

Inquiry into Unconventional Gas in Victoria

My name is Jasmine Beschorner and I live both in Melbourne (where I vote) and at Byaduk in Victoria's great south west. I have great concerns about the possible lifting of the moratorium on UCG (aka Fracking aka Coal Seam Gas) particularly in the south west of Victoria, where both petroleum companies and Origin have potential licenses. I believe Origin is heavily involved in UCG industry in Queensland. I would like to make a submission to the Victorian State government's Inquiry into unconventional gas.

I have previously written or emailed to the Honourable Premier, Daniel Andrews, together with 2014 Environment and Shadow Environment portfolios, my local Melbourne electorate candidates. If I got a response it was around the lines that while they did not personally support the idea of fracking / UCG, that they would rely on the science. I then of course, looked at the proposed 'science' in relation to the government's fracking/UCG guidelines, only to find that a mere 4 chemicals would be regarded as detrimental to water. If one looks at USA figures/science, there are actually hundreds of chemicals involved in fracking/UCG that can have a serious impact on water supplies.

I would like to make it clear that I do not support UCG drilling. I will therefore limit my comments to the terms of reference that seem most relevant to me. I have attended introductory community meetings in February 2014, and then done my own research. My research has greatly concerned me in the following areas, which I will discuss below.

I believe there is a compelling case to place an outright and permanent ban on all onshore unconventional gas drilling in Victoria.

This inquiry offers us our best chance to stop this industry before it gets established. Based on the experience in other parts of the world where the industry is more advanced, including here in Australia and in North America, I do not believe that this industry can co-exist safely with other land uses like farming, conservation, and tourism.

Victoria is a densely populated state which is heavily reliant on agriculture and associated food processing. Nature based tourism is also significant across much of the state where the UCG industry wants to get established. Gas drilling will industrialise the landscape, and impact on rural land dwellers and people in adjacent areas. It is likely to have significant public health impacts. UCG is a fossil fuel which will further entrench our current reliance on coal and gas as energy sources. It is energy intensive to produce, and will produce significant greenhouse gas emissions. The benefits associated with any royalties that are likely to be delivered as a result of drilling need to be carefully considered against possible negative economic impacts. The costs are likely to far outweigh any short term benefits.

And finally, I point out that this industry does not have social license to operate, as shown by the 60+ community declarations that have already happened across southern Victoria.

I urge you to recommend that Victoria ban all unconventional gas drilling permanently.

Comments on the terms of reference.

- (1) the prospectively of Victoria's geology for commercial sources of onshore unconventional gas;

It is clear that compared with black coal, Victoria's brown coal resource will be marginal in terms of the commercial viability of coal bed methane/ coal seam gas. A range of companies have been searching for commercial quantities of unconventional gas resources such as Tight Gas for several decades. Despite all this work, and despite regular announcements from some companies that commercialisation is imminent, there was no commercial production in Victoria prior to the moratorium being announced. Given this fact, that it is quite likely that the resource will prove to be only marginally viable in commercial terms. As a result, return to the state via royalties can be expected to be negligible, especially when considered against the possible negative impacts on agricultural production.

The areas of the state that are most likely to contain UCG resources are south of the Great Dividing Range. These areas, stretching from the South Australian border to Bairnsdale, includes much of our best grazing and dairy country, and a considerable portion of our fruit and vegetable production.

Why would we consider putting some of our best farmland at risk by allowing this industry to proceed for only minimal royalty returns to the state?

- (2) the environmental, land productivity and public health risks, risk mitigations and residual risks of onshore unconventional gas activities;

Responsible decision making where risk is involved and science is uncertain requires the application of the precautionary principle. It is clear that many problems with the industry may take years, and potentially decades, to be fully understood. It would be reckless to unleash this industry on our state with all the evidence that is emerging about contamination events associated with UCG drilling.

For example, in the USA, pre-testing of water / ground water was not conducted, and when farmers saw the impact post fracking on their water and had their water tested, their now chemical ridden water could not be submitted to their local EPA because pre-testing had not been undertaken.

So I would ask the Victorian State Government Inquiry a pertinent question: would you recommend that all water, ground water, channels, streams, waterways be pre-tested to determine current levels of contaminants, so that if any UCG was to occur (should God forbid, fracking/UCG ever took place) that the post contaminants could be determined. NO, I guess you would not.

