



Submission to The Independent Planning Commission on the Proposed Narrabri Gas Project SSD 6367

Submitted by a specific knowledge expert group convened by the Sydney Environment Institute

23 July 2020

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Executive Summary

This submission by leading academics and civil society organisations provides an analysis of the inadequacies within the NSW Government Department of Planning, Industry and Environment (DPIE) Assessment Report recommending approval of the proposed Santos Narrabri Gas Project (NGP). The Independent Planning Commission (IPC) has been asked to make a determination regarding the NGP. The IPC must apply a risk-based approach to determine whether the NGP is in the public interest. This submission details how the DPIE assessment report has not applied a risk-based approach to its assessment of the proposed project. Instead, DPIE has compiled an assessment report based on flawed evidence and optimistic assumptions, yet without providing any tangible proof that the public will be guaranteed any net community benefits.

The submission examines the basis of the DPIE's recommendation for approving the NGP. It outlines that there has been a systematic failure by the DPIE to provide robust evidence in effectively evaluating Santos's Environmental Impact Statement (EIS). This submission demonstrates that DPIE's assumptions about the public benefits of the project are misplaced and that the proposed project:

1. Is not critical for energy security and reliability in NSW;
2. Is highly likely to have significant impacts on the region's significant water resources, including the Great Artesian Basin, the biodiversity and heritage values of the Pilliga State Forest, and the health and safety of the local community;
3. Is highly likely to have significant impacts on people and the environment;

First, the NGP will not provide energy security and reliability in NSW because it will not provide essential gas supplies to the domestic market to address forecast shortfalls from 2024. The DPIE cannot rely on the project providing increased domestic gas supply as Santos has no corporate or financial motivation to do so, and there is no legally binding agreement or enabling legislation requiring it. Santos forecast for lower gas prices in no way reflects current economic and political realities, and there is already sufficient gas in the Eastern Gas Market to supply NSW needs.

Second, the proposed Narrabri Gas Project will result in significant risk to high quality groundwater resources in a region dependent on them. The proposed gas project involves extensive drilling below the Great Artesian Basin, creating a major risk of groundwater, land, and surface water contamination. Despite Santos and the DPIE assumptions that risk will be minimal, new research demonstrates how methane contamination of groundwater occurs due to changes in pressures during water and gas extraction. This creates health and safety risks and compromises water quality. Wastewater has already leaked in the proposed project area during pilot exploration and production activities, which is of significant concern and demonstrates the high risks of the proposed project. The

DPIE's assessment is not robust in relation to threats to the water table and management of waste brine, and its approval of adaptive management approach is insufficient to address significant potential impacts that are highly complex and therefore likely impossible to mitigate.

Third, concerns around social impacts presented by affected community members have not been adequately addressed by DPIE and Santos. The DPIE's assessment report relies almost exclusively on a desktop review by Professor Deanna Kemp of Santos' own Social Impact Assessment (SIA) and takes the view that Professor Kemp's review constitutes support of the project. Yet Professor Kemp has since clarified that her advice has been seriously misconstrued by DPIE and should not in any way be interpreted as giving the project "a green light". Further, no independent SIA has been undertaken and DPIE's reliance on Santos' numerous proposed *but unwritten* management plans, including a Social Impact Management Plan, is misguided, given that no actual assessment of the social impacts has been made by DPIE. There is sufficient evidence outlined in our submission to suggest that the social impacts in the short and long term will be unmanageable.

The Sydney Environment Institute argues that the flawed evidence in DPIE's Assessment Report constitutes serious inadequacies in the planning and assessment process. The Sydney Environment Institute recommends against approving the NGP project.



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Introduction

This submission is authored by a group of experts in response to the Assessment Report undertaken by the NSW Government Department of Planning, Industry and Environment (DPIE) of the proposed Santos Narrabri Gas Project (NGP). The NGP has been referred by the Minister for Planning and Public Spaces for determination by the Independent Planning Commission (IPC) following DPIE recommendation for approval. The IPC will conduct a public hearing into the NGP to assess the merits of the development application from Monday 20 July 2020 to Saturday 1 August 2020.

The authors include academic experts from the University of Sydney and RMIT in the fields of energy law, the social and environmental impacts of resource developments, groundwater impacts of unconventional gas, as well as experts from the commercial energy industry and civil society with decades of experience working at the interface of climate change and resource developments.¹ All authors have contributed to this submission on a pro-bono basis on behalf of the Sydney Environment Institute (SEI) with further contributions from Greenpeace and RMIT.² The SEI notes that Associate Professor Matthew Currell contributed the expert advice regarding groundwater-related impacts of the NGP (on pages 19-22) but did not offer a view regarding the approval outcome for the project.

The issues discussed throughout the submission are not intended to be exhaustive but serve to highlight a systematic failure by DPIE to provide robust evidence in effectively evaluating Santos's Environmental Impact Statement (EIS). This submission is not exclusively focused on one aspect of DPIE's assessment of the NGP, but rather examines a number of aspects and identifies inadequacies within the Assessment Report.

In their Assessment Report to the IPC, DPIE concludes the NGP is approvable and in the public interest on the basis that the project:

1. Is critical for energy security and reliability in NSW;
2. Delivers significant economic benefits to NSW and the Narrabri region and stimulates the economic recovery from the effects of the COVID-19 pandemic;
3. Has been designed to minimise any impacts on the region's significant water resources, including the Great Artesian Basin, the biodiversity and heritage values of the Pilliga State Forest, and the health and safety of the local community;
4. Would comply with the relevant requirements and standards in government legislation, policies and guidelines;
5. Would not result in any significant impacts on people or the environment; and that

6. Any residual impacts of the project can be reduced to an acceptable level by capping total water extraction to 37.5 gigalitres (GL) over the life of the project and requiring Santos to comply with strict standards, rehabilitate the site to a high standard and offset the biodiversity impacts of the project.

This submission will critically examine DPIE's findings outlined above within points 1, 3 and 5 and presents several inadequacies in DPIE's assessment processes. The SEI argues these failings constitute serious inadequacies in the planning and assessment process and that the project cannot be approved on the basis of DPIE's Assessment Report and the flawed evidence therein.

In particular, the SEI argues the IPC in conducting an assessment of the NGP must apply a risk-based approach³ in determining whether the NGP is in the public interest. As the final consent authority for the NGP,⁴ the IPC must consider 'DPIE's Assessment Report, including any recommended conditions of consent; key issues raised in public submissions during the public hearing; and any other documents or information relevant to the determination of the development application'⁵ against the requirements of the *Environmental Planning and Assessment Act 1979* (NSW) (EPAA). Importantly, no merit appeal may be lodged under Division 8.3 of the EPAA following the IPC's decision.

If the IPC grants approval of the NGP, it will effectively be granting the four petroleum production leases (PPLA 13, PPLA 14, PPLA 15 and PPLA 16) applied for by Santos and Energy Australia in May 2014 and currently under consideration pursuant to Division 5 Part 3 of the *Petroleum (Onshore) Act 1991* (NSW). This means that once approved, the petroleum production leases cannot be refused, by any other department or authorising body where the lease conditions are 'substantially consistent with the consent'⁶ if granted by the IPC.

1. The Narrabri Gas Project is not in the 'public interest'

The DPIE Assessment Report concludes the NGP is in the public interest and recommends its approval in referring the proposed development to the IPC for determination. The public interest is a legal concept that applies across resource assessment and development frameworks. Petroleum licences and leases require consent authorities to assess the risk posed by petroleum activities relative to differing levels of exploration and production. In assigning property rights to gas producers, the state grants the right to develop its gas resources in exchange for royalties as capital to be expended for the public good.⁷ The state then owes a 'duty of development' to develop unconventional gas resources in the public interest through the explicit requirement that state sovereignty over natural resources 'must be exercised in the interest of...national development and of the well-being of the people of the state concerned'.⁸

This submission examines the DPIE NGP assessment against the public interest standard pursuant to s4.15 of the *Environmental Planning and Assessment Act 1979* (NSW) (EPAA). It will do so by analysing whether the NGP will:

1. Provide long-term energy security to NSW;
2. Be consistent with the NSW carbon budget and net zero by 2050 commitments;
3. Be a commercially viable project;
4. Likely result in significant risk to high quality groundwater resources within the Narrabri region;
5. Likely result in significant social impacts within the Narrabri community.⁹

The 'public interest' is not defined¹⁰ within the EPAA but rather relates to the broad adoption of its objects¹¹ as set out within s 1.3. These objects include consideration of the principles of ecologically sustainable development, the precautionary principle and intergenerational equity.¹² Of particular importance to the IPC's assessment of the proposed development is its role to 'balance the public interest in approving or disapproving the Project, having regard to the competing economic and other benefits and the potential negative impacts the Project would have, if approved'.¹³

A recent NSW Government independent review of the IPC recommends 'a more risk-based approach is necessary'¹⁴ in assessment of proposed developments. The IPC must consider whether the public interest and objects of the EPAA are satisfied consistent with a risk-based approach in its assessment of the NGP. A risk-based analysis requires consent authorities to address and adopt decisions in a qualitative balancing exercise between the overall public interest, any likely benefits and the severity of risks presented.¹⁵ For example, the DPIE assessment states the project will have 'minimal risk of any adverse environmental impacts'.¹⁶ The IPC must now assess whether coal seam gas extraction, production and transportation within a sensitive environmental land zone with prime agricultural land and high quality groundwater resources gives rise to acceptable risks in the public interest. Such risks must then be weighed against any likely project benefits. This submission highlights risks that must be considered by the IPC in undertaking its merits-based assessment of the NGP.

There are currently no other pending petroleum exploration licenses or petroleum production lease applications for unconventional gas exploitation in NSW. If approved by the IPC, the development of the four Narrabri PPLAs will signal a positive political environment for petroleum developers to further exploit the Gunnedah Basin and other NSW unconventional gas basins. Such unconventional gas development is being justified in the name of the 'public interest'¹⁷, but with no robust evidence that the public will actually be guaranteed any net community benefits.

2. The Narrabri Gas Project will not contribute to energy security for NSW

The DPIE assessment recommends the NGP's approval on the basis that it is 'critical for energy security and reliability in NSW' and is therefore in the public interest, as the project would:¹⁸

1. Provide essential gas supplies to the domestic market to address forecast shortfalls from 2024;
2. Facilitate the extension of the existing gas pipeline network to northern NSW, bringing it closer to the strategic gas supplies in both Queensland and the Northern Territory;
3. Support the development of gas-fired power stations in NSW to provide dispatchable energy to the National Electricity Market (NEM) as it transitions away from a long-term reliance on coal-fired power stations to a greater reliance on renewable energy; and
4. Put downward pressure on gas prices.

This submission addresses points 1 and 4 specifically in rejecting DPIE's finding that the NGP will facilitate energy security for NSW. The SEI will demonstrate that:

- a. The NGP will not prevent forecasted gas shortfalls from 2024;
- b. It is unlikely that the NGP will put downward pressure on NSW gas prices;
- c. Gas Reservation legislation is required in NSW; and
- d. There is sufficient gas in the Eastern Gas Market to supply NSW needs.

