

20th May 2017

Submission to NSW Planning in relation to the Santos Pilliga CSG project EIS:

Summary: Santos proposes up to 850 wells on 425 well pads over 95,000 hectares. This is more than 4 times the size of either of the previously approved CSG projects in NSW. Just in the initial exploration phase, this project has already caused over 20 toxic spills and leaks including contaminating an aquifer with uranium. The project would extract over 35 billion litres of toxic groundwater and drill right through the recharge area of the Great Artesian Basin. It would generate tens of thousands of tonnes of salt waste for which SANTOS has still offered no waste disposal plans. The gasfield would fragment over 90,000 hectares of the Pilliga Forest, impacting endangered species and industrialising the largest temperate woodland in eastern Australia. It has been shown time and time again overseas that the industry is incapable of safe and responsible practice and has been riddled with accident after accident severely affecting communities and ecosystems. CSG methane is a direct and serious greenhouse gas.

My submission in detail:

Relevant Qualifications and experience: I have a Science degree from Sydney University with Zoology majors, Chemistry and Botany; Cert IV in Workplace Training, Cert III Conservation and Land Management. Years of work experience as a research assistant at Sydney Uni, Australian Museum, NSW Agriculture working for some of Australia's top scientists, Environmental Educator: Blacktown Council, HN Catchment Management Trust, Community volunteer in bush regeneration; and 7 years as a welfare worker. I am not only able to comprehend the science around CSG extraction and its implications, but am also keenly aware of the social issues of the state and the need for revenue and jobs.

I have serious objections to Santos' Pilliga project on several grounds:

Climate Change: NSW should be phasing out all non-renewable energy sources and promoting renewable energy with battery storage. This should include financial incentives for both households and businesses to become 100% electricity reliant for all cooking, heating and manufacture. No more coal, CSG or conventional gas projects should be given the go-ahead on the basis of severe human induced climate change from fossil fuel use among other sources. State resources should be directed to the renewable energy industries to produce jobs, export opportunities (in relation to technology) and supply of household business energy needs. This is achievable without blackouts if the east coast energy market is regulated to serve the people rather than profit making vested interests. It is our gas. The citizens of Australia own it – let's use the conventional gas that is ours and is currently being produced.

There is currently plenty of gas supply for NSW to ensure baseload power for a transition phase to 100% renewables. Yes, we will have to buy it from Victoria; so be it. The faster we phase out the need for it though, the quicker the pain will ease.

NSW can no longer rely on fossil fuel generated revenue. It is not in the best long term interest of the citizens of the state to continue to contribute to the emission of greenhouse gases which are

causing catastrophic climate change. The amount of revenue or jobs provided by the fossil fuel industry is irrelevant if the planet can no longer function.

Water consumption: CSG gas extraction uses astronomical amounts of water (Santos themselves admit to the extraction of 35 billion litres of groundwater, much of which will be toxic). Australia is a dry continent and set to get drier. Water is a primary resource needed for human consumption and food production and it should not be wasted on unnecessary energy extraction. There are severe limitations placed on the farming community on the amount of water they can extract for agricultural activity in NSW. Degradation and depletion of the aquifers in NSW and throughout the Great Artesian Basin has long been a known serious issue (to the point that for years bores were capped throughout QLD to stop excessive water loss). Yet we are prepared to practically give away gigalitres of water, some of it useable for stock and agriculture, to a dinosaur industry on its way out. This is morally reprehensible. The loss of water from these aquifers could have knock on effects on neighbouring aquifers that hold potable human drinking water. Even if potable water is not used in the fracking process, it could disappear from neighbouring aquifers. Rivers and creeks could be drained and natural patterns of surface flow could be altered all having severe impacts on the Agriculture industry and ecosystems.