Please see section (3) for our detailed comments on the environmental risks associated with unconventional gas activity.

- (3) the coexistence of onshore unconventional gas activities with existing land and water uses, including —

(a) agricultural production and domestic and export market requirements;

Please see below for our comments on likely impacts on agricultural production.

(b) the legal rights of property owners and the impact on property values; and

(c) any implications for local and regional development, investment and jobs;

UCG activity fundamentally industrialises landscapes. Gas drilling operations require access roads, drill pads and processing equipment, waste ponds and water treatment sites, flaring pits, and pipelines. It will profoundly change the rural nature of the areas where it is allowed to become established.

UCG drilling is proposed by the industry across large sections in the south of the state. These are the areas that receive the best rainfall and have lower average temperatures compared with the north of the state, and are the areas experiencing the most rapid population growth. The state government is encouraging people to move to regional centres, and natural population growth will continue to see regional centres grow, especially in the milder and coastal sections of the state.

There can be no doubt that these communities will, in general, object to industrialisation of rural landscapes that will happen as a result of gas drilling. There will be visual and noise pollution, plus increased heavy traffic use of local roads. It is likely there will be local short term distortion of the rental and property markets. There is no guarantee that any employment generated will significantly benefit local communities given it will rely on specialist skills. Given all these obvious impacts it is difficult to imagine that an UCG industry will not impact negatively on rural property value.

In terms of regional centres near to gasfields, there will be a mixed impact. The experience in places like Queensland is that a small number of businesses will do well, but long term residents will be impacted by a boom and bust cycle in both the property and rental markets. For towns with significant numbers of lower income families, there is a real risk that people will be displaced from the rental market.

(a) co-existence with agricultural production

A key issue relating to whether we should allow this industry to become established in our state is the question of its likely impacts on agricultural production and hence both domestic and export economies.

Agriculture is a cornerstone of Victoria's economy, producing goods valued at around \$9 billion a year. Victorian farmers do this with only around 3 per cent of Australia's arable land. Our output has been growing in recent years, from \$6.56 billion in 2007-08 to around \$9 billion in 2010/11.

With a 25% share of Australia's total food exports and a 28% share of Australia's total wool and fibre exports, Victoria is Australia's largest state food and fibre exporter 1.

The dairy industry in Gippsland is the highest value agribusiness industry in the region. In 2006 it produced 30% of Victoria's milk production and 20% of Australia's dairy production, making it one of Australia's leading dairy regions. By 2011, it was providing 23% of national milk production 2.

In terms of livestock grazing, Victoria plays a significant role in the overall pattern of export production. Victoria's beef cattle industry generally supplies smaller, younger animals for the domestic market and also higher quality stock for the Japanese market 3.

Apart from significant production of fruits and vegetables in the areas under exploration for various forms of UCG, organic production is of growing importance. According to the Organic Farmers Association of Australia (OFA), the organic industry is growing rapidly in Gippsland. "Organic dairy, horticulture and beef production are leading this development. An organic dairy co-operative based in West Gippsland processes approximately 80% of Australia's certified organic milk with products distributed throughout Australia and abroad. The only Victorian certified organic meat processor is situated in the region. Currently it supplies organic meat domestically and is in the process of building export capability" 4.

The southern half of the state has a strong, and growing, viticulture industry which produces a variety of generally cool climate wines.

It can be argued that the organic sector in particular will be very vulnerable to the perception of contamination that could come with new coal or CSG operations.

When the current exploration licenses for UCG are considered, it is clear that large sections of highly significant farmland is being considered for gas production.

There are a range of reasons why UCG cannot co-exist peacefully with farming:

Competition with farmers over water

Groundwater plays a vital role in sustaining agriculture in Victoria, and hence our economy and lifestyle. Mining coal and gas (and especially UCG) is a very water intensive process. With the prospect of an expanding mining sector, fossil fuels and agriculture can be expected to be in increasing conflict over limited water supplies in coming years.

