estimated at 15,000. Repeat surveys within the Pilliga forests show a decline of over 80% since the 1990s.<sup>5</sup>

The impact of extreme weather events such as drought and extreme heatwaves on koalas is expected to increase with climate change and may also exacerbate other threats such as disease.<sup>6</sup> The Pilliga forest koalas are likely to have faced extreme (but less frequent and long) heat events in the past and responded by retreating to creek lines with either available free water or a higher moisture content in the leaves of their food trees. However, land clearing within and on the periphery of the forests and from road construction since the early 1900s has resulted in creeks within the Pilliga forests silting up. Habitats that would have once likely functioned as a refuge during times of drought are now highly disturbed and are unlikely to provide the required level of protection for koalas.<sup>5</sup>

The planned significant fragmentation of habitat by the Narrabri Gas project will exacerbate the problems caused by earlier land clearance and may lead to the local extinction of the Koala. The potential local extinct of an vulnerable species appears to contradict the assessment that the project will “not result in significant impacts on people or the environment”.

## Economics

Gas supply on the east coast of Australia has tripled since 2014. However, domestic gas prices have also tripled in the same period in response to a huge demand for gas for LNG production and export. LNG exporters in Gladstone were unable to supply enough gas from their CSG production wells, with reserves grossly overestimated compared to their supply capacity. This resulted in a hoovering up existing low cost of production gas increasing domestic prices.<sup>7</sup>

---

<sup>5</sup> NSW Chief Scientist & Engineer (2016, December). Report of the Independent Review into the Decline of Koala Populations in Key Areas of NSW. Retrieved from [https://www.chiefscientist.nsw.gov.au/data/assets/pdf\\_file/0010/94519/161202-NSWCSE-koala-report.pdf](https://www.chiefscientist.nsw.gov.au/data/assets/pdf_file/0010/94519/161202-NSWCSE-koala-report.pdf)

<sup>6</sup> Lunney, Daniel & Crowther, Mathew & Wallis, Ian & Foley, William & Lemon, John & Wheeler, Rob & Madani, George & Orscheg, C. & Griffith, Joanna & Krockenberger, Mark & Retamales, Melissa & Stalenberg, Eleanor. (2012). Koalas and climate change: a case study on the Liverpool Plains, north-west NSW. 10.7882/FS.2012.022.

<sup>7</sup> Rios, J. (2019, September 13). What’s next for Australia’s natural gas market? Retrieved from <https://www.eecc.eu/blog/whats-next-for-australias-natural-gas-market>

Domestic gas prices in Australia have remained at levels far in excess of international parity prices. Whilst prices have fallen somewhat, they have not fallen by nearly as much as those in Asia or Europe. Domestic prices have remained some 30-40% higher than ACCC calculated export parity prices (a.k.a. "netback" prices).<sup>8</sup> This may be explained as there is a lack of competition in the supply and delivery in the domestic gas market with only 5 producers and 2 pipeline owners. This is compounded with a lack of transparency of gas prices (there is no wholesale gas market with most gas traded bilaterally via contracts) that puts domestic and industrial gas buyers at a disadvantage.<sup>7</sup>

Consequently, gas has become uncompetitive as a fuel source for power generation in Australia and demand for gas-powered generation has fallen by 59% since 2014.<sup>12</sup> Subsequently, gas-powered generation has been running well below capacity.<sup>9</sup> Not surprising that at present there are no committed new investments in gas-fired power generation.<sup>10</sup> Nevertheless, electricity prices for both households and businesses have been driven up by higher gas prices, because gas-fired power stations typically supply the electricity market during times of peak demand.<sup>8</sup> Gas is effectively the price setter in the National Electricity Market; for every \$1/GJ increase in the price of gas the price of electricity rises by \$11/MWh.<sup>12</sup>

The CSIRO GenCost report indicated that renewables (wind and solar photovoltaic) with storage (such as pumped hydro) were now cheaper than gas for electricity generation in Australia.<sup>11</sup> As such, it is expected that demand for gas for electricity generation will decline in the future.

One of the key competitive advantages Australian industry has enjoyed has been low energy prices. Energy intensive industries and industries dependent on energy intensive inputs have become less competitive as prices for electricity and gas for combustion have increased. This has forced the closure of some major manufacturing and chemical plants, lead to the offshoring

---

<sup>8</sup> Long, S. (2020, February 27). Gas giants misled governments and it is costing Australian jobs, ACCC boss says. Retrieved from <https://www.abc.net.au/news/2020-02-27/gas-giants-misled-governments-acc-boss-rod-sims-says/12004254>

<sup>9</sup> Morton, A. (2020, March 8). 'Expensive and underperforming': energy audit finds gas power running well below capacity. Retrieved from <https://www.theguardian.com/environment/2020/mar/08/expensive-and-underperforming-energy-audit-finds-gas-power-running-well-below-capacity>

<sup>10</sup> Robertson, B. (2020, January 30). IEEFA Australia: Gas is not a transition fuel, Prime Minister. Retrieved from <https://ieefa.org/ieefa-australia-gas-is-not-a-transition-fuel-prime-minister/>

