

**Submission
No 338**

INQUIRY INTO COAL SEAM GAS

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Date received: 08/09/2011

To:
General Purpose Standing Committee Number 5

From:
Nimbin Environment Centre,

And from:
Tweed Richmond Organic Producers' Organisation (Tropo)

Submission to the Inquiry into Coal Seam Gas

Preamble

Just because a resource exists or has been discovered does not require that it be exploited by our generation of people, especially so if it is a fossil fuel and even more so if it is, as is the case with coal seam gas, an unconventional fossil fuel.

We humans have more than sufficient carbon based fossil fuels to devastate our planet's once benign climate, as is becoming increasingly apparent, without using the unconventional fossil fuels. As party to an international agreement in 1992, Australia had a moral obligation to reduce its emissions by now (2010) to 10% below 1990 levels. Ignoring Australia's cheating on accounting (the inclusion of a huge spate of land clearing emissions in 1990) and our whining for special treatment, our fossil carbon emissions are now 32% above 1990 levels or 47% above what they would have been had we acted morally.

CO₂ levels in the atmosphere are now 391ppm. For a safe climate we need to reduce atmospheric CO₂ levels back below 350ppm or, if we don't want a sea level rise of 7m from Arctic melt, then back to 325ppm CO₂ .

If human's were to exploit half of the planet's proven and probable (2P) unconventional (coal seam and shale) gas reserves this would raise atmospheric CO₂ by 50ppm. If Australia is going to justify exploiting all our coal seam and shale gas reserves then we cannot complain when the world follows suit and hence we cannot complain when the climate becomes unliveable.

On our path to a low carbon civilisation our best option is to eliminate the worst fossil fuels first. Apart from the fact that it should never have jumped in the queue whilst coal itself is in the process of being phased out, coal seam gas is a very good contender in a bad lot for elimination first.

The factors that put coal seam gas in the running for first elimination from use as a fossil fuel are: Because of fugitive methane emissions the global warming from coal seam gas life cycle emissions is comparable to or worse than burning coal. Water source contamination by toxins from fracking fluids and water extracted from the coal seam is almost guaranteed by the industry. Detrimental health effects from airborne and water borne toxins from coal seam gas are legion. Though the coal seams extend over vast areas beneath the Earth's surface, in order to extract the gas the Earth's biospherical surface is criss-crossed with an extensive network of pipeways, roads, well pads, compressor stations, condensers, flares, toxic waste ponds and other infrastructure that fragments wildlife habitat causing species extinction and turns productive farmland into an industrial zone effectively incapable of food production and uninhabitable, in practice, by people. Draconian totalitarian measures are being employed by an industry-

government consortium to alienate landowners from control of their land and the public from control of their commons in an attempt to establish coal seam gas mining.

Geoscience Australia's estimate of the NSW CSG 2P reserves of 887PJ (with a 50% probability) would extend Australia's fossil energy dependence by 1 month on current consumption rates. This short burst of fossil energy supply is dwarfed by the length and magnitude of environmental destruction left in CSG's toxic wake. A millennium for aquifers to detoxify and of the order of a century to detoxify land by employing the laborious techniques of myco-remediation. Note however that thus far these coal seam gas reserve estimates are based on optimistic gas well production rates that are not justified by the more precipitous gas well decline rates experienced in practice. Current CSG reserve estimates deserve considerable scepticism.

All fossil fuels are finite and thus it is a nonsense to consider "energy security" in relation to them. The only role for fossil fuels in relation to energy security is their use in building renewable infrastructure, in particular solar thermal and wind, which have highly sustainable energy returns. Solar thermal with heat storage provides base load electricity. Wind in combination with pumped storage is another form of base load electricity supply.

It isn't surprising, as evidenced by its ethical standards thus far, that the CSG industry should attempt to rebrand CSG as "alternative" but for the government and its bureaucracy to collude in this rebranding is a disturbing use of public money for misinformation.

There is no longer a role for "State competitiveness" if ever there was one. It represents a competition to give away environmental capital more cheaply than any other state in a dinosaur race to the bottom (with apologies to the dinosaurs' descendants). Instead national and international cooperation ought to be our goal and especially cooperation to build renewable energy systems sufficient to eliminate fossil fuel burning.

Now to address some of the terms of reference.

1. The environmental and health impact of CSG activities.

Water: Fracturing from fracking extends in unpredictable ways along weaknesses and old fault lines for as much as 400m. This pollutes water supplies with fracking chemicals and cross contaminates aquifers with coal seam water. Removal of large volumes of water from coal seams leads to land subsidence, loss of surface water and requires problematic disposal of often hypersaline water. There is not the oversight capability in place by government environmental watchdogs and in Qld often government bodies are complicit in allowing pollution. This leads to CSG companies doing what they like as far as pollution goes because "they can". Eastern Star Gas in the Pilliga wasn't shy about discharging waste water into Bohemia creek – a recharge area for the Great Artesian Basin.

For the NSW government to grant the coal seam gas industry exemption from the Water Management Act 2000 can only further make the government complicit in water pollution and answerable for the effects some 30 generations into the future according to the National Water Commission's report on coal seam gas.

