Salt in the wound: An assessment of the scale of the NSW Government's planned expansion of Santos' Narrabri coal seam gas field

Summary

- Following widespread community opposition, most of New South Wales is now free from the threat of coal seam gas, but the NSW Government has indicated it intends to renew CSG exploration licences across **more than one million hectares of land** from the Liverpool Plains north to the Namoi floodplain.
- Nearly **400,000 hectares** of this land is mapped by the Government as "biophysical strategic agricultural land" and this area represents a quarter of the such land in the New England North West region.
- If the scale of coal seam gas development and impacts approved for the Narrabri gas project were replicated across this area, it might be expected to see **more than 10,000 additional coal seam gas wells** that could remove as much as **449 billion litres of groundwater**.
- If the scale of salt waste expected for the Narrabri gas project were repeated across this area, it could result in the creation of **10 million tonnes of solid salt waste**.
- Replicating the greenhouse gas emissions expected from the Narrabri gas project across a further million hectares would mean creating another **1.5 billion tonnes of greenhouse pollution** over 25 years - equivalent to three times Australia's total annual greenhouse gas emissions in 2020.[1]

[1] Source: https://www.industry.gov.au/data-and-publications/national-greenhouse-gas-inventory-quarterly-update-december-2020

History of opposition to Santos and CSG across NSW

In 2011, unconventional gas exploration licences covered 43% of New South Wales. In the decade since, one of the biggest community movements in New South Wales' history brought the coal seam gas industry to a standstill, stopping the industry in Sydney, the Northern Rivers, Illawarra, Lower Hunter and Gloucester.

Widespread and sustained opposition to the coal seam gas industry has continued in the north west of the state, the only area still threatened by its expansion. Local people have been arrested interrupting coal seam gas operations, have lodged petitions in parliament, and have door-knocked the town of Narrabri - finding majority opposition to the Narrabri gasfield and overwhelming support for renewable energy. A record 22,700 objecting submissions were made against the Narrabri gas project in 2017 and almost two-thirds of submissions from the local Narrabri area objected to the project. Despite the scale of this continuous opposition, the NSW Government approved the Narrabri coal seam gasfield in September 2020.

Santos' original plans for the region involved seven gasfields, across millions of hectares of petroleum exploration licences the company either held itself, or held an interest in. Thanks to the scale of community opposition to gas and the challenging commercial prospects for the industry, these licences languished unused and expired for many years, leading to them being described as "Zombie PELs." Local people in Moree, Tamworth, Coonamble, Gilgandra and beyond campaigned, lobbied, protested and called for these Zombie PELs to be extinguished. Cancellation of all of these expired licenses is supported by, among others, the NSW Farmers Association, the Country Women's Association of NSW and local Members of Parliament. A motion to cancel all of the Zombie PELs was passed at the NSW National Party State Conference in 2019.

The NSW Government's plan to expand Santos' Narrabri gas project

In July 2021, Nationals leader and Deputy Premier John Barilaro released a *Future of Gas Statement* which reduced the area of these remaining exploration licences by 77%. However the government plans to renew over 1.1 million hectares of the Zombie PELs and indicated this area will be available for coal seam gas expansion, stating that "the NSW Government welcomes future extension proposals," in these areas, while ruling out gas exploration or production anywhere else in the state.[2]

Analysis by Lock the Gate reveals that a third of the area now earmarked as open for further exploitation for coal seam gas, nearly 400,000 hectares, is "biophysical strategic agricultural land" according to the Government's own mapping. See Figure 1 for an overlay of biophysical strategic agricultural land on the Government's map of land it intends to make available for coal seam gas. Biophysical Strategic Agricultural Land has been described by the government as the "State's most valuable farming land"[3] and was mapped based on the availability of "high quality soil and water resources capable of sustaining high levels of productivity."[4]

The area now made available for Santos to expand its gasfield stretches from Wee Waa and Bellata to Willow Tree and includes prime farmland on the Liverpool Plains and the Namoi River floodplain. According to the NSW Government, this area represents just 1.5% of the state, but the impacts of coal seam gas development on this scale would still be devastating for land, water, communities and the climate.