It can be argued that when recharge rates are considered, many aquifers in Victoria are already over committed. Additionally, there are already substantial concerns about subsidence and over use of aquifers across Gippsland as a result of mining activity. One example comes from Yarram in South Gippsland, where according to former VFF regional president Rob Grant, a major aquifer has dropped a metre a year since offshore oil production began in the 1970s. As is noted in the Gippsland Water Atlas 5 (GWA), the offshore oil and gas industry withdraws a substantial volume of fluid (oil, gas and water) from the aquifer. This occurs outside the states jurisdiction and is not directly accounted for in state government water allocations, even though it is connected to the aquifer beneath Gippsland (GWA, p21). It is estimated that Esso currently extracts about 100,000 mega litres of seawater, oil and gas each year from oil and gas reservoirs via rigs located between 20 and 80 kilometres offshore 6.

As reported in the Gippsland Farmer (October 2012), water levels at 'irrigation bores had dropped 10 metres since the turn of the century' and are 'largely attributable to ongoing offshore oil and gas industry operations'. This has already cost farmers in affected areas because of the need to drill deeper to maintain water supplies. Efforts by Yarram farmer Bill Bodford resulted in a \$5 million compensation package to irrigators in the Yarram and Bairnsdale areas affected by falling water levels, to help them upgrade pumping equipment. Who will be responsible for farmers having to spend more to access groundwater should an UCG industry be allowed to become established?

It is likely that there will be localised economic competition for water between agricultural users and miners should gas production become commercialised. As noted in the GWA, 'in coal, oil and gas extraction industries where ground water is used for operational purposes, its value is enormous compared with other uses' (p27). Many farmers already struggle with high production costs and downward pressure on farm gate prices for their product. If miners, in effect, drive up water prices, this will impact on farmers who need to buy water allocations. With the probable localised nature of any UCG production, this could cause pockets of hardship for agricultural producers unlucky enough to have gas production in their immediate area, although impacts are likely to be felt over a much wider region over time because of the interconnected nature of key aquifers. While new water entitlements are difficult to obtain, existing entitlements may be traded where it is not used fully by the license holder. If miners are willing to pay good money for a farmers entitlement this could have negative impacts on farming output. Temporary transfers are fairly cheap. However if commercial production does occur, miners would need to organise a permanent transfer, which can be ten times more expensive (GWA, p27).

We really do not know how much mining and drilling the industry thinks it can get away with in Victoria. A number of the more aggressive companies now speak of 'localised' nodes of activity in places like Seaspray and inland from Port Campbell. A number of players in the UCG industry are quiet secretive in regards to what their long term intentions are. What we do know is that fossil fuel production in the state already consumes vast quantities of water, especially in Gippsland. If new coal and gas operations do become established, the conflict for water between agriculture and mining can be expected to be the first point where sharp battle lines will be drawn.

The question of how much water will be needed by industry will depend, of course, on how many drill operations are ultimately approved. A difficulty in assessing the likely impact of any approvals of UCG drilling is that there is a wide variety of opinions on just how much water is used. Something of considerable community concern is the process of hydraulic fracturing ('fracking') and apart from risks of chemical contamination, how much water is likely to be used with each frack operation. Additionally, there is the matter of how much water will be extracted from coal or other gas seams in the fracking process, and how this will affect the water table.

As industry often explains, the process of fracking involves pumping a mixture of water, sand and chemicals into coal seams or rock in order to release methane gas. The mix is often referred to as being '98%' water.

According to Tina Hunter, an Assistant Professor at Bond University, " the fracking of one CSG well can require as much as 5 million litres (ML) of water, although often only 2 - 3

million litres of water is used. In this process, a high-pressure mix of water, sand and chemicals is injected into the reservoir to release gas 7".

Ms Hunter explains that "the same amount of water will return to the surface. When the water comes to the surface after fracking, it will in all probability have an increased salt content (brine water) and contain chemicals that were used in the fracking process".

"This returned water, known as "produced water", requires some form of treatment or storage. It cannot be released back into the water cycle unless treated. If it is released untreated, it can cause major contamination of surface and ground water resources".

The Gippsland Water Atlas produced by Southern Rural Water says that CSG is likely to "use 100 ML per year of groundwater per well to release the gas from the coal"

Obviously this water, which is pumped from above ground as part of the frack is most likely to come from existing surface or ground water supplies, which will need to be allocated by a water authority.

Fracking will also bring water from the seams that are being drilled to the surface. The ABC has compiled likely water use from a variety of sources, and says:

"In September 2010, the Water Group provided a report to (federal) Environment Minister Tony Burke that highlighted the wildly different estimates of water extraction and the limited amount of information that had so far been published. In an appendix, the Water Group cited comments from Origin Energy senior engineer Robert Kane which had been published in Gas Today in 2009".