British Gas at Tara in Qld flouted regulations about clearing old growth and remnant trees as a matter of course, with equanimity, and despite reports to Qld EPA nothing was done to stop this clearing.

Both the blind eye of government regulators and the comparatively small fines levied if CSG companies are found culpable of environmental vandalism means that it is financially beneficial to CSG companies to break environmental law and pay fines rather than slow their development.

For the CSG industry to be able to break environmental law with impunity is immoral so we hope that this inquiry can redress that wrong.

Effects related to the use of chemicals

Some of the chemicals used in or produced by the CSG industry are insidious, generating effects at below detectable amounts. The volatile compounds evaporate from evaporation ponds and leak from throughout the system.

From the National Toxics Network (<http://www.ntn.org.au>):

Benzene, toluene, ethyl-benzene, xylene (BTEX) from both fracking fluid and coal seam water.
“BTEX chemicals are hazardous in the short term causing skin irritation, central nervous system problems (tiredness, dizziness, headache, loss of coordination) and effects on the respiratory system (eye and nose irritation). Prolonged exposure to these compounds can also negatively affect the functioning of the kidneys, liver and blood system. Long-term exposure to high levels of benzene in the air can lead to leukaemia and cancers of the blood.”

In the US there are 980 chemical formulations with trade names used by the gas industry. Out of these

- 421 have less than 1% of their ingredients listed on the Material Safety Data Sheet (MSDS).
- 136 products had less than 50% of their ingredients listed,
- 291 products had between 51% and 95% of their ingredients listed
- Only 133 products had information on more than 95% of their ingredients

A total of 649 chemicals were used in the 980 products. Specific chemical names and CAS numbers could not be determined for 286 (44%).

- Using health data identified on MSDSs, in government toxicological reports, and in the medical literature, health effects were identified for the remaining 362 chemicals with CAS numbers.
- Over 78% of the chemicals are associated with skin, eye or sensory organ effects, respiratory effects and gastrointestinal or liver effects. The brain and nervous system can be harmed by 55% of the chemicals. Symptoms include burning eyes, rashes, coughs, sore throats, asthma-like effects, nausea, vomiting, headaches, dizziness, tremors, and convulsions.
- Between 22% and 47% of the chemicals were associated with possibly longer-term health effects such as cancer, organ damage, and harm to the endocrine system.
- 210 chemicals (58%) are water-soluble while 131 chemicals (36%) are volatile; i.e., they can become airborne. Because they can be inhaled, swallowed, and also reach the skin, the potential for exposure to volatile chemicals is greater.
- Over 93% of the volatile chemicals can harm the eyes, skin, sensory organs, respiratory tract, gastrointestinal tract or liver, 86% can cause harm to the brain and nervous system and 72% can harm the cardiovascular system and blood, and 66% can harm the kidneys.

Fracking companies in Australia have listed 23 chemicals in their formulations, here's the biological effects from 8 of them:

Tetrakis(hydroxymethyl)phosphonium sulfate (THPS) – a biocide associated with mutations and chromosomal aberrations, possible carcinogen.

Sodium Persulfate - can cause skin rashes and eczema as well as allergies, irritating to eyes and respiratory system, long-term exposure may result in disease of the airways.

Ethylene Glycol - respiratory toxicant, spontaneous abortion and sub-fertility, foetal deformation, carcinogen, endocrine disruptor.

2-Butoxyethanol - highly mobile in soil and water, birth defects, destroys red blood cells.

Ethoxylated 4-nonylphenol - is a persistent bioaccumulative endocrine disruptor, which has been detected widely in wastewater and surface waters across the globe, changes to reproductive organs, breast cancer,

Naphthalene –carcinogenic – nasal & lung tumours, haemolytic anaemia

Isopropanol - reproductive toxin and irritant, central nervous system depressant, degenerative changes in the brain.

Formamide – birth defects, eye irritant, affects the central nervous system

Because of the serious nature of these health defects it is irresponsible for CSG companies to get away with “commercial in confidence” as an excuse for the release of unregulated toxins into the environment.

We are calling for full regulation by the chemical regulator for the use of these chemicals and the proper regulation of the “produced” chemicals, in their application to CSG mining and hope that this enquiry can move to enforce that.

Effect on greenhouse gas and other emissions

It is the ubiquitous methane leaks from the CSG industry that lead to the high global warming effects when lifecycle emissions are evaluated. Fugitive methane leaks come from the fracking water, especially in the first 10 days as the methane rich fracking water is discharged, from compressors which have deliberately leaking rotating shaft seals as designed, from condensers, separators, pipe seals and from where fracking releases methane to the surface.

Methane is up to 105 times the global warming effect of CO₂ when evaluated over a 20 year lifetime. (Methane burns slowly in the atmosphere to form CO₂ and water, taking 12 years to burn half of it) Howarth and Ingraffea have collected data on industry methane leaks in the USA and found estimated leak rates from 3.6% to 7.9% of production. Life cycle emissions from burning CSG, when evaluated over a 20year time span, amount to 20% more than life cycle coal emissions and up to double that of burning coal.