The experience of communities in Queensland and the USA has demonstrated what happens once the unconventional gas industry gets a foothold in a region. The short productive life of each individual well and the enormous capital expenses required to transport the gas to overseas markets, means that the industry relies on ongoing expansion to sustain its output. For example, Queensland currently hosts approximately 10,000 coal seam gas wells, with the Gasfields Commission expecting that number to roughly double by 2050.[5]

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[2] Exact area figures were not provided by the New South Wales Government and the decision on which areas of seven petroleum licences with renewal applications pending is yet to be made. This figure is an estimate by Lock the Gate based on a digital rendition of the map released by the Government.

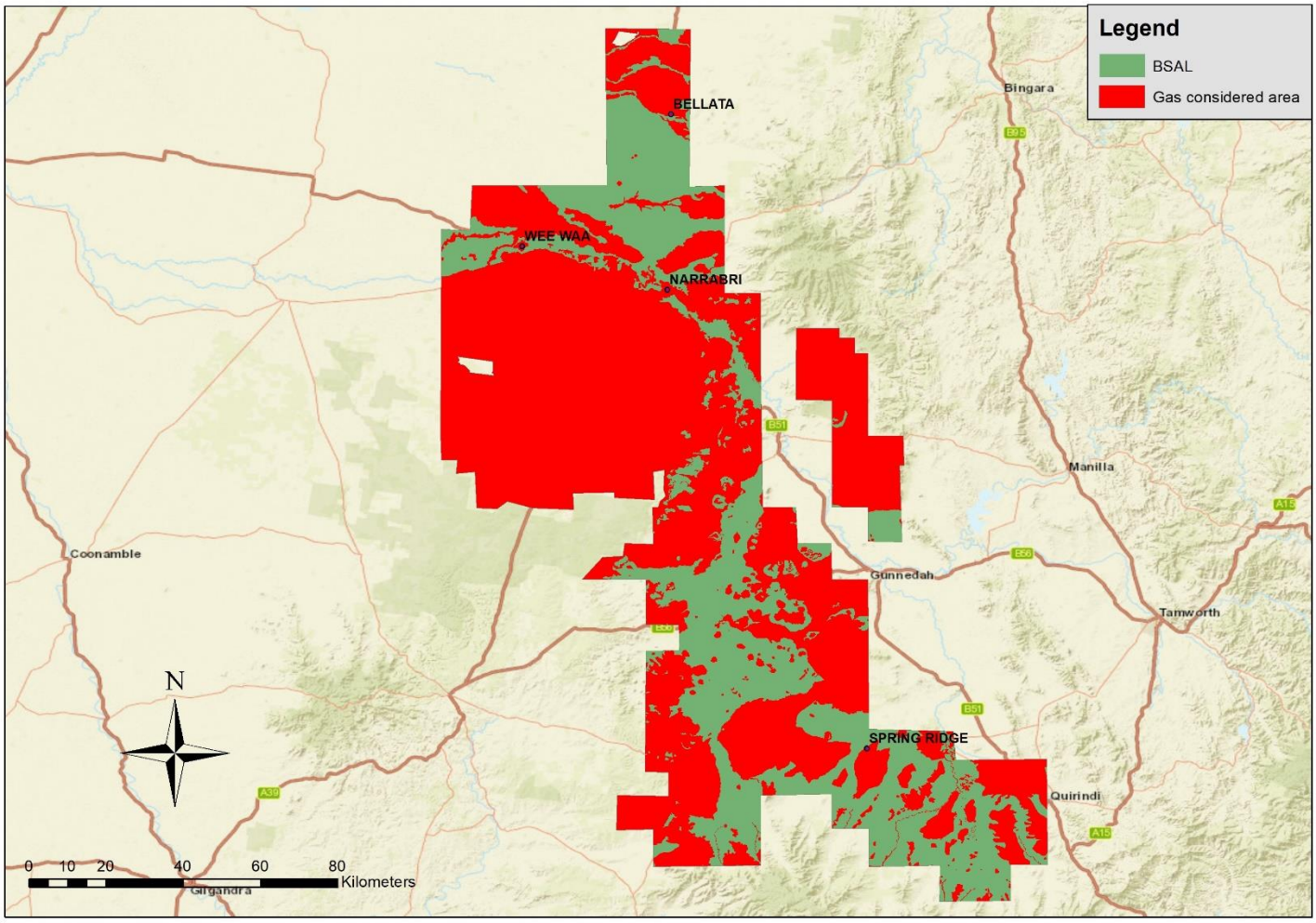
[3] Source: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/476963/media_release_131003_planning_coal_seam_gas.pdf

[4] Source: https://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/Safeguarding-our-Agricultural-Land#

[5] Queensland Gasfields Commission. *Industry Snapshot April 2021*. See Table 2 for current well numbers.

