

Keir Delaney
Secretary
Environment & Planning Committee Parliament House
Spring Street, Melbourne VIC 3002

RE: Submission to Environment and Planning Parliamentary Committee Inquiry into Unconventional Gas

Thank you for the opportunity make a submission to the inquiry into unconventional gas. I live in Toolamba, in northern Victoria. Toolamba is located within the Goulburn Murray Irrigation District – the Foodbowl of Victoria.

I wish to address the following terms of reference:

- the environmental, land productivity and public health risks, risk mitigations and residual risks of onshore unconventional gas activities;
- the coexistence of onshore unconventional gas activities with existing land and water uses, including —
 - (a) agricultural production and domestic and export market requirements;
- 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;

I address them within the headings below.

Concerns within the area of my community

I am not aware of any unconventional gas resources within the area of my community.

Subsidence

One of the primary competitive advantages of the area in which I live is that irrigation water delivery to the farm, and then on farm to the paddock, is by gravity. The lack of energy use through the delivery process helps keep production costs down in an otherwise high cost environment. Unconventional gas exploitation presents a risk of land subsidence. Even minor levels of subsidence presents a significant risk to public and private irrigation assets by changing the ability to move water across the landscape.

Groundwater

Both shallow and deep lead groundwater resources exist within my community area.

The shallow aquifer is considered both a resource and, at times when the watertable is high, a salinity threat. There are hundreds of shallow irrigation bores within our area that enable farmers to utilise the shallow aquifer resource. There are also many smaller bores used for stock and domestic water needs. Public groundwater pumps extract shallow groundwater to protect agricultural assets from salinisation and discharge this groundwater to irrigation channels or to drains, which then discharge to rivers.

The deep lead resources are heavily utilised for irrigation use and are managed via allocation systems.

I am concerned by the potential impacts of unconventional gas extraction on water quality. Substantial evidence already exists about the threat unconventional gas extraction. Probabilistic analysis of the Marcellus Shale found that even in the best case scenario, the development of an individual unconventional gas well would release 200 m³ of contaminants (Rozell & Reaven, 2012). There's also a well-known failure mode for unconventional gas bores – the casing seal. Failure of the casing seal allows gas to migrate into shallow aquifers (Vidic, et al., 2013). Vidic *et al.* (2013) found that up to 3% of well casing seals fail. On the typical scale of production in a well field, well casing seal failure is basically a certainty. Therefore the focus of a decision on unconventional gas in this should be on whether polluted aquifers is an acceptable trade-off for supply of gas. I contend that it is not.

There is also significant risk with the transportation and storage of hydraulic fracturing fluids, particularly in an agricultural landscape. Release of toxic fracturing fluids and contaminated water presents a commercial risk to entire communities. What to do with the contaminated water is an emerging problem in U.S unconventional gas fields where the opportunities for reuse or storage of the water has diminished (Vidic, et al., 2013). The urban economies of my community are dependent on the prosperity of agriculture, and the agriculture in our area depends on its water supply and its reputation for being clean and green.

I am also concerned by unconventional gas extraction impacts on water availability.

Human health

Risk-based analysis indicates an increased health risk for residents living within close proximity to unconventional gas wells (McKenzie, et al., 2012). That study recommended further study on those identified risks. Other studies also suggest significant human health risks associated with unconventional gas development, particularly with ambient releases of chemicals known to cause an increased risk of morbidity and mortality (Shonkoff, et al., 2014). Shonkoff *et al.* (2014) also noted that water contamination can occur via multiple pathways, and impact human health through that mechanism.

It is widely accepted in the current scientific literature that although there are indications of increased health risks associated with unconventional gas development, there are many uncertainties at present (Adgate, et al., 2014). I argue that with such large potential to cause human health impacts, and no obvious identified impact minimisation measures identified to date (particularly in light of the irreversible alterations to aquifers and the persistent threat posed by contaminated groundwater), that these health risks cannot be considered manageable until that is demonstrably the case.

Trade

Australia has an enviable reputation as an exporter of healthy, clean and green food products. This helps market Australian produce as 'high-end', giving us an ability to sell products into markets at

prices that a lower rated product would not be profitable. Unconventional gas development may undermine this through contamination of soils and air and thus the agricultural productions systems.

Concerns within the catchment area

Water quality of supply

The catchment supplying water to the area in which I live is the Goulburn River. The Goulburn River is the most significant river in Victoria's north, supplying water for irrigation and the environment across a vast area. It supports an agricultural industry that is vital to food security within Victoria and the country. It also supports thousands of jobs. If the Goulburn River is contaminated, it will have significant economic impacts, health impacts, and/or both. It may also impact upon the plants, animals, and ecosystems that depend on the Goulburn River.

Vegetation loss

Where unconventional gas fields have been developed in Queensland, vast amounts of native vegetation has been lost to develop roads to access wells, and to install pipelines. Loss of significant areas of native vegetation is inconsistent with State policy and will further threaten listed species and communities.

Concerns at a global scale

Global warming

Human-induced climate change is a well-established scientific fact that has a known cause and the extent of this impact is well understood, with that understanding being further refined all the time. It is known that if the earth is to avoid dangerous climate change (assumed to be under 2°C by the end of the century) we need to very rapidly decarbonise the economy. The failure to do so will result in significant strains on human health, infrastructure, the environment and the economy. In fact, the United Nations has clearly stated that fossil fuels must stay in the ground if we are to prevent the worst impacts of a warming climate. With this in mind, it simply does not make sense to open fossil fuel resources to exploitation. Any temporary financial benefit will be more than outweighed by the irreversible impacts to our community caused by climate change. The role of natural gas within our economy must obviously shrink over the next few decades. This means that households will new heating, water heating and cooking infrastructure that is not based on gas, unless biogas generation is cost effective. Government should play a role in this.

Governance factors

It should not be assumed that with appropriate governance, regulation and management that risks and can be mitigated, minimised or, in the event of failures, ameliorated. Recent evidence on rehabilitation of mines and even basic emergency planning process (in the case of the Morwell fire) demonstrate that regulation, governance and risk management will be enough.

Conclusion

I support a permanent ban on unconventional gas development in Victoria. It is not the energy source we need in a rapid decarbonisation of our economy. It is a technology that poses significant risks to the environment, agriculture and human health. For those reasons it should play no part in our future.

Yours sincerely,

Chris Solum

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