2. The economic and social implications of CSG activities

Organic farming and coal seam gas mining are mutually exclusive. Both can't coexist in the same paddock, or water catchment or even over the hill because some toxins are airborne. Toxins originate from the drilling fluid, fracking fluid, from the water pumped out of the coal seam and from the leaks that come from every part of their infrastructure.

The volcanic soils of the NSW Northern Rivers are some of the few most productive soils in Australia. This is an area where Organic farming techniques have been well developed.

Coal seam gas mining would quickly eliminate Organic farming as a possibility in this area. This is at a time when fossil fuels are depleting making Organic techniques all the more necessary for fertiliser and pest management.

Global warming as well is making food security an even more important consideration in determining land use strategy.

Gas prices are currently so low that the CSG industry cannot cover drilling costs. It is madness to destroy some of the best farming land and the long term food security for our children for the temporary CSG industry that does not cover current costs.

Legal rights of property owners

If an industry was to put a case for trumping the property rights of landowners such an industry should be able to prove that it was beneficial to the planet and people. Such is not the case for the CSG industry. CSG is more polluting than coal, the risk of water contamination is almost 100% and water and airborne emissions are toxic to life.

Despite that the CSG industry operates with an arrogance second to none. At Tara in Qld British Gas (BG) and Queensland police (under instruction from BG) ignored a civil court case by the property owner, broke a blockade then entered the property by force of bulldozer and the Qld Terror Squad and cleared one quarter of his property for gathering lines and pipeways to 4 properties further on.

With this approach by both CSG companies and government to support an unjustifiable industry it leaves no option but direct action or civil disobedience by property owners to protect both planet and people and their livelihood.

Local Government

All except the Richmond Valley council in the Northern Rivers support a moratorium on coal seam gas mining pending a proper scientific evaluation of the industry. Richmond Valley council owned land is being used by Metgasco for its waste water evaporation ponds. These ponds are at the headwaters of 2 creek systems and the DA allows for flushing in a heavy downpour. We suspect that the amount of saline and toxic water produced by CSG mining is beyond the scope of local government to regulate. Thus far State regulation has been a failure, allowing fracking to go ahead at Casino without disclosure of most of the chemicals used.

3. The role of CSG in meeting the future energy needs of NSW

As stated in the preamble CSG, since it is an unconventional fossil fuel, has no legitimate role in NSW's energy mix. If Australia continues to claim special privilege to pollute then this is the pathway to the end of a liveable planet. Both NEC and Tropo are committed to a policy of reducing fossil carbon emissions and we strongly reject to the use of unconventional fossil fuels including CSG. Please see the attached note by Jim Hansen on this topic.

Also noted in the preamble, on the scale of Australia's energy consumption rate and using Geoscience Australia's reserves figures, NSW CSG reserves amount to 1 months energy supply for Australia. The whole of eastern Australia's gas supply amounts to about 3 years energy supply for Australia. Apart from the fact that we should leave the gas sequestered for global warming reasons this small reserve does not solve any energy problems for the future nor warrant the accompanying environmental pollution and health problems. Only a fraction of the effort spent on CSG if diverted to solar thermal and wind turbines would however solve future energy problems. Particularly the solar thermal resource is enormous.

Relative whole-of-lifecycle emission intensity of CSG versus other energy sources

As noted in the preamble the whole of lifecycle emissions from CSG are between 20% above to double that of whole of lifecycle emissions from coal. See the Howarth and Ingraffea paper attached. In Australia CSG companies have plans to liquefy methane for export. According to Santos figures liquefaction can use as much as 68GJ/tonne LNG. If this is correct then lifecycle emissions from burning LNG are up to 4 times that of coal.

Recorded methane leaks are common in the Northern Rivers. 45% of gas wells tested by Qld EPA were leaking methane. Industry practices and infrastructure are similar here to that used in the USA where Howarth & Ingraffea collected their data so there is every reason to anticipate that lifecycle emissions here would be comparable to those in the USA.

If fossil fuels are used (as distinct from renewable energy) to make solar thermal systems then lifetime emissions are one 48th that of the fossil fuels used or for wind turbines the lifetime emissions are one 80th of the fossil fuels used in manufacture.

Non Energy Needs: chemical manufacture

Solar hydrogen, which can be produced via high temperature solar electrolysis of water with a 50% energy efficiency, can be used in place of coal seam methane for chemical manufacture.

The coal seam gas industry has been forced on the community in great haste with no time for rational thought or assessment of all the factors. So far the industry avoids acknowledging the global warming contribution from CSG and refuses to divulge all the chemicals used in CSG mining. Here in the Northern Rivers the CSG industry displays considerable ignorance of the natural environment. Please extend the moratorium on CSG until a proper scientific investigation of all the factors involved can be thoroughly carried out. And please allow time to do this satisfactorily.

Thankyou for conducting this enquiry,

Alan Roberts,
for Nimbin Environment Centre & Tweed Richmond Organic Producers' Organisation (Tropo)