The impact of this growth is industrialisation and pollution of the landscape, with more communities surrounded by gasfields they neither want or need. Every new well risks pollution of precious groundwater, requires dewatering of aquifers and imposition of well pads, access roads, pipelines and compressor stations on the land. Millions of tonnes of waste salt will need to be disposed of, huge quantities of water will be required and there will be vast emissions of methane and other greenhouse gases. If Santos' Narrabri gasfield is allowed to develop, there will inevitably be enormous pressure on the NSW Government to allow it to continue growing, taking up every available hectare within the remaining exploration license areas.

Figure 1: A digital rendering of the area of North West NSW proposed to be made available for continued exploitation for coal seam gas in red (this includes the area of the already-approved Narrabri Gas Project), overlaid with NSW government mapping of Biophysical Strategic Agricultural Land in green.



Potential scale of future gas expansion

The remaining petroleum exploration licences (PELs) following the *Future of Gas Statement* are estimated to be 12 times bigger than the Narrabri gasfield.[6] If Santos were permitted to utilise the area of petroleum licences slated to be renewed at the same intensity of development that was recently approved for the Narrabri gasfield, the impacts could be severe. We replicated the expected number of wells, tonnes of salt waste and greenhouse gas emissions from the Narrabri gasfield across the area of renewed petroleum licences and the results are presented in Table 1 below.

	Narrabri project	**Expanded across renewed licence area**
Area	95,000 hectares	1,137,172 hectares[7]
Gas wells	850	10,175
Waste salt	840,000 tonnes[8]	10,054,995 tonnes
Groundwater removal	37.5 billion litres[9]	448.88 billion litres
Direct greenhouse emissions	33.5 million tonnes CO_{2e}[10]	401 million tonnes CO_{2e}
Total greenhouse emissions	127.8 million tonnes CO_{2e}[11]	1.53 billion tonnes CO_{2e}

Farmland implications

Lock the Gate digitised the Government's map indicating the area it intends to renew for further exploration of coal seam gas and overlaid this area with mapped Biophysical Strategic Agricultural Land. Based on this analysis, there is 398,840 hectares of strategic agricultural land affected, occupying a third of the total gas licence area intended to be renewed by the Government. This represents a quarter of all strategic agricultural land mapped in the New England North West and coincides with major agricultural production areas and floodplains, including the highly fertile black soils of the Liverpool Plains.

[6] Rounded up from 11.97. This calculation is based on the Narrabri gasfield occupying 95,000 hectares of the total area open to coal seam gas exploitation, which we estimate at 1,232,172 hectares. With the 95,000 hectares of Narrabri subtracted, the area intended to be renewed by the NSW Government for new exploration is 1,137,172 hectares.

[7] This is the entire area shown in red and green in Figure 1, minus the 95,000 hectares of the Narrabri gas project.

[8] Independent Planning Commission. Statement of Reasons *Narrabri Gas Project*. See page 16.

[9] Environmental Impact Statement, Narrabri Gas Project. 2017.

[10] Narrabri EIS Appendix R

[11] Narrabri EIS Appendix R. NB: Santos estimated an annual downstream emission rate "in the order of 3.77Mt" per year based on expected production. We have multiplied this number by 25 to estimate total downstream emissions of 94.3Mt which is consistent with the approach taken by the Independent Planning Commission.

Biophysical Strategic Agricultural Land has been described by the government as the "State's most valuable farming land" and was mapped based on the availability of "high quality soil and water resources capable of sustaining high levels of productivity." While projects on strategic agricultural land must receive a 'Gateway Certificate' from the Mining and Petroleum Gateway Panel before they can obtain planning approval, there is no provision for the refusal to grant such a certificate. For example, the nearby proposed Caroona Coal mine failed all six main criteria but was granted a Gateway Certificate anyway[12], as was the Bylong coal project, which subsequently took several years to get to the Planning Commission before it was ultimately refused consent.