<sup>11</sup> CSIRO (2019, December) GenCost 2019-20: preliminary results for stakeholder review. Retrieved from [https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/Inputs-Assumptions-Methodologies/2019/CSIRO-GenCost2019-20\\_DraftforReview.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/CSIRO-GenCost2019-20_DraftforReview.pdf)

of production and undermined the profitability and viability of other gas users.<sup>8</sup> Gas use in manufacturing as a consequence of these prices has fallen by 12% since 2014.<sup>12</sup>

AEMO forecasts further reductions in gas use as consumers fuel-switch away from gas appliances towards electrical devices, in particular for space conditioning. The Commonwealth and NSW Government are exploring options to free-up gas demand through electrification, fuel switching and energy efficiency.<sup>13</sup>

Fuel switching from gas appliances towards electrical devices can often be more economic. A 2018 study of household fuel choice found that 98% of households with new solar financially favoured replacement of gas appliances with electric. With existing/no solar 60-65% of households still favoured replacement of gas appliances with electric.<sup>14</sup>

In the residential sector, for example, reverse-cycle air-conditioning is expected to reduce gas demand that could have arisen due to gas heating.<sup>15</sup> For those residents who cannot afford the capital costs of replacing gas appliances, these increased prices are leading to a worrying growth in energy poverty in the domestic residential sector.<sup>16</sup>

As over 70% of Australian gas is exported as LNG, increases in supply from CSG projects in NSW are unlikely to affect domestic prices into the near future and any potential flow on effect to the Australian economy. This is supported by the NSW Independent Pricing and Regulatory Tribunal (IPART) which expressed doubt as to whether the development of CSG projects in NSW was likely to have a bearing at all on gas prices in NSW as the development of the three LNG export projects meant the Eastern Gas Region had become linked to global LNG markets.<sup>17</sup> Moreover, Coal seam gas is high-cost gas, being 50% more expensive to produce

---

<sup>12</sup> Robertson, B. (2020, July 23). IEEFA update: Australia sponsors a failing gas industry. Retrieved from <https://ieefa.org/ieefa-update-australia-sponsors-a-failing-gas-industry/>

<sup>13</sup> Energy NSW. (2020, January 31). Memorandum of understanding, Retrieved from <https://energy.nsw.gov.au/government-and-regulation/electricity-strategy/memorandum-understanding>

<sup>14</sup> Alternative Technology Association (2018, July) Household fuel choice in the National Energy Market. Retrieved from [https://renew.org.au/wp-content/uploads/2018/08/Household\\_fuel\\_choice\\_in\\_the\\_NEM\\_Revised\\_June\\_2018.pdf](https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf)

<sup>15</sup> AEMO (2020a, July 30). 2020 ISP Appendix 10. Sector Coupling. Retrieved from <https://aemo.com.au/-/media/files/major-publications/isp/2020/appendix--10.pdf?la=en>

<sup>16</sup> Snow, J. (2014, February). Energy Policy Institute of Australia - Public Policy Paper Paper 2/2014 The economic impact of high energy prices in Australia, Retrieved from [http://oakleygreenwood.com.au/wp-content/uploads/2017/10/6\\_Snow\\_Jim\\_Public\\_Policy\\_Paper-6Feb2014.pdf](http://oakleygreenwood.com.au/wp-content/uploads/2017/10/6_Snow_Jim_Public_Policy_Paper-6Feb2014.pdf)

<sup>17</sup> Pegasus Economics (2019, August) Report on the Narrabri Gas Project. Retrieved from [https://8c4b987c-4d72-4044-ac79-99bcaca78791.filesusr.com/ugd/b097cb\\_c30b7e01a860476bbf6ef34101f4c34c.pdf](https://8c4b987c-4d72-4044-ac79-99bcaca78791.filesusr.com/ugd/b097cb_c30b7e01a860476bbf6ef34101f4c34c.pdf)

than conventional gas.<sup>18</sup> The proposed Narrabri Gas project is even more expensive, as according to an AEMO commissioned report, gas extraction costs from this field will be over twice the cost of other existing fields in the eastern gas region.<sup>12</sup> According to AEMO, the Narrabri Gas Project is ranked 41 out of 51 actual and undeveloped gas projects and there are 18 developed and 22 undeveloped gas projects with lower estimated production costs than the Narrabri Gas Project.<sup>17</sup>

The marginal source of supply (the final source of gas supply needed to meet demand) is likely to set floor price in negotiations between gas suppliers and buyers in NSW.<sup>19</sup> This cost of production together with transmission costs to Sydney is currently some 20% less than the proposed Narrabri Gas Project. Furthermore, future marginal source of supply may be satisfied by imported LNG (where wholesale gas prices would be set to import parity levels) or through existing or developed lower cost domestic supplies (such as noted by AEMO).<sup>17</sup> Under these circumstances, the Narrabri Gas Project would not provide the marginal source of supply for wholesale gas in NSW, and is thus unlikely to exert any influence over wholesale gas prices in NSW over the near or long term and therefore not contribute to any reduction in domestic gas prices.

Kevin Gallagher, Managing Director and CEO of Santos recently stated, “*The notion that any industry can survive selling its product lower than its cost of production is clearly out of step*”.<sup>20</sup> This may be the case for the Narrabri Gas project with predicted high production costs precluding LNG export (if allowed) and production costs higher than marginal source of supply for domestic distribution.