Mr Kane was reported as saying that bores would extract between 0.1 megalitres a day and 0.8 mega-litres a day. A mega-litre is one million litres. He was referring to operations in Queensland, where the resource being drilled is black coal. Brown coal, which is primarily found in Victoria, is a wetter coal, which has a higher water content, so the average amount of water brought to the surface may be higher than in Queensland. To give a comparison, according to Melbourne Water, an average person in Melbourne consumes 277 litres a day 8.

Mr Kane suggested a bore would have a production life of 15 years. It should be noted that these estimates are based on initial well flows extrapolated across the life of a bore, however flow rates fall significantly over time with repeated fracks.

Other forms of UCG also use substantial quantities of water in the drilling process. Shale and Tight Gas, which exist at deeper levels will need to be fracked, as confirmed by Lakes Oil in community consultations held in Victoria in early 2015 10. This means substantial volumes of water, even if fewer chemicals are used in the frack mix compared with CSG. The company said that wells may be in use for up to 20 years, although main flow of gas is expected in the first few years of operation.

The Australian gas industry provides a figure of 11 million litres per shale or tight gas frack, however, many other sources suggest higher levels of water use. One estimate of water use in shale gas frack operations was '20 ML per frack', with 'flow back rates of 10 to 70%' 11 Dr Damian Barrett from the CSIRO 12 says that shale gas drilling is likely to

use 7 to 15 ML of water per frack (and up to 25 ML). There could be several wells per pad, based on multiple horizontal drill lines, increasing the water consumption substantially.

Like the water that is pumped into the ground as part of the frack to carry the sand and chemicals, this water will be contaminated with salts, whatever chemicals are used in the frack, and potentially any chemicals found in the coal seam itself. In the case of tight and shale gas, other potential contaminants from the frack mix could include biocides, corrosion inhibitors and friction reducers.

Competition with other water users

It is also possible that any new mining operations will come into competition with urban use. For example, the GWA (p49) notes that areas such as Loch Sport may need to rely on groundwater in future. This area is being targeted for Tight Gas operations.

Lower aquifers are used to support farming and town supplies (including Bairnsdale, Leongatha and Yarram) and coal mine de-pressurisation and offshore oil and gas developments are already the major user of this resource (GWA, p51).

The potential for contamination of groundwater

Apart from the question of industry accessing large volumes of water, there is also the matter of quality of ground water. Based on the experience in Queensland, concerns about contamination of aquifers or surface water from mining operations can be expected to become significant once operations become established.

The initial fear about UCG in Victoria was focused on CSG. The known contamination incidents in NSW and QLD are well documented. In the past two years, there has been growing concern about other forms of UCG, especially tight and shale gas. Industry proponents have been active in attempting to convince the community and local governments that tight and shale gas is fundamentally different to CSG and that fewer chemicals are used in the frack process and there is no risk of contamination.

Where industry admits to contamination incidents, they are generally referred to 'legacy' problems, and the result of poorer management regimes in other countries or older and poorer drilling technology. The take home message from industry is that 'new' technology has made the process safe and that Australia has excellent regulatory regimes to safely manage the industry.

However, globally, there is growing evidence of contamination incidents associated with shale and tight gas drilling. For instance:

- researchers have traced low levels of methane and other contaminants to a source of shale gas in the sprawling Marcellus Formation, which lies beneath much of New York state, Pennsylvania, West Virginia and Ohio. 13
- Pennsylvania's Department of Environmental Protection has catalogued 243 cases of contamination of private drinking wells from oil and gas drilling operations. In some cases, one drilling operation contaminated the water of multiple wells, with

water issues resulting from methane gas contamination, wastewater spills, and wells that simply went dry or undrinkable. 14

- add more incidents

There is also a fear of geo contamination – dangerous materials being brought to the surface in recovered water as a result of shale and gas fracking. These contaminants include heavy metals, naturally occurring radioactive materials (NORMs - including Radium, Thorium and Uranium), volatile and semi volatile organic compounds (VOC's) and high concentrations of salts.