Whether the proposed Narrabri gas project development is in the public interest has centred on the ability of the project to provide gas security for NSW. The DPIE assessment states that gas from the proposed development could meet up to 50% of NSW's forecast gas demand in producing up to 200/TJ of gas a day over 20 years.¹⁹ There are several problems with this assumption. First, while DPIE assessment stipulates Santos has "committed" to all Narrabri gas being earmarked for the domestic market as a condition of its petroleum production lease²⁰ under the ss 41 and 42 of the *Petroleum (Onshore) Act 1991* (NSW), it is unclear whether such a condition if agreed upon will require reservation for NSW only, or to the Eastern Gas Market as a whole. Second, as explored in part 2.3 of this submission, unlike Queensland and Western Australia, NSW does not have broad enabling legislation allowing the state to legally require any gas produced from an area to be reserved and supplied domestically, other than enforcing a condition on a petroleum production lease. Third, DPIE has not recommended a legally binding development consent condition to the IPC requiring Santos to reserve gas for the NSW domestic market as a condition of a potential production lease

under the *Petroleum (Onshore) Act 1991* (NSW) prior to any approval.²¹ Consequently, DPIE cannot rely on the project providing any benefits in terms of increased domestic gas supply or lower gas prices in NSW.

The exploitation of Narrabri gas does not address long-term aspects of NSW energy security. For example, there is no assessment of long-term demand energy security aspects, certainty in availability for pipeline capacity nor its construction for transporting Narrabri gas in NSW. Such a limited assessment by DPIE is arguably inconsistent with the *NSW Gas Plan Action 15* requiring all gas companies to ‘demonstrate how projects that development NSW gas reserves will be of benefit to NSW gas consumers’.²² A pipeline approval for the Queensland-Hunter gas pipeline or developing the proposed Western Slopes Pipeline to transport NGP gas is yet to be lodged.²³ Significant community opposition to the construction of a new pipeline across prime agricultural land and environmentally sensitive areas is also likely. This will lead to further delay any injection of gas into the NSW gas market, possibly beyond the 2023 gas shortfall year and would render any promise of NSW energy security obsolete.

2.1 The Narrabri Gas Project will not prevent forecasted gas shortfalls from 2024

As outlined in its annual *Gas Statement of Opportunities*, the Australian Energy Market Operator (AEMO)²⁴ indicates a long-term decline in domestic gas supply from 2024 onwards between 5PJ – 15PJ,²⁵ as existing gas fields reach end of life, and as demand for LNG exports continues to increase. The potential of a gas shortfall has not come about due to traditional short-term energy concerns of supply security in the ECGM, but rather due to the market failure and lack of regulation over LNG exports. In short, approving more unconventional gas projects is not going to solve the supply problem.

DPIE argue:

Any shortfalls in gas supply or increases in gas prices could have significant economic consequences for NSW: it may result in the closure of several major industrial facilities and businesses, resulting in significant job losses in regional areas. [In addition, they argue], it may also discourage the development of peaking gas-fired power stations, which AEMO predicts could play a critical role in providing dispatchable energy to the NEM over the next few decades as it transitions to a greater reliance on renewable energy (wind, solar and pumped hydro).²⁶

AEMO forecast gas consumption in NSW to remain reasonably steady, from around 116.1 PJ in 2018²⁷ to around 121.02 in 2038.²⁸

A number of problems arise with the DPIE assessment of an anticipated domestic shortfall. First, DPIE expect the NGP to produce up to 200 TJ of gas/day, which equates to an annualised figure of around 73 PJ and which, they argue, ‘is enough to supply 50% of NSW’s forecast gas demand’.²⁹ Estimates provided by the Commonwealth Government, however, put this figure at 36 PJ³⁰ of production from the NGP which equates to only 31% of current NSW gas demand.

Moreover, Davey and Fisher (2019), argue wholesale domestic gas prices are determined by the Marginal Source of Supply (MSS);³¹ and that the NGP is unlikely to ever become the MSS because:

- a. Based on production costs provided by AEMO (2019a), the Wallumbilla Gas Supply Hub had a delivered gas price of \$7.55/GJ to Sydney, contrasting with the projected delivered gas price of \$9.00-\$9.40/GJ for the NGP.
- b. International LNG imports, as proposed for five LNG import terminals in southern states,³² would be competitive with QLD pipeline imports because:
 - i. Cost of production in QLD is relatively high; and
 - ii. Transportation via pipeline from QLD is relatively costly. If these come to fruition, then wholesale gas prices will be set to import parity.³³

Further, a number of industry-led mechanisms are already in place to avert any domestic shortfall within the ECGM, without the need for additional gas from the NGP, including:

1. The Heads of Agreement commitments by Queensland LNG Exporters

In response to predicted shortfalls a number of production and supply security mechanisms have been triggered within the ECGM. The federal Australian government introduced the ADGSM in an attempt to secure reliability and affordability for ECGM consumers by 'direct(ing) LNG projects to limit exports or find new gas source if their gas consumption causes a domestic supply shortfall'.³⁴ However, the ADGSM has not been triggered to date, nor is it likely to be given the slump in oil and gas prices spurred by COVID-19. Rather, a Heads of Agreement was entered into between the Queensland LNG exporters and the federal government which led to the aversion of gas shortfalls since 2017. Thus, the Heads of Agreement has successfully curtailed previous predicted gas shortfalls to date by LNG exporters committing uncontracted gas to the domestic market on reasonable terms. Therefore, additional NGP gas is arguably not needed in a policy environment which requires LNG exporters to commit gas to the ECGM in the event of a domestic shortfall.

2. Five proposed LNG import terminals

According to Pegasus Economics, the importation of LNG is arguably more likely to promote 'wholesale gas prices... to import parity levels in order to attract the supply of gas required to meet demand...(as) there are plenty of cheaper gas resources that could be developed, and it is unlikely to have any bearing over gas prices either in the immediate future or over the longer term'.³⁵ There are currently five proposed LNG import terminals to inject gas into the ECGM.³⁶ Of most importance to the NSW gas market is the approved Port Kembla Gas LNG terminal, which would inject up to 100/PJ of gas per annum or 500/TJ a day into NSW at a comparatively cheaper price to the NGP of \$6 - \$8/GJ. From 2022, being prior to any predicted gas shortfall in 2024, Port Kembla LNG imports will equate to the meeting of 75% of NSW gas needs, beyond Santos's ability to meet up to 50%.³⁷ Port Kembla gas will therefore satisfy

the NSW Government MOU commitments with the federal government to inject an additional 70 PJ/per annum into the NSW gas market. The approval of the Port Kembla LNG import terminal, coupled with the potential Port of Newcastle LNG import terminal which would provide up to 110/PJ into the NSW gas market if approved, represents security of supply in NSW without Narrabri gas.

2.2 It is unlikely that The Narrabri Gas Project will put downward pressure on NSW gas prices

DPIE and Santos argue that bringing Narrabri gas into the Eastern Market will bring down east coast prices. However, since the commencement of LNG exports in 2015 the overall traded gas price setting mechanism for Australia is now linked to the world LNG market on a long-term basis.

The CORE *Delivered Wholesale Gas Price Outlook 2019*, commissioned by AEMO, projects that:

The demand/supply balance in eastern Australia, as it relates to the domestic market, will remain tight throughout the projection period. Given linkages between export and domestic market supply, it is further assumed that future prices under new contracts will move closer to, but fall short of, LNG netback parity, where netback is defined as the price of LNG netted back to the Wallumbilla hub, which includes the Gladstone f.o.b. LNG price less costs associated with transport, marine facilities and LNG processing.³⁸

Effectively, the globally traded LNG pricing pattern emerging from COVID-19 will be reflected in the Eastern Gas domestic market. This has caused a number of petroleum producers and investment groups to question the long-term demand outlook for gas against the Paris Agreement targets in transitioning to a zero-carbon economy by 2050. For example, the IEA recently stated the COVID-19 decline in gas pricing and demand is likely to remain at historic lows until at least 2025.³⁹

Santos' forecasted scenario for oil prices, which are the underlying driver of LNG prices, is US\$65 per barrel (bbl) of Brent crude escalating to US\$77 by 2025. By contrast, BP in June reduced its long-term oil price forecast out to 2050 equating to US\$55 per bbl. The stark disparity between the two forecasted pricing estimations per bbl of oil likely renders several Santos's assets unviable commercially, including the NGP.

The widescale downgrading of oil and gas prospects by both Shell and BP signal a fundamental shift rather than a cyclical decline for oil and gas against a Paris-Agreement consistent environment. The effects of the unviable commercial environment for new gas development is evident in Santos's offshore Barossa gas project being placed on hold alongside another four Australian offshore gas projects.⁴⁰ Indeed, persistent low gas pricing will render 42% of conventional and unconventional Australian gas reserves as uneconomic.⁴¹

Santos relies on high gas prices in which it can justify the expenditure to drill and produce Narrabri gas, which has a high cost of marginal production at \$7.40/GJ. This renders the statement that Narrabri gas will 'place downward pressure on NSW gas prices'⁴² highly questionable, for the simple reason that any gas produced out of the NGP will be expensive per unit, and thus necessarily have to be sold at a relatively high market rate. To put Narrabri in global context, annual production from Narrabri represents less than 0.5% globally traded LNG and less than 0.05% of global gas production. Narrabri is evidently a price taker not a price setter. This is expressly acknowledged by BA economics:

In analysing the economic impact of the Narrabri gas Project, it was assumed that the project did not add to total gas supply at the national level. Rather, it was assumed that it benefited NSW by being an alternative to new gas supply located outside of NSW. Therefore, it was assumed that the project itself did not drive changes to gas market prices. In effect, the project was a gas price taker and not a price maker.⁴³

Santos indeed recognise and confirm this in its statements that exploration and development is not viable without export related pricing.

Narrabri gas also cannot be produced at the \$4/GJ target price set by the NCCC to produce a competitive 'gas-fired' manufacturing market. This is due to the NGP being situated within the Gunnedah Basin where wet coals are present. Wet coal gas extraction is a challenging geological environment where high amounts of dewatering are needed, adding to high costs of production. The high price of Narrabri gas production is in direct contrast to DPIE's assessment labelling the Narrabri Gas Project as 'reliable and reasonably-priced supply of gas'.⁴⁴

The DPIE assessment also states that the NGP would increase competition in the NSW domestic market and, accordingly, decrease gas prices. Davey and Fisher (2019) refer, however to the Independent Pricing and Regulatory Tribunal (IPART) who argue that because the NSW market is now linked, through Gladstone, with the international LNG market, 'it is likely that NSW gas retailers will have to compete with offshore demand and pay export parity prices for wholesale gas'.⁴⁵

A number of other inconsistencies and flaws are identified within DPIE's Assessment Report. For example, in the case of the Queensland – NSW transmission pipeline the 'pipeline would be congested most days throughout the time horizon, and bottlenecks would be expected transporting the gas south'.⁴⁶ Such 'bottlenecks' has led to AEMO's assessment of NGP production potential being just 100/TJ per day of gas.⁴⁷ This figure is in stark contrast to the forecasted up to 200/TJ per day of gas into the NSW gas market, as claimed by Santos and stated within DPIE's Assessment Report.⁴⁸ This would then halve the projected 50% meeting of NSW's gas demand to just 25%.

For the Eastern Gas Market, high internationally traded gas prices will lead to price-induced demand destruction. Conversely, low internationally traded gas prices will lead to price-induced supply destruction. Santos is banking on a surge in demand for world traded gas, produced (ironically) by a need to displace coal quickly from the world energy mix. It is also banking on higher oil prices. However, the carbon budget requirements mean that all fossil fuel use needs to be dramatically reduced to close to zero over the next two decades. According to Global Energy Monitor, in order to reach Paris Agreement commitments and maintain a two-in-three chance of limiting global warming to 1.5°C

'gas use in 2030 relative to 2010 will need to decrease by 20 to 25%...by 2050, gas use will need to drop by 53 to 74%'.⁴⁹

In the wake of a post COVID-19 and a 'widespread pullback'⁵⁰ of early-stage gas projects, a 'gas-led' economic recovery is highly unlikely. Far from the NGP stimulating a burgeoning new gas-based manufacturing industry, it is likely that manufacturers will be forced to become more efficient in their use of gas while hydrogen is being developed at a commercially-viable price of \$2 per kg. By putting forward Narrabri as a project that is in the public interest and is approvable, DPIE is arguably parochial and naive in its understanding of the global gas market. DPIE also misallocates the risks presented in approving a new gas project against financial setbacks and commercial uncertainty in the global gas market.