The Narrabri Gas Project was declared a Strategic Energy Project because of the crucial role it could play in strengthening energy security and reliability in NSW due in part on being able to address the AEMO predicted future gas supply shortfalls in the Eastern Gas Region in 2024 “*if no further sources of gas or alternative infrastructure are developed*”.<sup>17</sup> Furthermore, the Australian Commonwealth and NSW Government have entered into a Memorandum of Understanding that includes an undertaking that the NSW Government will facilitate investment opportunities for new gas infrastructure that will inject as additional 70 PJ of gas in to the east coast market which happens to be the estimated production of the Narrabri Gas project.<sup>13</sup> However, recent predictions by AEMO are that supply is projected to be sufficient to meet all

---

<sup>18</sup> West, M. (2020, January 2). Smithereens: Australia’s climate commitments blown if giant fossil fuel projects proceed. Retrieved from <https://www.michaelwest.com.au/smithereens-australias-climate-commitments-blown-if-giant-fossil-fuel-projects-proceed/>

<sup>19</sup> ACCC (2020, January) Gas inquiry 2017-2025 – Interim Report. Retrieved from <https://www.accc.gov.au/system/files/Gas%20inquiry%20-%20January%202020%20interim%20report%20-%20revised.pdf>

<sup>20</sup> West, M. (2020, July 3). A Savage Call: energy tsar calls time on Australia’s gas cartel. Retrieved from <https://www.michaelwest.com.au/a-savage-call-energy-tsar-calls-time-on-australias-gas-cartel/>

eastern and south-eastern Australian demand until 2026-2027.<sup>21</sup> In this assessment, AEMO further noted that the annual southern shortfall is estimated to be 51 PJ, lower than the estimated production from Narrabri of 70 PJ.

AEMO in 2018 estimated that in NSW, industry accounts for 42% of domestic gas demand, gas powered generation accounts for 21% of demand and residences accounted for the remaining 37%.<sup>22</sup>

It should be noted that demand for natural gas in NSW has declined over recent years. From 2014 to 2018, annual consumption of natural gas in NSW fell by 15 per cent, with the major contributor of this fall in consumption being the reduction in the use of gas for power generation.<sup>17</sup> Whereas domestic demand for gas has fallen for use in manufacturing by 14%, it has dropped by a staggering 59% for power generation by since 2014.<sup>12</sup>

The AEMO 2020 Gas Statement of Opportunities stated that their 2020 gas consumption forecast was lower than all previous forecasts for 2023 onwards, largely reflecting a reduced outlook for the LNG sector, along with a muted outlook for gas-powered generation as new utility-scale renewable capacity forecasts were higher than previously forecast.<sup>21</sup>

Whereas AEMO has predicted no effective change to the level industrial gas use and residential and commercial gas use in NSW, demand for gas-powered generation is predicted to continue to fall by over 85% from 2019 levels by 2028.<sup>23</sup>

International demand for LNG has stagnated and it is likely that Eastern Gas Region reserves will no longer be drawn on by Queensland LNG export projects to satisfy their export orders while demand is flat.<sup>24</sup> Consequently, the supply of natural gas in the Eastern Gas Region is expected to ease.

---

<sup>21</sup> AEMO (2020, March). Gas Statement of Opportunities, March 2020, For eastern and south-eastern Australia. Retrieved from <https://aemo.com.au/en/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo>

<sup>22</sup> AEMO (2018, June). 2018 Gas Statement of Opportunities, June 2018, For eastern and south-eastern Australia. Retrieved from <https://aemo.com.au/en/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo>

<sup>23</sup> AEMO (2020, March 27) National Electricity & Gas Forecasting 2020 GSOO Publication. Retrieved from <http://forecasting.aemo.com.au/Gas/AnnualConsumption/Total>

<sup>24</sup> McCarthy, J. (2020, July 20) Our \$70 billion gas industry sinking as export ships 'steaming around in circles'. Retrieved from <https://inql.com.au/business/2020/07/20/our-70-billion-gas-industry-collapsing-as-export-ships-steaming-around-in-circles/>

Several LNG import terminals are planned for the 3 southern states. All the proposed LNG import terminals intend to utilise Floating Storage Regasification Unit (FSRU) technology. FSRUs require little construction or investment, can provide access to LNG much faster (around 2 years), and cost less than half the cost of an onshore facility and the vessel can be reassigned on project completion. The first NSW LNG import terminal at Port Kembla is expected to commence supply at the start of 2021 with an expected capacity of 100 PJ and could be increased further to 140– 150 PJ per annum in the future.<sup>17 25</sup> In April 2020, approval was granted to increase the annual capacity to 115 PJ and to allow up to 500 TJ/day in winter months to account for high domestic demand periods.<sup>25</sup> The second NSW LNG import terminal Newcastle Gas Terminal was declared a NSW Critical State Significant Infrastructure in August 2019, and if approved would have an expected capacity of 110 PJ. The NSW government has committed to fast tracking/streamlining regulatory assessments for the Port Kembla import terminal and, if approved, the Newcastle Gas Terminal. **Error! Bookmark not defined.** The east coast gas import terminals would reduce the need for pipeline development and complement the seasonality of gas production by securing a reliable supply in winter (typically the time of peak domestic gas demand for heating), when the demand in the northern hemisphere is typically low (during the northern hemisphere summer).<sup>15</sup>