The Otway Basin west of Melbourne is a key location for shale gas potential. There are risks specific to the local geology. The Otway Basin is considered “structurally complex, which may increase the potential for fluid flow between gas shales and other units including aquifers”. 15

The Otway Basin already has multiple users, ranging from conventional oil and gas, carbon capture and storage, groundwater (unconfined and confined), hot sedimentary aquifer (geothermal), and domestic water supply, which will make management of any UCG drilling complex when compared with less densely populated regions like the Cooper Basin.

The Gippsland Water Atlas shows that aquifers that run from East Gippsland to the Latrobe Valley, almost 150 km away, are connected. Therefore any contamination from drilling or over allocation for mining can be expected to impact far beyond the local area. Obviously, once any form of chemical contamination occurs, it will be difficult, if not impossible to contain. The GWA notes that rates of decline of bore levels over large distances, for instance between Yarram and Bairnsdale are ‘remarkably similar’ (p57), highlighting the likelihood that impact at any point in the aquifer may impact a broad area.

These aquifers lie under the Macalister Irrigation District (MID), the state’s second largest irrigation zone, on the northern end of the Gippsland Plains, where Lakes Oil subsidiary Commonwealth is currently looking for brown coal. The MID has the highest concentration of ground water entitlements in Gippsland (GWA, p22). At present the aquifers are considered to be ‘low salinity, high yielding alluvial aquifers’ (p34).

Well failure through blowouts, annular leakage (along the well) or radial leakage (perpendicular to well) is the primary cause of groundwater contamination from unconventional gas production.

An additional concern expressed by some rural communities is that groundwater could be contaminated by drilling lines intersecting with older, unmapped drill holes from previous agricultural activity. As noted by people like Kieran Kennedy, the former mayor of South Gippsland, there are many old and undocumented drill lines into aquifers which could potentially be breached by new drilling operations for mining.

Despite regular assurances from industry, experience in the real world shows that contamination has, and does, occur. For instance, the National Toxics Network 16 reports that “methane can contaminate bores and water wells near gas wells. An analysis of 60 water wells near active gas wells in the US found most were contaminated with methane

at levels well above US federal safety guidelines for methane. The majority of water wells situated one kilometre or less from a gas well, contained water contaminated with 19 to 64 parts per million (ppm) of methane. Wells more than a kilometre from active gas had only a few parts per million of methane in their water”.

There has been substantial concern in the community about the possibility of contamination from BTEX chemicals (the chemicals benzene, toluene, ethylbenzene and xylene).

These compounds occur naturally in crude oil and can be found in sea water in the vicinity of natural gas and petroleum deposits. Benzene is a known carcinogen. According to the National Toxics Network¹⁷, “the fracking process itself can release BTEX from the natural-gas reservoirs, which may allow them to disperse into the groundwater aquifers or to volatilise into air. People may be exposed to BTEX chemicals by drinking.”

The use of BTEX chemicals is currently banned in Victoria. Even where no dangerous chemicals are used in gas operations, there is the fear that accessing and fracturing coal seams will release potentially dangerous materials (including those in the BTEX group) which are currently safely trapped deep under ground. These could be brought to the surface in the recovered water.

Doctors for the Environment point out that a range of other hazardous chemicals are reported to be used in Australian fracking operations for CSG including 2-butoxyethanol and ethylene glycol.

Research compiled by Doctors for the Environment¹⁸ found that 2-butoxyethanol is easily absorbed and rapidly distributed in the human body and is particularly toxic to red blood cells, carrying the risk of haemolysis, and damage to spleen, liver and bone marrow. Ethylene glycol is used to make anti-freeze and when ethylene glycol breaks down in the body it can affect kidney function as well as the nervous system, lungs and heart¹⁹.

Increased seismic activity

There are a number of geological risk factors which may affect future shale gas development in Australia. Induced seismicity from fracture propagation has been identified as a key risk by industry sources²⁰. To give one example: in the US, the Eola Field, Garvin County in South-Central Oklahoma, more than 50 earthquakes were detected on January 18, 2011, with 43 large enough to locate the epicentres. These earthquakes were associated with an active fracking project being conducted in a nearby well. Studies and investigations have subsequently showed that there was a clear correlation between injection and seismicity.