Contamination of aquifers: There is no guarantee that potable aquifers will not be contaminated. No mining company can give 100% surety that surrounding aquifers will be safe. The precautionary principle must be instituted when it comes to a key resource such as water. I quote from 'Ground water in Australia' published by The National Centre for Groundwater Research and Training, authors: Nikki Harrington and Peter Cook:

"Some key water management challenges in the current coal seam gas boom are
(a) the effect of depressurisation on surrounding aquifers,
(b) the likelihood and impacts of inter-aquifer leakage caused by aquifer depressurisation and hydraulic fracturing, and
(c) chemical processes affecting the quality and safe disposal of the released water.
In Queensland, there are concerns over possible interactions of the CSG developments with usable aquifers in the Great Artesian Basin, the Bowen Basin and the Surat Basin (Figure 9) (Prosser et al., 2011). Usable aquifers can occur above or below the coal seams, and removing water from the coal seams induces leakage from the surrounding aquifers. The extent of the leakage would depend upon the amount of water removed, the distance between the aquifers and whether there are any low permeability layers in between to inhibit leakage."

Spillages from containment ponds, haulage trucks and pipelines: This project has already caused over 20 toxic spills and leaks including contaminating an aquifer with uranium. Once again no extraction company can give a 100% guarantee that spills will not occur. There is no going back once a spill happens. Clean-up of a spill can cause further destruction of the land and can permanently damage the area in question. Much of the Pilliga is prone to flooding and with the effects of climate change rain events are becoming less predictable in timing and degree. Floods can seriously impact on retention ponds, leading them to overflow and contaminate surrounding forests. Although dilution would lessen the impact, contamination to any degree is unacceptable in such a fragile area.

Fugitive and deliberate methane emissions: Methane is continuously vented from CSG wells and leaks occur throughout the system. Methane is a colourless gas and can only be detected with

special cameras and equipment. In Qld methane is continuously allowed to leak into the environment. Nothing has been done by either the extraction companies or the government to prevent this serious greenhouse gas from escaping. <https://www.youtube.com/watch?v=Jx-jWcRzndw>. Nor have initial methane emissions been tested by independent bodies before works began – this is simply negligent on the part of government and makes it easy for extraction companies to argue the methane levels are the same after development. The amount of leakage and deliberate emission though are clearly large and it is very hard to believe that gases trapped in underground layers surrounded by rock, water and soil would leak naturally at these levels.

Methane harms the planet; it is 86 times more potent as a greenhouse gas than CO₂ (<https://www.scientificamerican.com/article/how-bad-of-a-greenhouse-gas-is-methane/#>) and when burnt methane forms CO₂ + 2 H₂O. with other minor products present such as carbon monoxide & nitrogen oxides (http://www.answers.com/Q/Which_products_are_made_when_methane_burns). Flares are already present 24/7 in the Pilliga – these continue even through high risk fire danger periods - pumping CO₂ into the atmosphere.

Apart from this, the drilling and fracking process has probably fractured far more than just the immediate coal seam. Despite disputes over the actual source of methane leaking from the Condamine River, farmers are quite clear that they never witnessed this prior to CSG exploration in the area. Why do we distrust them? Once our farmers were considered the honest labourers that held the economy together, but now they are reviled as liars and lunatics (and ‘ecofascists’! labelled by the then NSW Energy Minister, Anthony Roberts). Amazing how money can change things.

Fracking and its link to earthquakes: Injection of waste water in the fracking process can increase the risk of earthquakes (<https://earthquake.usgs.gov/research/induced/myths.php>), but in areas of fault lines, fracking itself can induce quakes (<http://science.sciencemag.org/content/354/6318/1406>). Do we know if this is going to be an issue in the Pilliga? And what are the consequences to farming and township infrastructure if quakes occur? Quakes can also open fractures in rock and allow surface water to seep thorough disappearing from the landscape. Santos does not seem to have addressed this, though it may be hidden in the massive document and I just missed it.