Waste salt implications

Santos is yet to release plans for the disposal of the hundreds of thousands of tonnes of salt waste expected to be generated by the Narrabri gas project. The destiny of this waste, which will be laced with concentrated elements from produced water from coal seam aquifers, was an unresolved matter of contention during the assessment of the project. In Queensland, the industry is still investigating options to dispose of the expected 6 million tonnes of salt waste expected to be produced by coal seam gas operations over time.[13] If the volume of salt expected to be produced by the Narrabri gas project over its lifetime were replicated by gas production across the area intended by the Government for renewal of exploration activities, the total volume of salt produced could be as high as ten million tonnes.

Greenhouse gas implications

The total volume of greenhouse emissions that would be created if Santos were allowed to proceed with expanding coal seam gas beyond the approved Narrabri gas project and into the area of renewed licences could be as high as 1.9 billion tonnes. This comprises 127.8 million tonnes already slated to be released over 25 years by the extraction and burning of gas from the Narrabri project, with an estimated 1.7 billion tonnes if the same intensity of development were to occur across the area of licence renewal. For comparison, NSW's total annual emissions for 2019 were 136.6 million tonnes[14] and Australia's total annual emissions for 2020 were 499 million tonnes.

Water implications

The production of coal seam gas requires large volumes of groundwater to be brought to the surface in order to depressurise the coal seams that hold the gas. The Narrabri gas project is expected to remove 37.5 billion litres of groundwater over 25 years. Initially, this water comes from the coal seam aquifers of the Gunnedah Oxley Basin, up to a kilometre below the ground. Over the decades and centuries after gas extraction, however, the productive aquifers that lie

[12] Source: https://www.smh.com.au/environment/sustainability/bhps-caroona-coal-mine-fails-gateway-tests-20140711-zt47v.html

[13] See for example a February 2020 *Independent Review: Brine and salt management (Section 6, Queensland Gas: end-to-end water use, supply and management)* prepared by UQ at the Government's request. https://environment.des.qld.gov.au/__data/assets/pdf_file/0018/240318/independent-review-brine-salt-management-report.pdf

[14] Source: National Greenhouse Accounts 2019 State and territory greenhouse gas inventories.

above, closer to the surface, like the Great Artesian Basin's Pilliga Sandstone or the alluvial aquifer of the Namoi River, slowly lose water downward to this depressurisation.

If the volume of water to be extracted over the life of the Narrabri gasfield were to be replicated across the Liverpool Plains and Namoi Valley in the area of gas licences intended to be renewed, the volume of water to be removed over time could be as high as 449 billion litres. In reality, groundwater is far more complex than this simple calculation implies but, as demonstrated by the CSG industry in Queensland which removes 65 billion litres of groundwater a year, this is a reasonable estimate.[15]

Conclusion

The NSW Government's Future of Gas Statement indicates that it "welcomes future extension proposals" extending the Narrabri gasfield into the areas analysed in this report, subject to the usual assessment processes. In reality, the footprint, concentration of wells and volumes of water and salt from potential future gas development in the 1.1 million hectares intended to be available for coal seam gas exploration are unknown at this point and the figures presented in this report represent a rough estimate assuming replication of the Narrabri gasfield impacts across this area.

As there is no prohibition that would prevent such extensions taking place on strategic farmland, it is reasonable to fear that these areas will be subjected to development proposals that will affect this land and the productive groundwater that supports agricultural industries. The experience from Queensland and the USA is that gasfields expand across the landscape once they begin operation.

Unless the NSW Government agrees to further reduce the area under Petroleum Exploration Licenses, then communities must assume that the intention of both government and industry is to develop the region to the greatest extent possible. If this occurs it will have a devastating impact on our land, water, communities and climate. Expansion of the coal seam gas industry across these districts is unnecessary, unsafe and unwanted. It is inconsistent with the New South Wales government's climate change commitments and puts the resilience of these rural communities and landscapes at risk.

[15] Source: Queensland Gasfields Commission https://gasfieldscommissionqld.org.au/communities/environment/water/csg-produced-water