The planned LNG import terminal at Crib Point, Victoria has the potential to supply up to 160 PJ of natural gas per annum to the gas grid and is expected to be operational by 2022. If approved, the project would meet the shortfall in gas supply predicted by AEMO and would provide gas supply certainty to Victoria, NSW and South Australia.<sup>26 21</sup>

In considering the predicted future gas supply shortfall for NSW in 2024 and whether it will eventuate, one should consider the drop in demand for gas in NSW, the stagnation of international demand and potential freeing up of reserves, and the impact of LNG import terminals coming on line from 2021 onwards. Given these factors, it is unlikely that there will be any shortage of supply in NSW from 2024 onwards.

---

<sup>25</sup> GHD (2019, November) Port Kembla Gas Terminal Proposed Modification Environmental Assessment November 2019. Report for AIE. Retrieved from <https://www.planningportal.nsw.gov.au/major-projects/project/25811>

<sup>26</sup> Gas Import Jetty and Pipeline Project (2020, July). Gas Import Jetty and Pipeline Project Summary Document Environmental Effects Statement, July 2020. Retrieved from <https://www.gasimportprojectvictoria.com.au/environment-effects-statement#view-the-ees>

## Economic recovery and jobs?

It is dubious that projects such as the Narrabri Gas Project will deliver the goods for an economic recovery. The industry is not a large employer and pays little or no tax.<sup>27</sup> Analysis by The Australia Institute noted that the gas sector was one of the worst options to choose for mass job creation and that investment in other sectors would create many more jobs.<sup>28</sup> This doesn't include losses in employment in other sectors resulting from the project such as agriculture.

## Climate Change Impacts

The impacts of climate change on the environment are significant and severe. The present scientific consensus is that the earth's climate is warming due to human activity (<https://climate.nasa.gov/scientific-consensus/>), and the negative impacts of increased greenhouse gas emissions are measurable globally and nationally.<sup>29</sup>

The government is responsible for the environment, the health and wellbeing of its citizens, and the financial security of the nation. As we see the impact of increased carbon emissions, we also find evidence of the impact on Australian native wildlife, the Australian people and the wealth of the nation as noted by the recent catastrophic bushfires and devastating drought.

To address the issue of dangerous climate change, Australia, along 196 other parties, is a signatory to the Paris Agreement, which entered into force on 4 November 2016. The Paris Agreement aims to strengthen the global response to the threat of climate change, by:

*Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.*<sup>30</sup>

---

<sup>27</sup> IEEFA (2019, November 25). IEEFA Australia: Oil and gas industry paying less tax than Telstra [PRESS RELEASE]. Retrieved from <https://ieefa.org/ieefa-australia-oil-and-gas-industry-paying-less-tax-than-telstra/>

<sup>28</sup> The Australia Institute (2020, July). Gas Fired Backfire Why a “gas fired recovery” would increase emissions and energy costs and squander our recovery spending. Retrieved from [https://www.tai.org.au/sites/default/files/P908%20Gas-fired%20backfire%20%5Bweb%5D\\_0.pdf](https://www.tai.org.au/sites/default/files/P908%20Gas-fired%20backfire%20%5Bweb%5D_0.pdf)

<sup>29</sup> NASA (n.d.) Scientific Consensus: Earth's Climate is Warming. Retrieved from <https://climate.nasa.gov/scientific-consensus/>

<sup>30</sup> IPCC (2018). Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts

NSW Climate Change Policy Framework details the NSW Government's objective to achieve net-zero emissions by 2050.<sup>31</sup> This long-term objective “sets a clear statement of government's intent, commitment and level of ambition and sets expectations about future emissions constraints that will help the private sector to plan and act.” The Policy Framework states that the NSW Government will investigate how to embed consideration of climate change mitigation and adaptation across government operations including service delivery, infrastructure, purchasing decisions and regulatory frameworks. Furthermore, it states that Agencies will undertake additional policy investigation for sectors with significant opportunities and risks, including primary industries emissions and adaptation (Department of Primary Industries).

The IPCC report provides an estimate for a global remaining carbon budget of 580 GtCO<sub>2</sub> (excluding permafrost feedbacks) based on a 50% probability of limiting warming to 1.5 degrees relative to 1850 to 1900 during and beyond this century and a remaining carbon budget of 420 GtCO<sub>2</sub> for a 67% chance.<sup>32</sup>

Committed emissions from existing and proposed energy infrastructure represent more than the entire carbon budget that remains if mean warming is to be limited to 1.5 °C and perhaps two-thirds of the remaining carbon budget if mean warming is to be limited to less than 2 °C. Estimates suggest that little or no new CO<sub>2</sub>-emitting infrastructure can be commissioned, and that existing infrastructure may need to be retired early (or be retrofitted with carbon capture and storage technology) in order to meet the Paris Agreement climate goals.<sup>33</sup>