Climate change

Any discussion about energy policy needs to consider the implications of climate change. In the case of UCG, which requires access to land in a way that is likely to adversely impact on local farming activity, there is an additional consideration when it comes to climate change. UCG can be seen as one more land use, like urban sprawl, that results in changes to farming activity. There is slow but steady loss of farmland to urban

development in key areas around the state. Yet climate science tells us that south eastern Australia will be affected by climate change in a way that will reduce food production. This makes our farmland even more important and in need of protection from continued urban sprawl and invasive activities like coal and gas mining. It should also be remembered that even though climate change is a significant factor that will influence future food production although, as yet, the exact impacts are not fully understood. According to the DPI 21, the general threats to agriculture from climate change across southern Australia include:

- a decline in productivity due to increased drought and bush fires
- some crop yields benefiting from warmer conditions and higher carbon dioxide levels, but increased vulnerability to reduced rainfall
- greater exposure of stock and crops to heat-related stress and disease
- earlier ripening and reduced grape quality
- less winter chilling for fruit and nuts
- southern migration of some pests
- potential increase in the distribution and abundance of some exotic weeds

The DPI says potential changes in climate may reduce productivity and output of Victoria's agricultural industries in the medium to long term. It is essential that we do not put one of the country's main food producing areas at risk from UCG drilling without fully understanding the possible long term impacts on groundwater and agricultural land.

Based on the experience of farmers in Queensland where the coal seam gas (CSG) industry has already become entrenched and its problems are well documented, we do not accept the premise put forward by the industry that UCG operations can peacefully co-exist with farming. While any potential onshore gas industry is unlikely to be of a scale of what is already found in sections of Queensland, we can expect that any impacts will be felt keenly given the relatively higher population density and smaller size of the average farm here in Victoria.

- (4) the ability of potential onshore unconventional gas resources contributing to the State's overall energy sources including —
- (a) an ability to provide a competitive source of energy and non energy inputs for Victorian industries;
 - (b) an affordable energy source for domestic consumers; and
 - (c) carbon dioxide emissions from these sources;

Victoria has a good supply of conventional gas from offshore sources. 30 years?

Victorians currently use a lot of gas. Natural gas accounts for 19% of all energy used in Victoria and our consumption is expected to increase. Victoria has the largest residential gas demand of any Australian state, which is a result of various factors, including our relatively cooler climate, and the poor energy rating of much of our existing housing stock. Around 40% of our energy use occurs in industrial activity. 22

Any energy policy based on mainstream science must, as a basic principle, rule out any new development of fossil fuels. In terms of our future energy supply mix, we must remember that UCG is a fossil fuel. The widespread burning of fossil fuels are the main single cause of human induced global warming. The only way to stop, or at least minimise, the impacts of climate change is to stop burning fossil fuels, not dig up more. To have even a 75% chance of meeting the 2°C warming limit, at least 77% of the world's known fossil fuel reserves (coal, oil and gas) cannot be burned. 23. 2°C of overall warming is generally seen as being the absolute upper limit that is allowable if we are to avoid 'catastrophic' climate change.

A responsible energy policy for Victoria would rule out any further coal, gas, or oil development.

By definition, unconventional gases which are trapped in coal or rock seams are harder to extract than conventional gas. This means that more energy needs to be invested in producing the gas compared with conventional gas. This is because most UCG will require fracking in order to release the gas trapped in rock or coal seams for it to flow to the surface. The Energy Return on Investment (EROI) for UCG is typically much greater than for LNG. Given the rising cost of diesel (required in the fracking process) it is difficult to see how UCG could compete with existing conventional gas supplies.

Therefore, it is difficult to see new production of UCG as being a panacea for rising energy prices. We need to use the existing offshore gas supply as a transition fuel, to give us 'breathing space' as we rapidly move to energy sources not based on fossil fuels.

Because of federal government plans to facilitate the massive production and export of liquid natural gas from ports in the north of Australia, Victorian gas consumers will increasingly be competing in a global market for their energy. Any government policy that seeks to protect energy consumers from continual price increases must look beyond fossil fuels.