Fragmentation of habitat: For many decades we, as a society, have been aware of the implications of habitat fragmentation on the whole system. The ‘edge affect’ is real; pests, diseases and weeds are more likely to infiltrate forest and destroy it and its inhabitants when the forest is divided by roads, human habitation and other vegetation loss through pasture encroachment etc. Fragmentation through roads also causes increased compaction of soils and serious increase in road kill. These impacts endanger many already vulnerable species and will industrialise the largest temperate woodland in eastern Australia. Although I long believed personally that all species have an equal right to survive on this planet and that humans have no special position here; increasingly others are acknowledging this on a national and global scale (<https://www.theguardian.com/world/2017/mar/21/ganges-and-yamuna-rivers-granted-same-legal-rights-as-human-beings>; <http://leonardodicaprio.org/united-nations-takes-rights-nature/>; <https://sustainabledevelopment.un.org/post2015/transformingourworld>). This however is not the only argument for protecting vast tracts of the earth from any form of development. The very

survival of the human species is dependent on the intricate connections in and between ecosystems. This has also been known for a very long time. None of this is new science. The Pilliga is a major recharge area for the Great Artesian Basin. Protecting it in its current state (albeit already slightly degraded from its pristine state by logging and grazing) is the best way to provide ongoing protection of this great and necessary water source. Fragmentation will destroy it completely – again this is known science.

Salt disposal: Going hand in hand with massive use of water in the fracking process is the production of salt laden waste water. This salt is a concentration of natural salts as well as introduction of chemicals in the fracking process. Huge volumes of salt and brine would be produced and concentrated, as a by-product of CSG extraction. “BG Group subsidiary Queensland Gas Co estimated that it alone would produce 4.6 million tonnes of salt over the next 30 years, the committee reported.” <http://www.theaustralian.com.au/national-affairs/mps-demand-controls-on-coal-seam-gas-rush/news-story/64796c500111eb9d2f2d94dc5d6e0875>

Santos clearly states that over the life of the Pilliga project they will produce 430, 500 tonnes of salt (EIS Table 28.5 pg 19 of Ch 28)! 1500 tonnes per month. There are no waste disposal plans for this and even if there were it would be unacceptable to dump this amount of salt anywhere. The ecological repercussions of the disposal of this would be long term and very probably disastrous. See photos of previous salt production in the Pilliga:

<https://www.parliament.nsw.gov.au/committees/DBAssets/InquirySubmission/Body/35419/Submission%200229a.pdf>

In conclusion, although Santos attempts to show it can minimise and manage the effects of its CSG project in the Pilliga, the scale and known ongoing negative effects as well as predicted negative so called ‘unknowns’ outweigh the benefits by a large degree. In a world where climate change is spiralling out of control we need to immediately transition to renewable energy production. It is possible now. Santos CEO’s statement that a global temperature increase of 4°C is acceptable, is at best severely ignorant and at worse, a brutally cynical attempt to sway the gullible in the populace and suspicious shareholders. Promises of jobs and export dollars (and spurious threats of black outs increases in energy prices) should be roundly ignored as the dying tantrums of an outdated industry. An industry that has seen the writing on the wall for a very long time and should have placed itself differently, to make the most of new renewable technologies. It is NOT in the best interests of the citizens of NSW to continue with this project. It does in fact threaten the very future(financially and qualitatively) of the children and grandchildren of this present generation and should be considered the white elephant that it is and be respectfully put to rest. Across NSW educated citizens from all walks of life understand the negative repercussions of this project, from doctors, nurses, farmers, economists, scientists, - I could go on, have all voiced their well thought out and learned opinions on this subject. They have been vilified and defamed by wealthy vested interests both within the government as well as in the business sector. This must stop. As independent arbiter of this process the NSW Planning Department should take into account the inconsistencies of Santos’s plans and the long term detrimental effects to NSW and the planet. It should not be swayed by short term financial gain for the company or the state – we have a vibrant and innovative community who will

quickly fill the shoes that Santos leaves, supplying long term jobs in sustainable and renewable industries, not only in the Pilliga area, but throughout the state and country.

Yours sincerely, Deborah Bushell