Australia's remaining emission budget from Jan 2017 until 2050 for a 50% chance of warming to stay below 1.5C warming relative to pre-industrial levels was estimated to be 5.5 GtCO<sub>2</sub>e.**Error! Bookmark not defined.** Adding the GHG emissions expended in 2017<sup>34</sup>,

---

to eradicate poverty, Intergovernmental Panel on Climate Change. Retrieved from <https://www.ipcc.ch/sr15/>

<sup>31</sup> OEH (2018). NSW Climate Change Policy Framework. Retrieved from <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-climate-change-policy-framework-160618.pdf>

<sup>32</sup> Meinshausen, M. (2019, March 19). Deriving a global 2013-2050 emission budget to stay below 1.5°C based on the IPCC Special Report on 1.5°C. Retrieved from [https://www.climatechange.vic.gov.au/\\_data/assets/pdf\\_file/0018/421704/Deriving-a-1.5C-emissions-budget-for-Victoria.pdf](https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0018/421704/Deriving-a-1.5C-emissions-budget-for-Victoria.pdf)

<sup>33</sup> Tong, D., Zhang, Q., Zheng, Y., Caldeira, K., Shearer, C., Hong, C., Qin, Y., & Davis, S. J. (2019). Committed emissions from existing energy infrastructure jeopardize 1.5 °C climate target. *Nature*, 572(7769), 373-377. <https://doi-org.ezproxy.newcastle.edu.au/10.1038/s41586-019-1364-3>

<sup>34</sup> Climate Council (2018) Australia's Rising Greenhouse Gas Emissions. Retrieved from [https://www.climatecouncil.org.au/wp-content/uploads/2018/06/CC\\_MVSA0143-Briefing-Paper-Australias-Rising-Emissions\\_V8-FA\\_Low-Res\\_Single-Pages3.pdf](https://www.climatecouncil.org.au/wp-content/uploads/2018/06/CC_MVSA0143-Briefing-Paper-Australias-Rising-Emissions_V8-FA_Low-Res_Single-Pages3.pdf)

2018<sup>35</sup>, and 2019<sup>36</sup>, this leaves just 3.8 Gt CO<sub>2</sub>e remaining as at December 2019. This leaves 6-7 years left at present emission rates of the 2013-2050 emission budget to stay below 1.5°C. Therefore, at current emissions rates, Australia will have exceeded its carbon budget for 2050 by 2026.

It therefore follows that no new fossil fuel development in Australia that is not carbon neutral, including the Narrabri Gas Project, that is estimated to result in 94.2 million tonnes of greenhouse gases over the life of the project, can be permitted because its approval would be inconsistent with the remaining carbon budget and the Paris Agreement climate target.

This project is not consistent with NSW's climate change policy, the principle of inter-generational equity nor the public interest, as it clearly assumes failure to meet the Paris Agreement temperature goals and worsening climate change impacts for New South Wales.

### Natural gas as a “transition fuel”?

Natural gas has often been touted as the “transition fuel” for the electricity sector to replace coal's greenhouse gas emissions and eventually paving the way for an emissions free future for Australia. This has been used as an argument for the approval of the Narrabri Gas project. This concept is out of date and I believe incorrect. It is simply too expensive and too emissions intensive to be so. Furthermore, the concept is based on the replacement of coal with gas which is effectively for electricity generation only. Gas is also utilised for heat through combustion both industrially and domestically producing greenhouse gases.

Methane leaks from natural gas production can make the process nearly as carbon intensive as coal. The CSIRO report “Fugitive Greenhouse Gas emissions from Coal Seam Gas Production in Australia”<sup>37</sup> noted that fugitive emissions for Natural Gas in Australia as a whole are estimated to be 1.5% of gas extracted, whereas if fugitive emissions exceeded 3.1% then the emissions intensity would match that of coal (due to the fact that methane is 86 times more powerful as a greenhouse gas than CO<sub>2</sub> over 20 years and 34 times more powerful over a 100-year time period).<sup>10</sup> They also noted that unconventional gas industry such as Coal Seam Gas would result in greater levels of fugitive emissions than the conventional gas industry. Moreover, the Narrabri Gas field has very high levels of CO<sub>2</sub> which will be vented into the

---

<sup>35</sup> Cox, L. (2019, March 14). Australia's annual carbon emissions reach record high. Retrieved from <https://www.theguardian.com/environment/2019/mar/14/australias-annual-carbon-emissions-reach-record-high>

<sup>36</sup> DISER (2020, May) National Greenhouse Gas Inventory: December 2019. Retrieved from <https://www.industry.gov.au/data-and-publications/national-greenhouse-gas-inventory-december-2019>

<sup>37</sup> CSIRO (2012). Fugitive Greenhouse Gas Emissions from Coal Seam Gas Production in Australia. Retrieved from <https://publications.csiro.au/rpr/pub?pid=csiro:EP128173>

atmosphere as part of gas extraction adding to the fugitive emissions from the implementation of this project.<sup>38</sup>

As noted above, the electricity market has already moved away from gas, with a 59% decline in usage in the National Electricity Market since 2014, whilst renewable energy has increased by 25% during the same period.<sup>12</sup> Furthermore, flexible gas plants already in the grid are running well below capacity.<sup>9</sup> AEMO forecast that increasing renewable generation developments in the NEM are expected to continue to drive down system normal demand for gas-powered generation.<sup>21</sup>