2.3 Gas reservation required in NSW

As discussed within part 1 of this submission, DPIE has not recommended a legally binding petroleum production lease condition requiring the NGP to reserve gas for the NSW domestic market. Without a production lease condition granted by the Minister for Energy and Environment, Santos will not be required to produce gas exclusively for NSW. Santos also cannot be compelled to reroute gas according to NSW energy requirements against shareholders' interests. This is the precedent in *Electricity Generation Corporation (Verve) v Woodside Energy Ltd*,⁵¹ where it was held by the High Court that gas producers cannot be compelled to supply gas in the interests of preserving gas security against their own business interests. Without legally binding gas reservation regulation or the Minister for Energy and Environment stipulating a condition on a petroleum production lease to reserve gas for NSW, commercial gas contracts will take precedent over any security concern or requirement. Consequently, Santos cannot be legally compelled by DPIE to reserve gas solely for NSW and the domestic affordability of gas and security of supply therefore cannot be guaranteed.

At a broader policy level, the NSW government should consider amending the *Petroleum (Onshore) Act 1991* (NSW) in providing a state-wide legislative basis to mandate legally binding conditions on petroleum production leases to reserve gas exclusively to NSW. However, in order to render the NGP commercially viable due to the high cost of exploitation and production as discussed in part 2 of this submission, Santos will likely require access and sale of produced gas to the Eastern Gas Market and potentially the international LNG market to render the NGP profitable. Thus, it is unlikely Santos would be accepting of a condition to reserve produced gas exclusively for NSW, as the project would not be financially viable. An example of an alternative legal tool to manage gas shortfalls is evident in Western Australia. A gas reservation policy has been effective in Western Australia since 2012 to reserve 15% of LNG for the domestic market in response to the Varanus Island explosion. This has led to cheaper gas prices of \$2.83/GJ within the Western Gas Market compared to the east coast gas price of \$8.23/GJ.⁵² Queensland has similarly implemented

the *Gas Security Amendment Act 2011* (Qld) in amending the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (PGPSA) to enable gas reservation. Part 2A of the PGPSA can require the holder of a petroleum tenure to '(a) not supply gas produced from the land other than to the Australian market; and (b) must include in any contract or other arrangement for the supply of the gas a condition that the gas must not be further supplied other than to the Australian market'.⁵³ However, this provision requiring gas reservation has not been triggered in Queensland to date. This illustrates the real reluctance of governments to regulate domestic gas supply and require legally binding gas reservation commitments from unconventional gas producers.

3. Greenhouse gas emissions and climate change

In DPIE's assessment of the NGP there are a number of flaws and omissions in the analysis and arguments put forward to justify the recommendation that the NGP not result in any significant impacts on the environment; namely:

- a. A lack of assessment of the urgency of mitigation of climate change and the carbon budget; and
- b. A lack of assessment of Santos' motives for developing Narrabri, together with that of the gas industry in general and the coal seam gas industry, in particular.

3.1 Climate change impacts

Unlike the COVID-19 crisis whereby Australian politicians have listened and acted swiftly on scientific analysis and advice, on climate change they have equivocated. Yet, the science of climate change is overwhelming in demonstrating that we are running out of time. Just as with COVID-19, there is a significant 'procrastination penalty' to pay. The 6th and latest IPCC Assessment Report currently being finalised will illustrate that the chance of keeping global warming well within the 2°C average above pre-industrial and as close as possible to 1.5°C is swiftly slipping away. In April this year, Michael Grose et al., published their paper *Insights From CMIP6 for Australia's Future Climate* in which the worst-case scenario could see Australia warm up to 7°C above pre-industrial levels by the end of the century.⁵⁴ For Narrabri itself, already the Climate Change Projections are showing a further warming of 0.7°C by the decades 2020-39 and 2.2°C warming by the decades 2060-79 above the warming since pre-industrial times (ca. +1.5°C).⁵⁵

Any unconventional gas project will further contribute to increased climate change, particularly by way of scope 3 emissions, that is downstream or indirect emissions. In fact, in their own Assessment Report, DPIE models extremely high potential scope 3 emissions for the project totaling 94.3 MT CO₂-e in the instance that the project will comprise on-site gas-fired power supply. Conversely, Santos's EIS states downstream scope 3 emissions 'would be in the order of 3.77 Mt CO₂-e...as a result of consumer demand for energy'.⁵⁶ This large deviation in figures and DPIE's own modelling calls into question the conclusion that 'the project is consistent with NSW's and Australia's commitments to a low carbon future'.⁵⁷ It is unclear what logic underpins this optimism. Again, any approval of a carbon producing resource project will contribute to climate change and take us further away from our Paris commitments.

Until very recently, all fossil fuel companies lived in their own self-reinforced world in which production and consumption continuously trended upwards with world economic growth. Increasingly however, we are witness to the emergence of two parallel universes that do not connect. On the one hand, there is robust and unquestionable evidence that climate change is happening and will have immense and irreversible impacts on our lives and environs if we do not significantly reduce our carbon emissions. On the other hand, a blind devotion to coal and petroleum projects and the interests of ongoing profitability.

To illustrate this point, starting from the beginning of 2020, total cumulative emissions in the atmosphere must less than around 100 gigatonnes carbon (GTC), if we are to achieve a 50% probability of meeting the Paris Agreement's lower bound of 1.5°C warming above preindustrial levels.⁵⁸ This figure of 100 GTC is likely to be lower when earth system feedbacks are taken into account. Any emissions thereafter must be netted to zero by harnessing technically and commercially unproven greenhouse gas removal technologies. And yet collectively, fossil fuel companies have the view that, around the world, there are 1070 gigatons of coal reserves, 1734 billion barrels of oil reserves and 7019 trillion cubic feet of gas reserves,⁵⁹ booked and ready to be developed,⁶⁰ which would emit around 800 GTC, 200 GTC and 100 GTC respectively. The category 'reserves' refers to unexploited resources in the ground, that in the view of the company could be recovered and sold at current economic and operating conditions. These reserves are 'booked' as non-current assets on a company's balance sheet. In short, the climate can handle a maximum of 100 GTC but resource companies are planning for a total of 1100 GTCs worth of carbon producing resource projects. At the current rate of fossil fuel consumption, by 2050 the fossil fuel companies recognise that they are banking on, and are intending to emit, approximately 360 GTC by 2050 and exhaust the carbon budget by themselves in less than 10 years. Clearly there is a mismatch that needs to be addressed.

The only prudent way forward to avoid dangerous climate change is first and foremost to phase out the burning of fossil fuels over this and the next decade, and to reduce emissions in other more difficult to manage sectors. Several key players recognise this, evidenced by the withdrawal of multiple industry superannuation funds from the resource sector and major resource giants such as BP, Shell and Santos committing to net zero emissions by 2050.⁶¹ Yet the political environment in Australia is seemingly out of sync with the real and urgent need to act on climate change. This

is illustrated through proposed legislative changes that would ‘remove the specific requirement to consider downstream greenhouse gas emissions’⁶² in planning decisions made by consent authorities.⁶³ This amendment may nullify the acknowledgment of climate impacts made in progressive decisions such as the *Rocky Hill*⁶⁴ and *Bulga*⁶⁵ cases, which rejected resource projects partly on the basis of their scope 3 emissions. It is in this political context DPIE is operating, which means they are highly unlikely to recommend a refusal on the basis of climate impacts, given the current legislative proposal before the Parliament.

3.2 Carbon budgets

Expanding production and increasing consumption of gas in NSW over the next two or more decades, as would occur if the Narrabri project were to go ahead, is incompatible with the Paris Agreement, the NSW government’s policy framework on climate change, and the NSW Government’s Net Zero Plan.⁶⁶ Burning the world’s already proven and already developed oil and gas reserves, even if coal burning ended today, would make reaching net zero emissions by 2050 and limiting warming to 1.5°C impossible.⁶⁷ Burning existing already developed proven and probable global gas reserves alone would lead to 173 Gigatonnes of CO₂ emissions, nearly half of the remaining post-2015 median carbon budget for keeping global warming below 1.5°C with better than 50% probability.⁶⁸ Without assuming that currently unproven technologies contribute to limiting emissions, meeting the IPCC’s most realistic pathway to 1.5°C would require a global reduction of not less than 39% in fossil gas consumption between 2018 and 2030.⁶⁹ Meeting this target requires an even greater reduction in Australia and NSW given our high per capita emissions compared with similar economies including key trading partners. For example, NSW’s per capita emissions of 16.7 tonnes per person are double those of the UK, Germany, Japan, and China.⁷⁰

Replacing coal plants with gas, even temporarily as a so-called ‘bridging fuel,’ is also not a viable pathway to net zero emissions. In making its recommendation that the project be approved DPIE states that permitting the project would:

encourage the development of peaking gas-fired power stations in NSW to compensate for the scheduled closure of several coal-fired power stations in the next 20 years (Liddell, Vales Point, Eraring and Bayswater) and reduce greenhouse gas emissions in NSW.⁷¹

However, taking into account the greenhouse gas emissions associated with extracting, producing, and transporting gas to consumers, the lifecycle emissions of gas may be as polluting as coal in terms of greenhouse gas emissions, if not more.⁷² Routine methane leaks from gas infrastructure have been severely underestimated globally, and particularly in Australia where assessment methodologies are outdated and based on assumptions rather than direct

measurement.⁷³ Methane is a greenhouse gas 86 times more potent than CO₂ over a 20 year timeframe.⁷⁴ The lifecycle emissions intensity of gas is also increased further when it is converted to LNG.

The Sydney Environment Institute argues that establishing new gas infrastructure, whether extraction projects or the new 'peaking gas-fired power stations'⁷⁵ entertained by DPIE if Narrabri CSG proceeds, would lock in emission increases for decades and jeopardise NSW's zero emissions by 2050 commitments. Global production plans for new gas projects and expansions already underway are set to exceed the global carbon budget for 1.5°C by 70%.⁷⁶

4. Commercial viability

New gas infrastructure is neither technologically necessary nor economically judicious to transition the NSW energy mix from coal to renewable energy. Since 2016, the role of gas in Australia's east coast market has been driving up energy prices for Australian households and businesses.⁷⁷ According to the CSIRO,⁷⁸ Lazard,⁷⁹ and Bloomberg's levelised cost of energy analyses, solar and wind have been the cheapest power generation technologies for new capacities in most major economies for some time and are now even competitive with installed coal.