- (5) the resource knowledge requirements and policy and regulatory safeguards that would be necessary to enable exploration and development of onshore unconventional gas resources, including —
 - (a) further scientific work to inform the effective regulation of an onshore unconventional gas industry, including the role of industry and government, particularly in relation to rigorous monitoring and enforcement, and the effectiveness of impact mitigation responses; and
 - (b) performance standards for managing environmental and health risks, including water quality, air quality, chemical use, waste disposal, land contamination and geotechnical stability;

From the negative examples of UCG drilling elsewhere in Australia and around the world, I believe the best way to regulate this industry is to ban it. This is the simplest policy response. Many other jurisdictions have chosen to place an outright ban on UCG and/or the process of fracking. Some examples include:

Outright Fracking Bans

USA

New York – December 2014 – this was implemented on the basis of health risks after expert investigation and the publication of a New York State Department of Health Report. http://www.nytimes.com/2014/12/18/nyregion/cuomo-to-ban-fracking-in-new-york-state-citing-health-risks.html?_r=0

https://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf

San Benito County, California – April 2014

http://www.mercurynews.com/science/ci_26866639/san-benito-countys-measure-j-voters-backing-anti

Mendocino County, California – 4th November 2014 – this ban on fracking was implemented as part of a community Bill of Rights to “natural and chemical free communities and ecosystems, a clean environment, and self-government by the people, without manipulation and overwhelming influence from corporations.”

It imposes considerable penalties for breaches.

http://ballotpedia.org/Mendocino_County_Community_Bill_of_Rights_Fracking_and_Water_Use_Initiative,_Measure_S_%28November_2014%29

Santa Cruz County, California – May 2014 -

<http://www.reuters.com/article/2014/05/21/california-fracking-idUSL1N00700J20140521>

Highland Park, New Jersey - Sep 17, 2013 – An ordinance to ban fracking was passed by Highland Park Borough Council.

http://www.nj.com/middlesex/index.ssf/2013/09/highland_park_becomes_first_town_in_nj_to_ban_fracking.html

Secaucus, New Jersey – 26th June, 2012 - The mayor and Town Council banned fracking and fracking waste water “in a resolution that states that the drilling process causes environmental hazards.”

http://hudsonreporter.com/view/full_story/19312259/article-Secaucus-bans-%E2%80%98fracking%E2%80%99-Local-officials-also-call-for-statewide-and-national-ban-?instance=secondary_stories_left_column

Denton, Texas, – 4th November 2014 - by citizen ballot – permanently prohibits fracking within the city limits.

<http://www.dallasnews.com/news/politics/headlines/20141105-denton-fracking-ban-passed-in-landslide1.ece>

Hawaii – October 2013 - unanimous County council bill banned hydraulic fracturing. <http://hawaiitribune-herald.com/sections/news/local-news/council-oks-ban-fracking.html>

Vermont – 17th May 2012 – Vermont was the first US state to ban fracking. The Governor stated that protection of drinking water is more important than increased access to natural gas. http://www.huffingtonpost.com/2012/05/17/vermont-fracking-ban-first_n_1522098.html

UK

Wales - from February 2015 – “effectively making it impossible for shale gas developments to receive planning permits in Wales.”
<https://uk.finance.yahoo.com/news/wales-votes-against-shale-gas-190742367.html>

Northern Ireland – July 2014 – the environment minister promised that there will be no fracking in Northern Ireland unless it can be proved “safe beyond doubt”.
<http://www.belfasttelegraph.co.uk/business/news/fracking-drilling-will-not-be-allowed-in-northern-ireland-unless-its-proven-safe-warns-environment-minister-mark-h-durkan-30469238.html>

Europe

France -30th June 2011 - Ban on hydraulic fracturing was voted in by parliament. The International Energy Agency claims that France has more plentiful reserves of shale gas than most of Europe, but France’s Constitutional council threw out a 2013 challenge to the law by US based Schuepbach Energy <http://www.dw.de/french-court-rejects-challenge-to-anti-fracking-legislation/a-17151744>

Current President François Hollande has promised the ban will be maintained for his five-year term. <http://www.bbc.com/news/business-23311963>

Luxembourg – 13th November 2012 – the Luxembourg parliament voted against a motion to extract underground shale gas based on environmental concerns.
<http://www.wort.lu/en/luxembourg/no-fracking-of-shale-gas-in-luxembourg-50a37ff8e4b0e83edf95f923>

Bulgaria – 18th January 2012 - Bulgaria banned exploratory drilling for shale gas. On 14th June 2012 Bulgaria imposed an absolute ban on fracking and revoked Chevron’s shale gas permit.
<http://www.theguardian.com/world/2012/feb/14/bulgaria-bans-shale-gas-exploration>

Spain – 30th January, 2014 – fracking was banned in Catalonia as part of the urban planning law.
http://ccaa.elpais.com/ccaa/2014/02/01/catalunya/1391210321_238105.html

– fracking was also banned in Cantabria, followed by La Rioja and Navarra later that year.

http://sociedad.elpais.com/sociedad/2013/04/08/actualidad/1365443283_986703.html

“The Rioja Government has implemented the principles of preventive action and caution advocating the European Union (EU) on environmental protection.”