The AEMO modelled the future electricity grid in its Integrated Systems Plan.<sup>39 40</sup> The results showed for all scenarios that the transition from coal to renewable energy would not be via gas.<sup>9</sup> The role of gas would be reduced with a decline in gas generation through to 2040.<sup>12</sup> The report notes that to firm up the inherently variable distributed and large-scale renewable generation, there will be needed new flexible, dispatchable resources such as: utility-scale pumped hydro and large-scale battery energy storage systems, distributed batteries participating as virtual power plants, and demand side management.<sup>39 40</sup> It also noted that new, flexible gas generators such as gas peaking plants could play a greater role if gas prices materially reduced, with gas prices remaining low at \$4 to 6 per GJ.<sup>40</sup> However this is unlikely as gas prices have tripled over the past decade and expected NSW gas prices are over 60% more than this price.<sup>9 19</sup> AEMO noted that the investment case for new gas-powered generation will critically depend on future gas prices, as gas-powered generation and batteries can both serve the daily peaking role that will be needed as variable renewable energy replaces coal-fired generation. In their 2020 Gas Statement of Opportunities report, AEMO predicted that as more coal-fired generation retired in the long term, gas consumption for gas-powered generation in the National Electricity Market was forecast to grow again in the early 2030s, recovering to levels similar to those forecast for 2020.<sup>21</sup> However, in a later report, AEMO determined that by the 2030s, when significant investment in new dispatchable capacity is needed, new batteries will be more cost-effective than gas-powered generation.<sup>40</sup> Furthermore, the commissioning of the Snowy 2.0 pumped hydro project in 2026 will result in less reliance on gas-powered generation as a source of firm supply.<sup>21</sup>

---

<sup>38</sup> Grogan, A. (2020, April 8). Cherry-Picking: Santos selects convenient data to deflect Narrabri gas challenge. Retrieved from <https://www.michaelwest.com.au/cherry-picking-santos-selects-convenient-data-to-deflect-narrabri-gas-challenge/>

<sup>39</sup> AEMO (2019, December 12). Draft 2020 Integrated System Plan - For the National Electricity Market. Retrieved from [https://aemo.com.au/-/media/files/electricity/nem/planning\\_and\\_forecasting/isp/2019/draft-2020-integrated-system-plan.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/isp/2019/draft-2020-integrated-system-plan.pdf?la=en)

<sup>40</sup> AEMO (2020b, July 30). 2020 Integrated System Plan - For the National Electricity Market. Retrieved from <https://aemo.com.au/-/media/files/major-publications/isp/2020/final-2020-integrated-system-plan.pdf?la=en>

AEMO noted that stronger interconnection between regions reduces the reliance on gas-powered generation, as alternative resources can be shared more effectively.<sup>40</sup> The expansion network interconnection enables the growth of variable renewable energy without a significant reliance on local gas generation.<sup>41</sup> Supporting this assertion, the AEMO announced a series of actionable transmission projects including interconnector upgrades and expansions and network augmentations supporting recently announced renewable energy zones.<sup>42</sup> AEMO noted that as each of these new transmission projects is commissioned, the ability for national electricity market regions to share resources (particularly geographically diverse variable renewable energy) is increased, and therefore demand for gas-powered generation is forecast to decrease.<sup>21</sup> The Marinus Link is forecast to be commissioned in 2036, with surplus renewable generation from Tasmania then being available to the mainland National Electricity Market, which would see further declines in gas-fired generation, despite continuing coal-fired generation retirements.<sup>21</sup>

Therefore, it is unlikely that further gas peaking plants would be developed to play a significant role in providing dispatchable energy to the grid as the grid transitions to greater levels of variable renewable energy.

Gas-powered generation can provide the synchronous generation needed to balance variable renewable supply, and so is a potential complement to storage.**Error! Bookmark not defined.** However, the current installation of synchronous condensers in South Australia and other eastern states to increase system strength and stabilise the electricity network will reduce the need for gas-fired generators acting in the role of synchronous generators as more renewables enter the grid.<sup>43</sup> Ancillary services are likely to utilise battery storage and synchronous condensers in the future and no longer require the use of gas-powered generation.

---

<sup>41</sup> AEMO (2020c, July 30) 2020 ISP Appendix 2. Cost Benefit Analysis. Retrieved from <https://aemo.com.au/-/media/files/major-publications/isp/2020/appendix--2.pdf?la=en>

<sup>42</sup> Energy Source & Distribution (2020, July 30). AEMO reveals Integrated System Plan 2020. Retrieved from <https://esdnews.com.au/aemo-reveals-integrated-system-plan-2020/>

<sup>43</sup> Parkinson, G. (2020, May 25) Big spinning machines arrive in South Australia to hasten demise of gas generation. Retrieved from <https://reneweconomy.com.au/big-spinning-machines-arrive-in-south-australia-to-hasten-demise-of-gas-generation-64767/>

## Transitioning away from Gas

The ACT is planning to go gas free by 2025. This is expected to reduce their overall emissions by 22%. As part of the ACT Climate Change Strategy 2019-2025, all government and public-school buildings will be completely powered by 100% renewable energy eliminating the need for natural gas. The ACT has also removed the mandatory requirement for new homes built in the ACT to be connected to the mains gas network and will begin to introduce new policies to replace gas appliances with electric alternatives. Some 14% of residents have already converted over to 100% electric.<sup>44</sup>

There are moves in other jurisdictions to remove the mandatory requirement for a gas connection in new developments such as in South Australia.