Approximately half of the existing gas plant fleet was built after 2000 and many proposed production projects have life spans beyond midcentury. New gas plants being built are either likely to operate and emit greenhouse gas emissions for decades, shattering the carbon budget, causing climate action to fail and resulting in increased costs of climate damage; or to become stranded assets. Stranded or unviable fossil fuel infrastructure will create distorting effects, for example displacing or rendering unviable renewable energy opportunities described in the NSW Chief Scientist's *Decarbonisation Innovation Study* and imposing unnecessary economic burden on future generations of NSW taxpayers.⁸⁰ Investors are already overexposed to gas. As of 2019, almost \$US5trillion of investments have already been committed to new oil and gas fields that are incompatible with limiting warming to 1.5°C.⁸¹ The gas market is also extremely volatile, with demand for 2020 expected to drop by 5% for the first time since 2009.⁸²

Gas is also not needed for grid reliability. Storage solutions and demand response technology are increasingly out-competing gas peaking plants for balancing electricity grids. AEMO's most recent draft Integrated System Plan shows no need for significant gas expansion in any scenario.⁸³ Moreover, according to energy industry analysts Wood MacKenzie '6-hour and 8-hour batteries... which are rapidly entering commercial deployment, could stand in for almost all the starts by (gas) peakers'.⁸⁴ In the last month, electricity utilities in three US states have announced the early closure of coal-fired power stations without the introduction of new gas-fired generation, instead adding wind, solar and battery capacity.⁸⁵ Electrifying transport and buildings with storage is expected to further help to meet grid reliability expectations.

4.1 Stranded Asset, abandonment and rehabilitation risks

Should the Narrabri Project be given the go-ahead, and should it manage to get financing, a probable outcome is to see it commence building well pads, well infrastructure and stimulate the building of a pipeline to market. This will arguably be followed by a crisis in confidence of the overall project cash flow returns in consistently down-graded gas industry climate, as outlined above. It is quite possible that the social, environmental and ecological damage in the Narrabri area will also be in vain, as the hoped for economic and financial returns for the community and the NSW government never materialise. Further, should Santos on-sell the asset to a weaker gas market player without guaranteeing the final rehabilitation costs, it is possible that the ongoing legacy costs get passed to the State of NSW, and ultimately, those local communities and landholders living with abandoned and dangerous gas infrastructure.⁸⁶ Santos is not motivated to provide gas to the Eastern Gas Market. Santos is primarily motivated to monetise an asset on their books for the past thirteen years before it becomes stranded. The asset has, at times, been core to Santos' strategy and at other times non-core. Indeed, Santos's Gunnedah Basin assets have been consistently downgraded in 2014, 2015 and 2016 resulting in impairment charges being invoked against Santos. In reducing its Gunnedah gas prospectively from proven and probable reserves to contingent resources, the asset is now written 'down the book value of the project to zero'.⁸⁷ Despite the modelled unprofitability of the Santos Gunnedah asset, it is currently listed as a core asset due to the favourable 'political' window of opportunity to gain planning approval as a result of the NSW Government 70/PJ MOU agreement.

James Baulderstone, former Santos Vice President – Eastern Australia, cogently put Santos' arguments on the table in 2013 when he pointed out the potential scale of Eastern Australia's coal seam gas industry: 'More than 86% of Eastern Australian gas reserves are in coal seams...'.⁸⁸ He went on to say 'The gas industry is not viable without export' and that 'Domestic gas reservation is not the solution..'.⁸⁹ Those arguments and indeed the facts and figures in Baulderstone's presentation have not changed. In short, there is no corporate or financial motivation for Santos to actually provide gas to the domestic market, only a political one to pay lip service to a non-binding commitment that will never likely be realised. The growing political and social license challenges to the industry, worsening investment outlook for gas infrastructure, historically low gas prices and competition against renewable energy for power generation renders gas an uncommercial asset without export.⁹⁰ Therefore, the need for Australian coal seam gas to be exported as LNG is evident in the need for producers to attract long-term contract security (the average LNG contract is between 20-40 years) and attract a higher price than liquefied gas. This leads to the conclusion that Narrabri gas will be earmarked for LNG export without any legally binding mechanism currently to enforce Santos's 'commitment'⁹¹ to preserve gas for the NSW domestic market.

Narrabri is a marginal and downgraded project for Santos. Hence its core/non-core placement in the asset portfolio. In the economics put forward in Appendix H2 – B Economics Expert Advice Appendix, costs of the Narrabri project at a 7% discount rate are estimated at \$3.9 billion NPV and benefits are given as \$5.4 billion.⁹² When a 4% rate is used

for the same case, the numbers show costs at \$5 billion and benefits as \$7.8 billion. These numbers however do not accord with the Santos reserves evaluation discount rate as stated in their annual report and accounts, in which they state:

The discount rates applied to the future forecast cash flows are based on the weighted average cost of capital, adjusted for risks where appropriate, including functional currency of the asset, and risk profile of the countries in which the asset operates. The range of pre-tax discount rates that have been applied to non-current assets is between 11% and 19%.

By applying Santos' stated asset test pre-tax discount rates (as opposed to the NSW treasury figures), and using a conservative 13%, it is evident the Narrabri gas project just breaks even. In putting Narrabri forward as a project that is in the public interest and is approvable, DPIE is clearly indicating that it wishes to see much of NSW CSG reserves exploited. In doing so, DPIE is prepared to accept the approval as Narrabri as a project operating as a loss by harnessing its approval as a positive market signal to other unconventional gas producers that NSW petroleum exploration and production leases will likely be approved.

The overall view for Santos is that if Narrabri can be secured, that it will unlock many more opportunities within the Gunnedah Basin and on the East Coast for other CSG producers. Indeed, Narrabri can be seen as the 'Trojan Horse' in the opening up of NSW CSG together with either the contingent (on Narrabri) Western Slopes Pipeline (WSP) or the speculative, but approved, Queensland to Newcastle, Hunter Gas Pipeline (HGP).

Consequently, contributing to the growth in fossil fuel use will have negative effects in the short, medium and long term. If signatory states are to meet their Paris Agreement targets and global carbon budget, we will require structural change which will be disruptive to our energy market. In the IPC context, a decision in favour of the development of the NGP is likely to have far reaching consequences. It may represent a decision to promote climate risk, ecological failure and a project that is commercially, environmentally and socially not in the public interest, and ultimately a major rehabilitation risk.

5. Groundwater resource risks⁹³

The proposed Narrabri Gas Project will result in significant risk to high quality groundwater resources, in a region where people and ecosystems are extensively dependent on them. These risks are summarised below.

5.1 Risk of contaminating groundwater in a key recharge zone for the Great Artesian Basin

The proposed Narrabri Gas Project is in the Pilliga Forest, south of Narrabri. This is a known groundwater recharge zone for the Pilliga Sandstone – a major Great Artesian Basin (GAB) aquifer, providing high quality groundwater to this important aquifer lying between five and 300 meters below surface level.⁹⁴ This groundwater is in some areas of high enough quality to be used for drinking and supports multiple uses and groundwater dependent ecosystems.

The proposed gas project involves extensive drilling into deep coal seams below the GAB, and the production, transport, and storage of high volumes of poor-quality wastewater (an estimated 1.5 gigalitres of extracted water per annum)⁹⁵ and hydrocarbons throughout the region. This will create a major risk of contaminating groundwater, land, and surface water in the region, due to spills and leaks. Analysis of unconventional gas monitoring and compliance data from the United States⁹⁶ shows that wastewater spills are difficult if not impossible to control and eliminate in unconventional gas production. They occur due to equipment failure and human error, even where strict operating protocols are followed (such as the requirements of the NSW Government’s Code of Practice for Coal Seam Gas – Well Integrity).

The produced water, which must be extracted from coal seams to produce gas for the project, is particularly poor quality in the target coal seams, containing high salt, arsenic, fluoride and organic carbon concentrations. This water is significantly more hazardous than coal seam gas produced water from other operating gas projects, such as in Queensland’s Surat Basin. Uncontrolled spills and leaks of wastewater have already occurred in the proposed project area during pilot exploration and production activities with only a fraction of the gas wells proposed in the project.⁹⁷

5.2 Cross-contamination of groundwater with methane and other hydrocarbons

Numerous studies of unconventional gas have shown that methane contamination of groundwater can occur due to changes in pressures during water and gas extraction and the presence of natural or man-made conduits connecting deep and shallow geological layers.⁹⁸ While Santos have repeatedly stated that connectivity between the target coal seams and overlying aquifer units is limited or negligible, this is contradicted by recently published peer-reviewed research⁹⁹ showing evidence that geological structures provide pathways for the transport of gas and water between deep and shallow aquifers in the area. Gas development may result in increasing movement of gas and water via these pathways into the shallow aquifers on which users depend – as was highlighted in the O’Kane review into coal seam Gas activities in NSW.¹⁰⁰

DPIE and their appointed water expert panel have considered the potential for cross-contamination, believing it can be managed through monitoring and operating conditions. However, the panel did not have access to the above mentioned recently published research study by Iverach et al.¹⁰¹ The expert panel also raised concerns about the lack of consideration of possible geological faulting in Santos's groundwater modelling and impact assessment.¹⁰² Cross contamination with methane and other gases may create health and safety risks associated with the operation of water bores, and potentially catalyse secondary water biogeochemical changes which could compromise groundwater quality.¹⁰³

5.3 Potential drawdown and reduction in available volume of water in key aquifers

The extraction of water from the target coal seams will result in changes to the local and regional water balance. Current modelling by Santos and the CSIRO indicate that the effect of these changes on groundwater in the key shallow aquifers will be limited and occur many years into the future. However, this modelling has not considered the possible influence of geological structures enhancing connectivity between aquifers, including the peer-reviewed study by Iverach et al. The groundwater modelling predictions are acknowledged to be uncertain, and suitable for 'indicative' predictions only. This is mainly due to the lack of detailed field data to inform the modelling. Without further in-depth field studies of the hydrogeological system and more careful analysis of the potential for inter-aquifer leakage, greater drawdown impacts cannot be ruled out and it is unlikely current predictions capture the full possible range of impact.

This is of major concern given the extensive usage of groundwater in the Namoi Alluvium – which is currently a fully allocated system – and recent climate which has the catchment in a state of severe water stress. Assessment of water licenses required to account for the project's indirect water usage under DPIE's recommended conditions of consent will be entirely dependent on Santos' groundwater modelling which does not require updating (despite the issues noted above) until after an approval decision on the project.

5.4 Risks associated with management of waste brine

The coal seam gas produced water generated during the project will be treated using reverse osmosis at purpose-built wastewater treatment plants in the project area. This type of treatment results in the production of waste brine, containing high concentrations of salts and trace elements. The proponent has not outlined a comprehensive plan for

the management of this waste,¹⁰⁴ and as such, it may pose an ongoing hazard to land, groundwater and surface water in the region.

5.5 DPIE's assessment and proposed management/mitigation strategies

DPIE's assessment of these issues, and proposed conditions designed to manage groundwater impacts from the project are not adequately robust to prevent significant potential impacts to water users and ecosystems in the region.

The proponent's current groundwater monitoring plan includes only a relatively small number of bores – as noted by the water expert panel - in comparison with the over 850 proposed coal seam gas wells on 425 well pads. This current infrastructure will not be sufficient to rapidly detect and respond to changes in groundwater levels and quality throughout the project area, such that the impacts discussed above can be effectively mitigated.

Baseline data regarding groundwater levels and quality, and the degree to which ecosystems depend on groundwater are also currently inadequate. Santos have not committed to collecting further baseline data on groundwater dependent ecosystems, believing the modelling predictions – which are acknowledged to be uncertain – mean there is no need for this. This is a risky approach, in contrast with statements about taking a 'conservative' approach to managing groundwater impacts.¹⁰⁵

The proposed adaptive management approach outlined in DPIE's Assessment Report and recommended conditions assumes that the current uncertainties about groundwater impacts can be addressed through the collection of new data and updated modelling during the development of the gas-field.¹⁰⁶ However, this approach – in the absence of a comprehensive monitoring network, baseline data and understanding of key issues such as inter-aquifer connectivity – will leave open the prospect of significant unforeseen impacts, which in some instances may be difficult or impossible to mitigate.