<http://www.larioja.com/20130531/local/region/gobierno-rioja-prohibe-usar-201305311150.html>

Navarra – banned hydraulic fracturing for exploration and extraction “under the provisions of the Regional Law of Urban Planning and Land Regime of Navarre.”

http://www.diariodenavarra.es/noticias/navarra/mas_navarra/2013/10/10/el_parlamento_prohibe_quot_fracking_quot_navarra_pese_upn_ppn_132959_2061.html

Canton of Fribourg, Switzerland – April 2011. Decision not to renew exploration licence of Schuepbach Energy, and all other licences suspended “for an undetermined period.” <http://coalseamgasnews.org/news/world/switzerland-joins-worldwide-ban-on-gas-fracking/>

Austria – March 2014 - a fracking ban was enshrined in the Vorarlberg State Constitution. <http://www.vol.at/fracking-verbot-wird-in-vorarlberger-landesverfassung-verankert/3907751>

Italy – September 2014 – a ban introduced as part of the Law of Stability 2014 in order to protect groundwater and soil and promote “efficient use of national water resources.” <http://www.ilfattoquotidiano.it/2014/09/04/fracking-commissione-ambiente-da-vietare-il-ministero-mai-autorizzato/1110626/>

New Zealand

Christchurch/Aotearoa– April 2012 – A unanimous vote by Christchurch City Council to declare the city a frack free zone, citing impact on the local environment, water supply and earthquakes.

<http://archived.ccc.govt.nz/council/proceedings/2012/april/cnclcover12th/ConfirmedMinutesCouncil12April2012.pdf>

Kaikoura – April, 2012 - The Kaikoura District Council declared itself a frack-free zone.

If the committee does not feel it can recommend an outright permanent ban on UCG, it could look to the example of New Brunswick in Canada. Shale gas was a major issue in the New Brunswick election of September 2014. Many commentators [stated](#) that the election a referendum on shale gas extraction.

As a result of the election, the New Brunswick parliament, on 18th December, 2014 introduced Bill 9, which placed a moratorium on the process of fracking. The moratorium will not be lifted unless the following five conditions are met:

1/ The industry gains a social license to operate.

This will be sought through extensive consultation and engagement exercises with New Brunswickers in order to identify whether the industry has been able to achieve social acceptance.

2/ Clear and credible information about the industry.

This will permit the government to compile clear and credible information about the impacts of hydraulic fracturing on public health, the environment and water in order to better inform a decision to allow the industry to proceed. This will allow the province to “develop a country leading regulatory regime with sufficient enforcement capabilities”.

3/ An infrastructure Plan;

“This analysis and planning will enable us to mitigate potential impacts on our public assets and address other related issues such as the disposal of waste water.”

4/ Proper consultations with First Nations;

“This exercise would have to ensure that we are fulfilling the crown’s obligations under the duty to consult”.

5/ Maximized benefits

There would need to be clear benefits for the people of New Brunswick for the industry be allowed to proceed.

Does this moratorium make a distinction between hydraulic fracturing with propane and water?

Although there are some differences between hydraulic fracturing with propane and hydraulic fracturing with water, the moratorium applies to hydraulic fracturing by any means.”

http://www2.gnb.ca/content/gnb/en/news/news_release.2014.12.1404.html

Bill 9 can be found here - <http://www.gnb.ca/legis/bill/FILE/58/1/Bill-9-e.htm>

- (6) relevant domestic and international reviews and inquiries covering the management of risks for similar industries including, but not limited to, the Victorian Auditor-General Office’s report Unconventional Gas: Managing Risks and Impacts (contingent upon this report being presented to Parliament) and other reports generated by the Victorian community and stakeholder engagement programs.

Please see section 5 above.