Several technologies new or new to Australia are expected to reduce the use of natural gas as the Australian economy transitions to a net zero emissions economy and would replace the need for new gas such as proposed by the Narrabri Gas project. Please note that these technologies not only look to transition electricity generation away from natural gas but also for gas combustion for heat. These technologies could also address any gas supply shortfalls.

## Hydrogen

Hydrogen is a colourless, odourless, non-toxic gas that is an excellent carrier of energy and can be used for a broad range of energy applications including as a transport fuel, a substitute for natural gas and for electricity generation.<sup>45</sup> Hydrogen gas can be produced from water in a process known as electrolysis, and when powered by renewable energy, the hydrogen produced is free from carbon emissions, making it an attractive way to decarbonise transport, heating and electricity generation.<sup>45</sup>

AEMO stated that, “*Hydrogen has the exciting potential to become an alternative energy storage technology and a new export commodity for Australia*” which could be used to help decarbonise the domestic heat, transport and the industrial and commercial sectors in Australia and noted that development of the hydrogen industry would potentially impact both natural gas and electric demands.<sup>15 39</sup>

Several developments involving green / renewable hydrogen are either planned or underway in Australia.

---

<sup>44</sup> Mazengarb, M. & Parkinson, G. (2019, September 16). ACT to phase out gas as it launches next stage to zero carbon strategy. Retrieved from <https://reneweconomy.com.au/act-to-phase-out-gas-as-it-launches-next-stage-to-zero-carbon-strategy-92906/>

<sup>45</sup> Tasmanian Government. (n.d.). Hydrogen. Retrieved from [https://www.stategrowth.tas.gov.au/energy\\_and\\_resources/energy/hydrogen](https://www.stategrowth.tas.gov.au/energy_and_resources/energy/hydrogen)

AEMO highlighted the potential for green steel production in Australia due to abundant renewable resources and the increased demand for low emissions industrial commodities worldwide.<sup>15</sup> ‘Green steel’ can be made via a direct reduction process which uses hydrogen (made from renewable energy) as the heat source and reducing agent to produce pig iron. The by-product of the iron reduction process using hydrogen is water, rather than carbon dioxide in conventional steel making. Renewable energy is then used by an electric arc furnace to produce low-emissions green steel.

The Arrowsmith Hydrogen Project, which will be built at a facility in the town of Dongara, located 320km north of Perth, will utilise dedicated onsite renewable energy 85MW of solar power, supplemented by 75MW of wind generation capacity to generate 25 tonnes of green hydrogen a day and will be operational in 2022.<sup>46</sup>

ATCO’s Clean Energy Innovation Hub, located in Jandakot in Western Australia, is being used to trial the production, storage and use of renewable hydrogen to power a commercial-scale microgrid, testing the use of hydrogen in different settings and applications including in household appliances.<sup>47</sup> This includes optimising hydrogen storage solutions, blending hydrogen with natural gas and using hydrogen a direct use fuel. Green hydrogen will be produced from on-site solar using electrolysis, fuelling a range of gas appliances and blending hydrogen into the natural gas pipeline.

The \$3.3 million development project will evaluate the potential for renewable hydrogen to be generated, stored, and used at a larger scale. ATCO aims to assess the practicalities of replacing natural gas with hydrogen at a city-wide scale across a municipality.<sup>48</sup>

The new chair of the Australian Energy Regulator, Clare Savage recently stated:

*“The national gas industry could also undergo significant change as some jurisdictions move towards a zero carbon emissions policy. This could have significant consequences for the future of gas pipeline networks. In response, the AER recently supported the future recovery of Jemena’s investment in trialling the production of hydrogen from renewable energy for injection into its Sydney network. If hydrogen trials such as Jemena’s prove successful, the natural gas networks could be re-purposed to distribute hydrogen. If not, the economic life of the assets could be limited.”<sup>20</sup>*

---

<sup>46</sup> Mazengarb, M. (2020, April 29). Massive hydrogen project gets green light after securing \$300m investment. Retrieved from <https://reneweconomy.com.au/massive-hydrogen-project-gets-green-light-after-securing-300m-investment-68959/>

<sup>47</sup> Energy Source & Distribution (2018, October 4). Nel awarded contract for Australia’s first hydrogen microgrid. Retrieved from <https://esdnews.com.au/nel-awarded-contract-for-australias-first-hydrogen-microgrid/>

<sup>48</sup> ARENA (2018, July 3). Green hydrogen innovation hub to be built in WA. Retrieved from <https://arena.gov.au/news/green-hydrogen-innovation-hub-to-be-built-in-wa/>