In summary, the Narrabri Gas Project has a high likelihood of causing short and long-term impacts on groundwater quality and quantity, in an area where groundwater is of vital importance for water users and ecosystems. Despite community concerns about these issues, there has been limited attempt to address them through substantial additional research, modification of the project design and environmental monitoring and management programs. Despite DPIE's assessment, these risks will remain significant during and following the project and it is questionable whether some of the impacts outlined above can be effectively mitigated, even with strict operating controls.

6. Social impacts

There are several key issues demonstrating the approval of the NGP would not be in the public interest with the high likelihood of the NGP creating significant adverse social impacts that cannot be ameliorated through mitigations or management plans. The points below are highlighted to demonstrate the inadequacy of the social impact management process:¹⁰⁷

- a) The impacts presented by community members affected by the project have not been adequately addressed by DPIE and Santos;
- b) DPIE's Assessment Report in regard to social impacts relies almost exclusively on a limited and narrow expert review provided by Professor Deanna Kemp; and
- c) The proposed social impact management plans and mitigations are flawed.

6.1 Social impacts on the Narrabri community

The stated benefits of the project assumed by the proponent and DPIE are minimal and will fall mainly to stakeholders outside of the Narrabri region. For example, 90% of the employment modelled by the proponent will go to non-local people.¹⁰⁸ Conversely, adverse impacts will hit those communities closest to Narrabri. Exploratory research in the Narrabri region investigating both existing and predicted social impacts resulting from the Narrabri Gas Project¹⁰⁹ has highlighted several key localised impacts, which are as yet, unaddressed and unresolved.

Rural landowners, in particular family run farming organisations, are being driven out of the region by cumulative threats from mining to water, air and soil quality, their livelihood and by proponent driven land acquisition processes which disempower landowners while exacerbating the risks to rural amenity and social cohesion. This has also been a prevalent experience of landowners in relation to the Vickery extension project, which is relevant and comparable to the land acquisition process as part of the NGP. The social impacts evident within the Narrabri community have been collected through scoping interviews in which the following social issues have been raised:

- i. Community members express a consistent anxiety for the fracturing of communities around the question of gas developments, and a concern that resource companies were intentionally fostering divisions within the community to obstruct attempts at a collective opposition;

- ii. Community members fear for their capacity to remain in the region should the Narrabri project be approved, due to both the social tensions that already permeate the region and the additional community stresses brought on by an incoming, predominantly male transitory workforce; and
- iii. Community members also described mental and physical stresses resulting from the time and energy spent investigating the validity of the proponent's claims regarding impacts to the community. In particular, this was accompanied by feelings of frustration and anger towards a perceived unwillingness from both Santos and the government to recognise local expertise and respond to questions and concerns raised by communities during consultation.

Moreover, it is important to note that the above impacts are compounded by the cumulative stressors of the eight existing coal mines within the region, with another three awaiting approval or commencement.¹¹⁰ The cumulative social and environment impacts of these multiple resource projects in the Narrabri region do not appear to have been adequately assessed at any point in the planning process.

6.2 Limitations of expert review

DPIE's Assessment Report in regard to social impacts relies almost exclusively on a review provided by Professor Deanna Kemp. However, Professor Kemp's review is limited to an evaluation of the proponent's SIA. Professor Kemp does not provide an assessment of the social impact merits of the case and was never commissioned to do so.¹¹¹ In fact, Professor Kemp's review states that 'The review highlights the limitations to making informed judgements about social impact on the basis of the information provided by the proponent'.¹¹² In other words, Professor Kemp's report highlights that DPIE cannot rely upon the SIA provided by the proponent in making an adequate and holistic assessment of NGP social impacts. Because Professor Kemp was not commissioned to undertake an independent SIA, and the proponent's SIA is the only source of social impact evidence evaluated by DPIE, there is therefore a lack of comprehensive evidence to adequately and comprehensively assess the likely social impacts to justify DPIE's recommendation for approval.

It is unfortunate that DPIE have misinterpreted Professor Kemp's advice as an actual and full assessment of the social impacts of the proposed project. Nothing in Professor Kemp's advice suggests this. In fact, Professor Kemp notes her scope was limited to a desktop study, focussing mainly on the proponent's SIA and response. Professor Kemp did not undertake any additional data collection (statistical or qualitative) nor did she conduct a site visit or meet with any key local stakeholders. In personal communications with Dr. Rebecca Lawrence, Professor Kemp has confirmed that her expert social impact advice has been misconstrued by DPIE: she was never engaged to assess the merits of the case *per se*, and any interpretation by DPIE that her report gives the project a "green-light" is misplaced.¹¹³

A key problem arises in that neither Professor Kemp, nor DPIE, have undertaken a comprehensive and adequate assessment of the social impact merits of the case. A comprehensive merits-based assessment of the social impacts of the proposed project is required against the 'public interest' standard cited by DPIE,¹¹⁴ yet DPIE has not done this. Both Professor Kemp's advice, and DPIE's Assessment Report, have leapfrogged the assessment stage and proceeded directly to conditioning the project.

This expedited process is presumably attributable, in part, to the heightened political appetite to approve the NGP against the background of the 70/PJ per annum MOU committed to by the NSW Government. DPIE appear to have presumed the project is approvable, sought advice from a social impact expert as to possible conditions for consent (which appears to have been the brief sought from Professor Kemp), and concluded that all the social impacts can be 'adaptively managed' through a Social Impact Management Plan. Yet in Professor Kemp's own review, she points to significant problems with the proponent's reliance on numerous management plans whose contents is unknown.¹¹⁵ Dr Alison Ziller, a leading expert in social impact assessment, also makes a similar point in her expert report, which is currently being finalised and will be submitted to the IPC, in which she notes: the proponent has proposed over 20 management plans, none of which are yet written, so their content cannot be assessed, nor relied upon, for the approval of the proposed project.¹¹⁶

6.3 Limited proponent response to social impact concerns

Throughout the entire assessment process Santos has been challenged on a series of key social impact issues, but their responses have been wholly inadequate. Professor Kemp notes that the Santos responses to public submissions have thus far been inadequate and highlights this as a problem 'key social issues raised in submissions did not prompt additional studies'.¹¹⁷ In her own review, Professor Kemp details pages of problems and omissions in the proponent's SIA. Professor Kemp dedicates a separate report to a lengthy series of specific questions to the proponent regarding social impacts, to which the proponent has responded.¹¹⁸ However, there is no assessment of the adequacy of these responses to date against the initial queries posed by Professor Kemp. Professor Kemp has not had an opportunity to respond, nor has DPIE actually assessed the proponent's responses in terms of adequacy. Instead, DPIE has erroneously assumed that the proponent's responses should be taken at face value to have addressed and discharged all queries, when all evidence suggests that when previous concerns have been raised the proponent's response has been to avoid further actions.

None of Professor Kemp's extensive and specific concerns have been reflected in DPIE's proposed conditions of consent. Instead, DPIE has assumed that a very general and vague Social Impact Management Plan will address serious and complex social impact issues and will render any social impacts of the NGP being mitigatable 'to a large extent'.¹¹⁹

In personal communications with Dr. Lawrence, Professor Kemp has expressed significant concern that none of her specific advice to DPIE in terms of strict conditions of consent have been taken on board.

Yet crucially, even if strict social impact conditions had been recommended by DPIE, legally unenforceable post-consent recommendations, targets, strategies, monitoring and future research are generally inadequate at addressing adverse social impacts. Social Impact Management Plans are notoriously general and vague, their implementation is often ad hoc, and they are rarely monitored or enforced. Moreover, without a proper merits-based assessment of the social impacts of the Narrabri Gas Project, the Department cannot, on balance, know if the social impacts are, in fact, manageable.

6.4 Flawed reliance on social impact management plans and mitigation

Indeed, evidence that will be provided to the IPC by Dr Ziller, and which is currently being finalised, suggests that the adverse social impacts will not be manageable. There is significant social tension and conflict around the Narrabri project. This is evident in the 98% of all submissions being overwhelmingly against the NGP.¹²⁰ It is of significant concern that DPIE appears to believe that social conflict can be addressed by consultation and unspecified programs to minimise or mitigate negative social impacts during and after the life of the project.¹²¹ Social conflict is not solved by consultative committees, whose agenda tends to be dictated by the proponent themselves. In our own research with communities affected by resource industries, we are aware of numerous instances in which consultative committees have not reduced conflict; in fact, they tend to escalate them, because they have inadequate or non-existent grievance mechanisms.

Nor are social conflicts addressed adequately in the establishment of community benefit funds. Community benefit funds are established under the *Petroleum (Onshore) Act 1991* (NSW) as an action arising from the *NSW Gas Plan*. The establishment of community benefit funds are in fact a rebate on royalties owed to the state for gas producers. Each \$2 paid by gas producers into an authorised community benefit fund equates to a \$1 rebate to be offset against the amount of royalties owed to the state up to a maximum of 10% of the royalties due each year of operation.¹²² What this means is that community benefit funds do not increase the total value of dollars being given back to the public via royalties or otherwise, they merely redistribute parts of them from the state back to the local. While this may be a noble gesture by way of recognising that local communities should receive economic goods from resource projects (and not just environmental harms), the problem is that Community Benefit Funds do not have the mandate, or resources, to address serious social impact issues including, but not limited to:

- i. Concerning adverse impacts on public health; violence associated with an increased masculinisation of the town;

- ii. The undermining of social cohesion due to the loss of rural livelihoods; significant and tangible mental health impacts because of social tensions; or
- iii. Increased inequalities for Aboriginal people because of rental pressures and their marginalisation in the resource sector more generally.

A SIMP, a consultative committee or a community benefit fund are profoundly inadequate tools for addressing these complex adverse social impacts, but DPIE's assessment appears to erroneously assume that they are sufficient. DPIE has recommended the project for approval with an inadequate evidence base and with deeply flawed assessment assumptions around the ability of yet unwritten management plans to combat complex and significant social impacts. Perhaps of most concern is that DPIE has relied heavily on Professor Kemp's review, a review which they have misconstrued and misunderstood as recommending approval of the project, where it clearly does not.¹²³

In conclusion, the social benefits of the project are limited, will be overwhelmingly distributed to people outside of the immediate locality, and will be relatively short-lived. The adverse social impacts, however, will be significant and long-lived and will be inequitably distributed to those residing locally, that is, to those same people who are least likely to receive any benefits.

Conclusion

This submission has demonstrated that several key elements of DPIE's NGP Assessment Report are fundamentally flawed. Our submission argues a risk-based approach must be applied by the IPC in determining whether NGP is approvable. The IPC is entrusted to assess the risks of the proposed unconventional gas activity in determining whether the NGP is in the overall public interest, against any likely benefits and the severity of risks presented. In conducting its assessment, it is recommended the IPC cautiously assess the following risks and impacts raised throughout our submission, namely that the NGP:

1. Will not provide energy security for NSW in averting a domestic shortfall from 2024 and will not place 'downward pressure' on gas prices;
2. Is not compatible with the urgency of mitigation of climate change and the carbon budget;
3. Is not a long-term commercially viable project;
4. Creates significant risks to high quality groundwater resources; and
5. Presents significant social impact risks that cannot be managed or mitigated.

The Sydney Environment Institute contends that some key impacts of the proposed Narrabri Gas Project, such as those on the social environment and on groundwater, are so significant, complex and long-lasting that they simply cannot be mitigated or 'adaptively managed'.

Biographical Statements

Greg Bourne

Greg Bourne, graduated from the University of Western Australian B.Sc. (Honours) in Chemistry and has worked at the nexus of energy business, energy policy and climate change for over 30 years. With BP he lived and worked in the UK, Middle East, USA, Canada, Ireland, Brazil, China, Venezuela and Australia. For two years he was Special Adviser on Energy and Transport to Prime Minister Margaret Thatcher. He returned to Australia in 1999 as Regional President, BP Australasia and worked with business and governments on the Climate Change and Renewables agendas. Greg was CEO WWF-Australia for six years and later a non-executive director of Carnegie Wave Energy. He is the former Chair of the Australian Renewable Energy Agency. He is a former member of BHP Billiton's Forum on Corporate Responsibility. Greg is Chair of Granville Harbour Operations Wind Farm, a member of the NSW Climate Change Council and is a Councillor for the Climate Council. A Fellow of the Australian Institute of Company Directors, he was awarded the Centenary Medal for services to the environment and an Honorary Doctorate from the University of Western Australia for services to international business.

Matthew Currell

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Dr Tanya Fiedler is a lecturer in the Discipline of Accounting. Tanya completed her PhD at the University of New South Wales (UNSW), where she conducted research into accounting and its role in the development of Australia's Clean Energy Act (2011), and the carbon market it enacted. Tanya's research is deeply interdisciplinary, and concern the ways in which the physical sciences integrate into the work practices, business strategies and disclosures of accounting. Tanya also works with industry and climate science on a number of fronts, both as a co-author, but also through a number of industry-led initiatives. Prior to her academic career, Tanya worked as a consultant for Energetics, a specialist climate, carbon and energy consultancy.

Rebecca Lawrence

Dr Rebecca Lawrence is a Senior Research Fellow at Sydney Environment Institute and the Department of Government and International Relations at the University of Sydney. She is a social impact expert and was the social impact expert in the Rocky Hill case for the Department of Planning, Industry and Environment. She was also recently commissioned by DPIE to evaluate DPIE's SIA Guideline and its implementation. Dr Lawrence's research focusses on the social impacts of resource developments for Indigenous and local communities, particularly with regard to human rights, social conflicts, protests, and the social and environmental legacies of abandoned resource projects. Dr. Lawrence frequently provides pro-bono advice to resource affected communities, as well as civil society organisations, including EDO, ACF and international Indigenous organisations such as the Sami Council.

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Professor Susan Park is Professor of Global Governance in the Department of Government and International Relations at the University of Sydney and a fellow of the Sydney Environment Institute. She focuses on how state and non-state actors seek to influence International Organisations like the Multilateral Development Banks (MDBs) and global governance more broadly to become greener and more accountable. Susan has published in numerous journals, and her most recent book with Cambridge University Press is *International Organisations: Theories and Explanations*. She recently published an edited collection with Dr Teresa Kramarz called *Global Environmental Governance and the Accountability Trap* (MIT Press, 2019). She is an Associate Editor of the journal *Global Environmental Politics* and is Co-Convenor with Dr Kramarz (University of Toronto) of the Earth Systems Governance (ESG) Task Force 'Accountability in Global Environmental Governance.' She is a Senior Hans Fischer Fellow at the Technical University of Munich (2019-2022), a Senior Research Fellow of the ESG, an affiliated Faculty member of the Environmental Governance Lab at the University of Toronto, and an external associate at Warwick University. She has held visiting

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Nathaniel Pelle

Nathaniel Pelle is an Associate of the Sydney Environment Institute and a Senior Campaigner at Greenpeace Australia Pacific where he leads the organisation's oil and gas, and oceans campaigns. He has led Greenpeace campaigns on industrial agriculture, Pacific and Indian Ocean fisheries, food supply chains, coal finance, and the oil and gas industry. He studied politics, philosophy, and environmental policy at the University of Newcastle and the Centre for Peace and Conflict Studies at the University of Sydney.

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Dr Madeline Taylor is an academic at the University of Sydney, School of Law. She specialises in Energy and Natural Resources Law with particular expertise on the intersection between energy and natural resources regulation, energy policy, and landholder rights. Madeline completed her PhD on the comparative regulation of unconventional gas activities, landholder rights and the potential for collective bargaining on agricultural farmland zones in Queensland and British Columbia, Canada. She teaches in the areas of Real Property Law, Personal Property Law, Corporate Law and Energy Law. Her research and publications to date performs a novel examination of transitioning energy regulation from a comparative and socio-legal perspective, including the strategic governance of energy and the fragmentation of ownership rights between the state, corporations, landholders and Indigenous Australian peoples. Her recent co-authored monograph entitled *Agricultural Land Use and Natural Gas Extraction Conflicts: A Global Socio-Legal Perspective* (Routledge, 2019) examines the socio-regulatory dimensions of coexistence between agricultural and onshore unconventional gas land uses in the jurisdictions with the highest concentration of proven unconventional gas reserves.

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Gemma Viney is currently completing a PhD in the Department of Government and International relations. She was an Honours Research Fellow with the Sydney Environment Institute in 2017. Gemma has a Bachelors degree in International and Global Studies from the University of Sydney, and a First-class Honours Degree in the Department of Government and International Relations.

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References

- AEMO, *2019 Reserves Costs Assumptions*, (2019a), <<https://aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo/2019-gas-statement-of-opportunities>>.
- AEMO, *Gas Statement of Opportunities*, (2019b) <https://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/GSOO/2019/2019-GSOO-report.pdf>.
- AEMO, *2019 Western Australia Gas Statement of Opportunities*, (2019c) <https://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/WA_GSOO/2019/WA-Gas-Statement-of-Opportunities---December-2019.pdf>.
- AEMO, *Gas Statement of Opportunities 2020*, (2020) <https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2020/2020-gas-statement-of-opportunities.pdf?la=en>.
- Baxter, T, *Scott Morrisons Gas Transition Plan is a Dangerous Road to Nowhere*, (2020) <<https://theconversation.com/scott-morrisons-gas-transition-plan-is-a-dangerous-road-to-nowhere-130951>>.
- BP, *Statistical Review of World Energy*, (2020) <<https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>>.
- Cahill et al. (2017) 'Mobility and persistence of methane in groundwater in a controlled-release field experiment', *Nature Geoscience* 10, 289-297.
- Core Energy & Resources *Delivered Wholesale Gas Price Outlook 2019-2040*, (2019) <https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Input-s-Assumptions-Methodologies/2019/CORE_Delivered-Wholesale-Gas-Price-Outlook_16-January-2019.pdf>.
- CSIRO, *Annual update finds renewables are cheapest new-build power*, (2018) <<https://www.csiro.au/en/News/News-releases/2018/Annual-update-finds-renewables-are-cheapest-new-build-power>>.
- CSRM, *Narrabri Gas Project Social Impact Assessment*, (2018) <<https://majorprojects.planningportal.nsw.gov.au/prweb/PRR-estService/mp/01/getContent?AttachRef=SSD-6456%2120200611T102337.692%20GMT>>.
- Darrah TH et al. (2014) *Noble gases identify the mechanisms of fugitive gas contamination in drinking-water wells overlying the Marcellus and Barnett Shales*. Proceedings of the National Academy of Sciences. <www.pnas.org/cgi/doi/10.1073/pnas.1322107111>
- Davey, A. and Fisher, R., *Report on the Narrabri Gas Project*, (2019) <https://d3n8a8pro7vymx.cloudfront.net/lockthegate/pages/6320/attachments/original/1571263354/NGP_Economic_Report_online_version.pdf?1571263354>.
- DISER, *Stepped Process and Timeframes for ADGSM*, (2020) <https://www.industry.gov.au/sites/default/files/stepped_process_and_timeframes_for_the_adgsm.pdf>
- DISER Office of the Chief Economist, *Resources and Energy Quarterly. December 2018, Major Projects-Data*, (2018a), <<https://publications.industry.gov.au/publications/resourcesandenergyquarterlydecember2018/index.html>>.
- DISER Office of the Chief Economist, *Resources and Energy Quarterly. In June*, (2018b) <<https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2018/documents/Resources-and-Energy-Quarterly-June-2018.pdf>>.
- Global Energy Monitor, *Gas Bubble 2020*, (2020) <https://globalenergymonitor.org/wp-content/uploads/2020/07/GasBubble_2020_r3.pdf>.
- Global Witness, *Overexposed: How the IPCC's 1.5C Report demonstrates the risks of overinvestment in oil and gas*, (2019) <<https://www.globalwitness.org/en/campaigns/oil-gas-and-mining/overexposed/>>.
- Grose et al., (2020), 'Insights from CMIP6 for Australia's Future Climate', *Earths Future*, <<https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2019EF001469>>.
- IEA, *Gas 2020*, (2020a) <<https://www.iea.org/reports/gas-2020/2020-meltdown>>.
- IEA, *Global Energy Review*, (2020b) <<https://www.iea.org/reports/global-energy-review-2020>>.
- IEEFA, *Is the Gas Industry Facing Its Volkswagen Moment?*, (2020) <https://ieefa.org/wp-content/uploads/2020/03/Is-the-Gas-Industry-Facing-its-Volkswagen-Moment_March-2020.pdf><https://ieefa.org/wp-content/uploads/2020/03/Is-the-Gas-Industry-Facing-its-Volkswagen-Moment_March-2020.pdf>.
- IEEFA, *Port Kembla expansion may doom NSW's Narrabri project*, (2020) <<https://ieefa.org/port-kembla-expansion-may-doom-nsws-narrabri-project/>>.

IPCN, *Request to the Independent Planning Commission Narrabri Gas Project*, (2020)
<https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2020/03/narrabri-gas-project/request-from-minister-for-planning-and-public-spaces/request-for-public-hearing_narrabri.pdf>.

Iverach CP, et al. (2020) 'Constraining source attribution of methane in an alluvial aquifer with multiple recharge pathways'. *Science of the Total Environment* 720: 134927.

Jackson RD, et al. (2014) 'The environmental costs and benefits of fracking.' *Annual Reviews in Environment and Resources* 39: 327-362.

Khan S. and Kordek G. (2014) *Coal seam gas: produced water and solids*. Report prepared for the office of the NSW Chief Scientist and Engineer (OCSE).

Lafleur et al., *A review of current and future methane emissions from Australian unconventional oil and gas production*, (2016)
<<http://climatecollege.unimelb.edu.au/review-current-and-future-methane-emissions-australian-unconventional-oil-and-gas-production>>.

Lazard, *Levelized Cost of Energy and Levelized Cost of Storage*, (2019) <<https://www.lazard.com/perspective/lcoe2019>>.

Long, S, *Coal Seam Gas Import or Mining will not guarantee lower prices*, (2020) <<https://www.abc.net.au/news/2020-02-12/coal-seam-gas-import-or-mining-will-not-guarantee-lower-prices/11954268>>.

OFGEM, *Wholesale Energy Markets in 2016*, (2016),
<<https://www.ofgem.gov.uk/publications-and-updates/retail-energy-markets-2015>>.

OILCHANGE, *The Sky's the Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production*, (2016)
<http://priceofoil.org/content/uploads/2016/09/OIL_the_sky_limit_2016_FINAL_2.pdf>.

Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, (2017)
<<http://www.mpi.org.au/wp-content/uploads/2016/06/Ground-Truths-2016-web.pdf>>

Nicholls, S. Santos coal seam gas project contaminates aquifer. *The Sydney Morning Herald*, (2014)
<<https://www.smh.com.au/environment/santos-coal-seam-gas-project-contaminates-aquifer-20140307-34csb.html>>.