## Biogas and Biomethane

Biogas is a renewable energy source, that is continuous and dispatchable, reliable, and local source of energy. Biogas can be converted into heat and/or electricity using boilers, generators or with Combined Heat and Power units.<sup>49</sup> Biogas also provides an alternative route for waste treatment and, as such, can help divert waste from landfill. Biogas consists primarily of methane and carbon dioxide, with trace amounts of other gases such as hydrogen sulphide, water vapour, oxygen, and ammonia.<sup>50</sup> Biogas can also be upgraded into biomethane: a renewable gas that can replace natural gas with a chemical composition very similar to natural gas. Biomethane is produced from the separation of methane from the other gases.<sup>50</sup>

Biogas and its industry offer many benefits:

- Biogas is a renewable energy source that assists the decarbonisation of the economy. A study of the replacement of natural gas by biomethane in France reduced GHG emissions by greater than 85%.
- Biogas is a secure, continuous and dispatchable source of energy that can contribute to national energy supply.
- Biogas also provides an alternative route for waste treatment and, as such, can help divert waste from landfill.
- The biogas industry supports local economies and regional communities, creating jobs, and offering new income sources, particularly for farmers.
- Biogas transformed into biomethane is a renewable gas that can replace natural gas, and can be used in homes for cooking, heating, and hot-water, or as a fuel for gas vehicles. It can be injected into the gas grid or used directly on-site. As biomethane has similar characteristics to natural gas, its injection into the gas grid does not require any adaptation of the existing infrastructure (neither the gas grid nor customer equipment connected to it). This is an opportunity for the gas and transport sectors to further assist the energy transition.<sup>50</sup>

A landmark report commissioned by Bioenergy Australia last year identified the total estimated biogas potential to be 371PJ (103TWh) of available energy, which is enough to decarbonise industrial, commercial, and residential gas users currently supplied by distributed gas networks across Australia.<sup>51</sup>

---

<sup>49</sup> Ramos-Suárez, J. L., Ritter, A., Mata González, J., & Camacho Pérez, A. (2019). Biogas from animal manure: A sustainable energy opportunity in the Canary Islands. *Renewable and Sustainable Energy Reviews*, 104, 137–150. <https://doi-org.ezproxy.newcastle.edu.au/10.1016/j.rser.2019.01.025t>

<sup>50</sup> Carlu, E. Truong, T. Kundevski, M. (2019, May). Biogas opportunities for Australia. ENEA Consulting – March 2019. Retrieved from: <https://www.energynetworks.com.au/resources/reports/biogas-opportunities-for-australia-enea-consulting/>

<sup>51</sup> Hughes, J. (2020, July 15). Business, industry and utilities back biogas for net zero Australia. Retrieved from <https://www.worldbiogasassociation.org/business-industry-and-utilities-back-biogas-for-net-zero-australia/>

Australian business, industry and utilities recently signed an open letter to the Commonwealth Government advocating for biomethane to be injected into the gas distribution networks to enable the lowest cost transition to a decarbonised energy market and address a number of challenges including:

- Provide complementary reliable and flexible renewable resources for variable renewable energy.
- Allow heavy industry dependent on process inputs and high-quality heat to decarbonise using existing gas connections.
- Provide a pathway for Heavy vehicle decarbonisation.
- Allow domestic gas customers to decarbonise their energy supply using existing networks and appliances.<sup>52</sup>

Both Renewable Hydrogen and Biogas/Biomethane can displace or replace natural gas as a fuel significantly reducing GHG emissions. These technologies show promise in Australia with the resources available locally. Once developed these would see assets such as the Narrabri Gas project left stranded.

## Summary

In summary, the Narrabri Gas project should not be approved.

The Narrabri Gas Project, that is estimated to result in 94.2 million tonnes of greenhouse gases over the life of the project, cannot be permitted because its approval would be inconsistent with the remaining carbon budget and the Paris Agreement climate target. This project is not consistent with NSW's climate change policy, the principle of inter-generational equity nor the public interest, as it clearly assumes failure to meet the Paris Agreement temperature goals and worsening climate change impacts for New South Wales.

Natural gas is not a “transition fuel” for the electricity sector to replace coal’s greenhouse gas emissions and eventually paving the way for an emissions free future for Australia. It is simply too emissions intensive to be so.

Both Renewable Hydrogen and Biogas/Biomethane can displace or replace natural gas as a fuel significantly reducing GHG emissions. No new gas is needed.

Furthermore, it is not critical for energy security and reliability in NSW as:

- Narrabri Gas project high production costs and resulting high gas prices will not put downward pressure on gas prices.

---

<sup>52</sup> Bioenergy Australia (2020, June 9). Joint letter in support of Australian biomethane market development. Retrieved from <https://www.bioenergyaustralia.org.au/news/joint-letter-in-support-of-australian-biomethane/>

- Domestic market forecast shortfalls by 2024 are unlikely due to a drop in domestic demand, a flattening on international demand freeing up supply, and LNG import terminals coming on-line prior to 2024.
- Transition of the National Electricity Market away from a long-term reliance on coalfired power stations to a greater reliance on renewable energy will not be dependent on gas-fired power stations.

Due to the above reasons I strongly object to the Narrabri Gas Project. Thank you again for the opportunity to comment. I look forward to hearing from you regarding this submission.

Yours sincerely,

Alec Roberts