NSW CSE, *Community Benefits Fund*, (2020)
<<https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/coal-seam-gas/community/community-benefits-fund>>.

NSW CSE, *Gas Plan*, (2014)
<http://www.resourcesandenergy.nsw.gov.au/_data/assets/pdf_file/0005/534830/NSW-Gas-Plan.pdf>.

NSW CSE, *NSW Decarbonisation Innovation Study*, (2019)
<<https://www.chiefscientist.nsw.gov.au/reports/nsw-decarbonisation-innovation-study>>.

NSW DPIE, *Climate Projections for NSW*, (2020a)
<<https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW>>.

NSW DPIE, *Development Consent*, (2020b)
<<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T101109.699%20GMT>>.

NSW DPIE, *Narrabri Gas Project SSD 6367*, (2020c).
<<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T101108.126%20GMT>>

NSW DPIE, *Net Zero Plan Stage 1: 2020-2030*, (2020d)
<<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/net-zero-plan-2020-2030-200057.pdf?la=en&hash=D65AA226F83B8113382956470EF649A31C74AAA7>>.

NSW DPIE, *NSW Emissions*, (2020e)
<<https://climatechange.environment.nsw.gov.au/About-climate-change-in-NSW/NSW-emissions#:~:text=NSW%20annual%20emissions%20per%20capita,tonnes%20CO2%20De%20per%20capita.>>

NSW Productivity Commission, *Review of the Independent Planning Commission NSW Productivity Commission*, (2019)
<<http://productivity.nsw.gov.au/sites/default/files/2020-01/Report%20-%20Review%20of%20the%20Independent%20Planning%20Commission.pdf>>.

Patterson LA, et al. (2017) 'Unconventional oil and gas spills: Risks, mitigation priorities and state reporting requirements', *Environmental Science and Technology* 51(5), 2563-2573.

Pedersen, D, *Barwon MP Roy Butler says Santos trying to pressure govt*, (2019)
<<https://www.theland.com.au/story/6292656/quick-narrabri-gas-approval-predictions-could-be-premature/>>.

Pegasus Economics, *Report on the Narrabri Gas Project*, (2019)
<https://d3n8a8pro7vnm.cloudfront.net/lockthegate/pages/6326/attachments/original/1571263720/NGP_Economic_Report_online_version.pdf?1571263720>.

Rystad Energy, *Up to 42% of Australian gas resources uneconomical at current LNG netback prices*, (2020) <<https://www.rystadenergy.com/newsevents/news/press-releases/up-to-42pct-of-australian-gas-resources-uneconomical-at-current-lng-netback-prices/>>.

Santos, Narrabri Gas Project, *Environmental Impact Statement*, Executive Summary <<https://majorprojects.planningportal.nsw.gov.au/prweb/PRR-estService/mp/01/getContent?AttachRef=SSD-6456%2120190228T034754.407%20GMT>>.

Santos, *Annual Report*, (2019) <<https://www.santos.com/wp-content/uploads/2020/02/2019-annual-report.pdf>>.

Santos, *Importance of NSW's Natural Gas: Time to separate fact from fiction*, (2013) <https://www.santos.com/wp-content/uploads/2020/02/131025_eastern_australias_energy_markets_outlook_2013.pdf>.

SEI, IISD, ODI, Climate Analytics, CICERO, and UNEP, *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C* (2019) <<http://productiongap.org/wp-content/uploads/2019/11/Production-Gap-Report-2019.pdf>>.

Spector, J, *Just how much business can batteries take from gas peakers*, (2018) <<https://www.greentechmedia.com/articles/read/just-how-much-business-can-batteries-take-from-gas-peakers#gs.xks74u>>.

Tong, D., Zhang, Q., Zheng, Y. et al, *Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target*, (2019), *Nature* 572, 373–377.

Ziller, A, *Social Impacts Review Report: Narrabri Gas Project*, (2020).

Footnotes

¹ See author biographies on page 22 for further details.

² The authors wish to thank Mark Ogge (The Australia Institute), Gavin Mudd (RMIT), Matthew Currell (RMIT) for their reviews and the SEI administrative support team for their invaluable support. Thanks is also given to Susanne Taylor for her helpful comments and review.

³ In accordance with recent recommendations from the NSW Productivity Commission, *Review of the Independent Planning Commission NSW Productivity Commission* (2019) <<http://productivity.nsw.gov.au/sites/default/files/2020-01/Report%20-%20Review%20of%20the%20Independent%20Planning%20Commission.pdf>> 2.

⁴ Other than the DPIE assessment being reviewed and final approval being given by The Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) Bilateral Agreement following the IPC's decision.

⁵ IPCN, *Request to the Independent Planning Commission Narrabri Gas Project* (2020) <https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2020/03/narrabri-gas-project/request-from-minister-for-planning-and-public-spaces/request-for-public-hearing_narrabri.pdf>.

⁶ *Environmental Planning and Assessment Act 1979* (NSW) s 4.42.

⁷ *Petroleum (Onshore) Act 1991* (NSW) s 6.

⁸ United Nations, General Assembly resolution 1803 (XVII) of 14 December 1962, *Permanent sovereignty over natural resources* Adopted by General Assembly Resolution 1803 (XVII) para 1.

⁹ The authors have mirrored the structure and order within DPIE NGP Assessment Report in presenting the issues examined within this submission.

¹⁰ As discussed in *Water Conservation and Irrigation Commission (NSW) v Browning* (1947) 74 CLR 492 at [505] per Dixon J 'indeed, the expression in 'in the public interest', when used in a statute, classically imports a discretionary value judgment to be made by reference to undefined factual matters, confined only in so far as the subject matter and the scope and purpose of the statutory enactments may enable ... given reasons to be [pronounced] definitively extraneous to any objects the legislature could have had in view'.

¹¹ *Carstens v Pittwater Council* (1999) 111 LGERA 1; [1999] NSWLEC 249.

¹² Pursuant to the *Protection of the Environment Administration Act 1991* (NSW) s 6(2).

¹³ *Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* [2013] NSWLEC 48 [171]

¹⁴ (NSW Productivity Commission 2019) 2.

¹⁵ As was applied in *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7 [687].

¹⁶ NSW DPIE, *Narrabri Gas Project SSD 6367* (2020c) xvii.

¹⁷ As recognised by Fagan, 'Santos has mapped a Taroom gasfield near Moree, a Bellata gasfield, a Maules Creek gasfield, a Bando gasfield on the Liverpool Plains, a gasfield for Tooraweenah near Gilgandra and a Murrurundi gasfield in the Upper Hunter'. Pedersen, D. *Barwon MP Roy Butler says Santos trying to pressure govt* (2019) <<https://www.theland.com.au/story/6292656/quick-narrabri-gas-approval-predictions-could-be-premature/>>.

-
- ¹⁸ (NSW DPIE 2020c) iv.
- ¹⁹ (NSW DPIE 2020c) x.
- ²⁰ Santos also previously agreed to a non-binding in principle Memorandum of Understanding with the NSW Deputy Premier in order to afford the NGP 'Strategic Energy Project' status in 2014. The MOU is not a legally binding document.
- ²¹ NSW DPIE, *Development Consent*, (2020b)
<<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T101109.699%20GMT>>.
- ²² NSW CSE, *Gas Plan*, (2014) <http://www.resourcesandenergy.nsw.gov.au/_data/assets/pdf_file/0005/534830/NSW-Gas-Plan.pdf>.
- ²³ (NSW DPIE, 2020c) v.
- ²⁴ AEMO, *2019 Reserves Costs Assumptions*, (2019a), <<https://aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo/2019-gas-statement-of-opportunities>> 5-7.
- ²⁵ AEMO, *Gas Statement of Opportunities 2020*, (2020) <https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2020/2020-gas-statement-of-opportunities.pdf?la=en> 44.
- ²⁶ (NSW DPIE 2020c) x.
- ²⁷ Davey, A. and Fisher, R., *Report on the Narrabri Gas Project*, (2019)
<https://d3n8a8pro7vhm.cloudfront.net/lockthegate/pages/6320/attachments/original/1571263354/NGP_Economic_Report_online_version.pdf?1571263354>.
- ²⁸ (AEMO, 2020).
- ²⁹ (NSW DPIE 2020c) 23.
- ³⁰ DISER Office of the Chief Economist, *Resources and Energy Quarterly. December 2018*, Major Projects-Data (2018a).
- ³¹ OFGEM, *Wholesale Energy Markets in 2016*, (2016) <<https://www.ofgem.gov.uk/publications-and-updates/retail-energy-markets-2015>> 12.
- ³² (DISER 2018b) 100.
- ³³ Davey, A. and Fisher, R., *Report on the Narrabri Gas Project*, (2019)
<https://d3n8a8pro7vhm.cloudfront.net/lockthegate/pages/6320/attachments/original/1571263354/NGP_Economic_Report_online_version.pdf?1571263354>.
- ³⁴ DISER, *Stepped Process and Timeframes for ADGSM*, (2020)
<https://www.industry.gov.au/sites/default/files/stepped_process_and_timeframes_for_the_adgsm.pdf>.
- ³⁵ Pegasus Economics, *Report on the Narrabri Gas Project*, (2019)
<https://d3n8a8pro7vhm.cloudfront.net/lockthegate/pages/6326/attachments/original/1571263720/NGP_Economic_Report_online_version.pdf?1571263720> vi.
- ³⁶ The five proposed LNG import terminals are: Crib Point (AGL) Western Port, Victoria; Port Kembla Gas (Squardon Energy, Marunbeni, JERA) Port Kembla, NSW, Newcastle GasDock (Energy Projects and Infra Korea) Newcastle, NSW; Outer Harbour LNG (Venice Energy) Port Adelaide, SA; Geelong Energy Hub (Viva Energy) Geelong, Victoria.
- ³⁷ IEEFA, *Port Kembla expansion may doom NSW's Narrabri project*, (2020) <<https://ieefa.org/port-kembla-expansion-may-doom-nsws-narrabri-project/>>.
- ³⁸ Core Energy & Resources, *Delivered Wholesale Gas Price Outlook 2019-2040*, (2019) <https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/CORE_Delivered-Wholesale-Gas-Price-Outlook_16-January-2019.pdf>.
- ³⁹ IEA, *Gas 2020* (2020a) <<https://www.iea.org/reports/gas-2020/2020-meltdown>>.
- ⁴⁰ Global Energy Monitor, *Gas Bubble 2020*, (2020) <https://globalenergymonitor.org/wp-content/uploads/2020/07/GasBubble_2020_r3.pdf>.
- ⁴¹ Rystad Energy, *Up to 42% of Australian gas resources uneconomical at current LNG netback prices*, (2020) <<https://www.rystadenergy.com/newsevents/news/press-releases/up-to-42pct-of-australian-gas-resources-uneconomical-at-current-lng-netback-prices/>>.
- ⁴² (NSW DPIE 2020c) 122.
- ⁴³ BAE Economics, *Appendix H2-B-Economic Expert Advice*, (2018)
<<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T102102.329%20GMT>> 5.
- ⁴⁴ (NSW DPIE 2020c) xvi.
- ⁴⁵ IPART, *Submission to Inquiry into the Supply and Cost of Liquid Fuels in New South Wales* (2014).
- ⁴⁶ Ibid.
- ⁴⁷ AEMO, *Gas Statement of Opportunities* (2019) <https://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/GSOO/2019/2019-GSOO-report.pdf> 57.
- ⁴⁸ (NSW DPIE, 2020c) 23.
- ⁴⁹ See section 3.2 for further discussion on the carbon budget. (Global Energy Monitor 2020)
- ⁵⁰ Ibid.
- ⁵¹ [2014] HCA 7.

-
- ⁵² AEMO, *2019 Western Australia Gas Statement of Opportunities*, (2019) <https://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/WA_GSOO/2019/WA-Gas-Statement-of-Opportunities---December-2019.pdf>.
- ⁵³ *Petroleum and Gas (Production and Safety) Act 2004* (Qld) s 175C.
- ⁵⁴ Grose et al., (2020), *Insights from CMIP6 for Australia's Future Climate*, Earths Future <<https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2019EF001469>>.
- ⁵⁵ NSW DPIE, *Climate Projections for NSW*, (2020) <<https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW>>
- ⁵⁶ Santos, *Narrabri Gas Project: Environmental Impact Statement* (2017) <<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120190228T034754.407%20GMT>> ES-18.
- ⁵⁷ (NSW DPIE 2020c) 107.
- ⁵⁸ CONSTRAIN, *Zero in on: The Remaining Carbon Budget & Decadal Warming Rates* (2019) <<https://climateanalytics.org/publications/2019/zero-in-on-the-remaining-carbon-budget-and-decadal-warming-rates/#:~:text=From%20the%20start%20of%202020,CO2%20for%20a%2066%25%20probability>>.
- ⁵⁹ The category 'reserves' refers to unexploited resources in the ground, that in the view of the company could be recovered and sold at current economic and operating conditions. These reserves are 'booked' as non-current assets on a company's balance sheet.
- ⁶⁰ BP, *Statistical Review of World Energy*, (2020) <<https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>>.
- ⁶¹ Kollewe, J, *BP cuts ties with three US trade groups over climate policies*, The Guardian (2020) <<https://www.theguardian.com/business/2020/feb/26/bp-cuts-ties-trade-groups-climate-policies>>; Santos, *Performance Report Climate Change* (2020) <<https://www.santos.com/wp-content/uploads/2020/02/SAN14875-Performance-Report-Climate-Change.pdf>>.
- ⁶² See *Environmental Planning and Assessment Amendment (Territorial Limits) Bill 2019* (NSW) (Bill) Sch 2.
- ⁶³ See *Environmental Planning and Assessment Amendment (Territorial Limits) Bill 2019* (NSW) (Bill).
- ⁶⁴ *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7.
- ⁶⁵ *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited* [2013] NSWLEC 48.
- ⁶⁶ NSW DPIE, *Net Zero Plan Stage 1: 2020-2030*, (2020) <<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/net-zero-plan-2020-2030-200057.pdf?la=en&hash=D65AA226F83B8113382956470EF649A31C74AAA7>>.
- ⁶⁷ Tong et al., *Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target*, Nature. (2019).
- ⁶⁸ OILCHANGE, *The Sky's the Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production*, (2016) <http://priceofoil.org/content/uploads/2016/09/OCL_the_skys_limit_2016_FINAL_2.pdf>.
- ⁶⁹ The IPCC path 1 required 25% reduction between 2010 and 2030. In 2010 global gas production reached 2714 Mtoe (million tonnes oil equivalent) and in 2018: 3309 Mtoe. Considering gas consumption increased 22% between 2010 and 2018 the required consumption cuts are now larger. Calculations are based on BP's *Statistical Review of the World Energy*, (2019) <<https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>>.
- ⁷⁰ NSW DPIE, *NSW Emissions*, (2020e) <<https://climatechange.environment.nsw.gov.au/About-climate-change-in-NSW/NSW-emissions#:~:text=NSW%20annual%20emissions%20per%20capita,tonnes%20CO2%20De%20per%20capita>>.
- ⁷¹ (NSW DPIE 2020c).
- ⁷² IEEFA, *Is the Gas Industry Facing Its Volkswagen Moment?*, (2020) <https://ieefa.org/wp-content/uploads/2020/03/Is-the-Gas-Industry-Facing-its-Volkswagen-Moment_March-2020.pdf><https://ieefa.org/wp-content/uploads/2020/03/Is-the-Gas-Industry-Facing-its-Volkswagen-Moment_March-2020.pdf>.
- ⁷³ Lafleur et al., *A review of current and future methane emissions from Australian unconventional oil and gas production*, (2016) <<http://climatecollege.unimelb.edu.au/review-current-and-future-methane-emissions-australian-unconventional-oil-and-gas-production>>.
- ⁷⁴ *Ibid.*
- ⁷⁵ (NSW DPIE 2020) x.
- ⁷⁶ Based on the IPCC 1.5°C median pathway: SEI, IISD, ODI, Climate Analytics, CICERO, and UNEP, *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C* (2019) <<http://productiongap.org/wp-content/uploads/2019/11/Production-Gap-Report-2019.pdf>>.
- ⁷⁷ Long, S, *Coal Seam Gas Import or Mining will not guarantee lower prices*, (2020) <<https://www.abc.net.au/news/2020-02-12/coal-seam-gas-import-or-mining-will-not-guarantee-lower-prices/11954268>>.
- ⁷⁸ CSIRO, *Annual update finds renewables are cheapest new-build power*, (2018) <<https://www.csiro.au/en/News/News-releases/2018/Annual-update-finds-renewables-are-cheapest-new-build-power>>.
- ⁷⁹ Lazard, *Levelized Cost of Energy and Levelized Cost of Storage*, (2019) <<https://www.lazard.com/perspective/lcoe2019>>.
- ⁸⁰ NSW CSE, *NSW Decarbonisation Innovation Study*, (2019) <<https://www.chiefscientist.nsw.gov.au/reports/nsw-decarbonisation-innovation-study>>.
- ⁸¹ Global Witness, *Overexposed: How the IPCC's 1.5C Report demonstrates the risks of overinvestment in oil and gas*, (2019) <<https://www.globalwitness.org/en/campaigns/oil-gas-and-mining/overexposed/>>.
- ⁸² IEA, *Global Energy Review*, (2020b) <<https://www.iea.org/reports/global-energy-review-2020>>.

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- ⁸³ Baxter, T, *Scott Morrisons Gas Transition Plan is a Dangerous Road to Nowhere*, (2020) <<https://theconversation.com/scott-morrisons-gas-transition-plan-is-a-dangerous-road-to-nowhere-130951>>.
- ⁸⁴ Spector, J, *Just how much business can batteries take from gas peakers*, GreenTech Media, (2018) <<https://www.greentechmedia.com/articles/read/just-how-much-business-can-batteries-take-from-gas-peakers#gs.xks74u>>.
- ⁸⁵ IEEFA, *U.S.: Utilities are now skipping the gas 'bridge' in transition from coal to renewables*, (2020), <<https://ieefa.org/ieefa-u-s-utilities-are-now-skipping-the-gas-bridge-in-transition-from-coal-to-renewables/>>.
- ⁸⁶ See for example Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, (2017) <<http://www.mpi.org.au/wp-content/uploads/2016/06/Ground-Truths-2016-web.pdf>>.
- ⁸⁷ (Pegasus Economics 2019) 3.
- ⁸⁸ Santos, *Importance of NSW's Natural Gas: Time to separate fact from fiction*, (2013) <https://www.Santos.com/wp-content/uploads/2020/02/131025_eastern_australias_energy_markets_outlook_2013.pdf>.
- ⁸⁹ Ibid.
- ⁹⁰ (Global Energy Monitor 2020)
- ⁹¹ (NSW DPIE 2020c) 107.
- ⁹² Santos, *Annual Report*, (2019) <<https://www.Santos.com/wp-content/uploads/2020/02/2019-annual-report.pdf>>.
- ⁹³ Matthew Currell contributed the following expert advice regarding groundwater-related impacts of the NGP but did not offer a view regarding the approval outcome for the project.
- ⁹⁴ (Santos 2017) ES-12.
- ⁹⁵ Ibid.
- ⁹⁶ Patterson et al., 'Unconventional oil and gas spills: Risks, mitigation priorities and state reporting requirements', *Environmental Science and Technology*, (2017).
- ⁹⁷ Nicholls, S, 'Santos coal seam gas project contaminates aquifer', *The Sydney Morning Herald* (2014); Khan, S and Kordek, G, *Coal seam gas: produced water and solids*, (2014).
- ⁹⁸ Darrah et al., *Noble gases identify the mechanisms of fugitive gas contamination in drinking-water wells overlying the Marcellus and Barnett Shales*, (2014); Jackson et al., 'The environmental costs and benefits of fracking', *Annual Reviews in Environment and Resources*, (2014).
- ⁹⁹ Iverach et al., 'Constraining source attribution of methane in an alluvial aquifer with multiple recharge pathways', *Science of the Total Environment*, (2020).
- ¹⁰⁰ O'Kane, M, *Independent Review of Coal Seam Gas Activities in New South Wales*, (2013) <<https://www.chiefscientist.nsw.gov.au/reports/coal-seam-gas-review>>.
- ¹⁰¹ (Iverach et al., 2020).
- ¹⁰² (NSW DPIE 2020c) Appendix G.
- ¹⁰³ E.g., Cahill et al., 'Mobility and persistence of methane in groundwater in a controlled-release field experiment', *Science of the Total Environment* (2017).
- ¹⁰⁴ Other than in signing and MOU with Natural Soda in July 2020 to use an unspecified amount of salt removed from produced water. The MOU, as a legally non-binding agreement seeks to convert salt waste into a product for use in the food and pharmaceutical industries.
- ¹⁰⁵ (NSW DPIE 2020c) xv.
- ¹⁰⁶ (NSW DPIE, 2020c) 49.
- ¹⁰⁷ This section on social impacts has been fact-checked by Professor Deanna Kemp who has confirmed the details herein per email with Dr. Rebecca Lawrence on 15 July, 2020.
- ¹⁰⁸ (Santos 2017) ES 26-11.
- ¹⁰⁹ This research is currently being undertaken by PhD Candidate Gemma Viney as a part of her PhD research.
- ¹¹⁰ See. for a total list of existing and proposed resource developments in the Narrabri region see Table 2, p. 10 of the *Social Impacts Review Report: Narrabri Gas Project* prepared by Dr Alison Ziller (2020).
- ¹¹¹ Personal communication between Dr Rebecca Lawrence and Professor Deanna Kemp telephone 25 June and 15 July 2020.
- ¹¹² CSRM, *Narrabri Gas Project Social Impact Assessment: Expert Review and Independent Advice to the New South Wales Department of Planning and Environment*, (2018) <<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T102337.692%20GMT>> 1.
- ¹¹³ Personal communication between Dr Rebecca Lawrence and Professor Deanna Kemp telephone 25 June and 15 July 2020.
- ¹¹⁴ (NSW DPIE 2020c) iv.
- ¹¹⁵ (CSRM 2018) 5.
- ¹¹⁶ Ziller, A, *Social Impacts Review Report: Narrabri Gas Project*, (2020), p. 38.
- ¹¹⁷ CSRM, *Narrabri Gas Project Social Impact Assessment Preliminary review and high-level gap analysis: questions to the Proponent*, (2017) <<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6456%2120200611T102337.692%20GMT>> 5.
- ¹¹⁸ Ibid.
- ¹¹⁹ (NSW DPIE 2020c) xviii.
- ¹²⁰ (NSW DPIE 2020c) 38.

¹²¹ (CSRM, 2017) 8.

¹²² NSW CSE, Community Benefits Fund (2020) <<https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/coal-seam-gas/community/community-benefits-fund>>. Petroleum (Onshore) Regulation 2016 (NSW) r 46.

¹²³ Personal communication between Dr Rebecca Lawrence and Professor Deanna Kemp telephone 25 June and 15 July 2020.