Submission on the Mineral Resources (Galilee Basin) Amendment Bill 2018

Submission to: The State Development, Natural Resources, and Agricultural Industry Development Committee
Email: sdnraidc@parliament.qld.gov.au

Submission from: Climate Council of Australia
Address: Pty Ltd PO Box 1267, Potts Point 2011
Telephone: [redacted]
Email: [redacted]

18 February 2018

Table of Contents

About the Climate Council

The Climate Council is an independent non-profit organisation that provides authoritative, expert advice to the Australian public on climate change. To find out more about the Climate Council's work, visit: www.climatecouncil.org.au. We would be happy to provide a briefing or further information on the information presented within this submission.

Executive Summary

Please accept this submission on the Mineral Resources (Galilee Basin) Amendment Bill 2018. The Climate Council supports the Bill, for the following reasons:

- Climate change poses real and serious risks for the wellbeing of humans, ecosystems and societies, both in Australia and globally. The risks of climate change rise rapidly and non-linearly in line with the increase in the global average surface temperature. Australia is one of the most vulnerable developed countries to climate change.
- Governments around the world signed and ratified the Paris Accord in 2015, in recognition of the fact that the risks of unmitigated climate change are too high to accept, and that there is a need to limit temperature rise to 1.5 -2°C. Australia signed and ratified the Paris Accord, and Queensland also supports the Accord.
- The carbon budget approach - a robust method of determining the amount and rate of emissions reductions required to meet the goals of the Paris Accord, clearly shows that to meet even a 2°C budget, a rapid phase-out of all fossil fuels is required by around 2040 or 2050 at the latest.
- This means that the majority of fossil fuels must remain in the ground unburned, and that no fossil fuel developments or mine extensions should be permitted.

This submission first outlines the impacts and risks of climate change for Australia and Queensland, and uses the carbon budget approach to outline how exploitation of the coal reserves in the Galilee Basin would be incompatible with meeting the goals of the Paris Accord.

Climate change risks and impacts

The world is warming rapidly as a result of increasing greenhouse gas pollution, primarily from the burning of fossil fuels such as coal, oil and gas. Greenhouse gas pollution in the atmosphere has risen steadily since around 1750. The mean carbon dioxide (CO_2) level during 2017 was 405 parts per million in the atmosphere - a 46 percent increase from the levels in 1750 (278 ppm) (CSIRO and BoM 2018). The increase in greenhouse gas pollution has led to more heat being trapped in the lower atmosphere, raising the global average temperature by around 1°C compared to preindustrial levels (CSIRO and BoM 2018).

The past four years have been the four hottest years on record for global surface temperature. This is part of a long-term upswing in global average temperature that began most clearly in the mid-20th century and has persisted since then. Globally, the 20 hottest years on record have been in the past 22 years. In Australia, the surface air temperature for 2018 was 1.14 °C above

the 1961-1990 average, making 2018 the third hottest year on record. For Australia, nine of the 10 hottest years on record have occurred since 2005 (CSIRO and BoM 2018).

The rate of warming is alarming. Since 1970 global average surface temperature has been rising at a rate of 1.7°C per century, compared to a 7,000-year background rate of change of about 0.01°C per century (NOAA 2016; Marcott et al. 2013).

The rise in global average temperature has influenced wide-ranging changes in circulation patterns in the atmosphere and oceans. Increasing energy in the lower atmosphere has also influenced the frequency and/or severity of extreme weather.

Impacts of climate change on Queensland

Heatwaves and marine heatwaves

Climate change has increased the incidence of extreme heat, making heatwaves longer and more frequent. Climate change has also increased the frequency and severity of marine heatwaves. In 2016 and 2017 marine heatwaves on the Great Barrier Reef led to unprecedented, back-to-back mass bleaching events that ultimately led to the mortality of around one third of the corals on the Great Barrier Reef. Climate change is widely recognised to be the single biggest threat to the Great Barrier Reef. As noted by the IPCC 1.5 report, coral reefs are projected to decline by a further 70–90% even if the global average temperature is limited at 1.5°C with larger losses (>99%) at 2°C. The risk of irreversible loss of many marine and coastal ecosystems increases with global warming, especially at 2°C or more (IPCC 2018).

The Great Barrier Reef is the largest living structure on Earth. It spans 2,300 kilometers and provides habitat for hundreds of thousands of marine and coral species. Although the Great Barrier Reef is arguably priceless, there are some quantifiable aspects of its value. It supports 64,000 jobs (39,000 of which are direct jobs) and contributes $6.4 billion to the Australian economy. Within Queensland alone, the Great Barrier Reef generates revenue of $3.9 billion and provides 33,000 jobs (Deloitte 2017).

Bushfires

An increase in extreme fire weather and longer fire seasons have been observed over recent decades across much of Australia including Queensland, particularly along the east coast. Bushfire risk is increased by fuel dryness and hot, dry, windy conditions. Weekly bushfire frequencies in Australia have increased by 40% between 2008 and 2013, with tropical and subtropical Queensland the most severely affected (Dutta et al. 2016).

Tropical and sub-tropical Queensland is often associated in people's minds with warm, humid conditions and moist vegetation not conducive to major bushfires. This is changing. More

frequent heatwave events typified by hot, dry air masses coming from the interior result in higher temperatures accompanied by lower humidity. This increases evaporation and rapidly dries out fuels, even in rainforests, making conditions more conducive to major bushfires. Major bushfires were burning as far north as Cairns in August and September 2018. In November, Queensland also experienced widespread heatwaves. Strong, gusting winds, low humidity and record high temperatures fanned devastating bushfires that affected property, infrastructure, ecosystems and farming land. The bushfires also penetrated rainforests. Climate change is driving a higher incidence of these conditions. On November 29 several areas of Queensland experienced “catastrophic” fire weather conditions for the first time ever recorded. In these conditions, fires are uncontrollable and loss of life and property is expected unless large-scale evacuations take place.

Bushfires in Queensland over the years have caused numerous deaths and losses of property and infrastructure, and have negatively affected agricultural and forestry production, and ecosystems. Inhalation of smoke and gases from bushfires can affect human health, especially in the elderly, young or those with heart or respiratory conditions. Increasing severity, intensity and frequency of fires, coupled with increasing length of bushfire seasons throughout Australia, is straining Queensland’s existing resources and capacity for fighting and managing fires. Overlapping fire seasons will increasingly restrict the ability of states and territories, and of other countries such as the USA, Canada and New Zealand, to send firefighting assistance. This will drive increased costs for state and territory governments, or alternatively, increased losses.

Intense rainfall and flooding

As the climate warms, heavy rainfall is expected to become more intense, based on the physical relationship between temperature and the water-holding capacity of the atmosphere. For heavy rain days, total rainfall is expected to increase by around 7 per cent per degree of warming. Although the range of natural variability in heavy rainfall is very large, there is evidence from observed weather station records that a higher proportion of total annual rainfall in recent decades has come from heavy rain days. For short duration, hourly, extreme rainfall events, observations in Australia generally show a larger than 7 per cent increase. Historical estimates for annual exceedance probabilities are likely to underestimate the probability of such rainfall in the future because climate change increases the likelihood of heavy rainfall events in most locations (BoM 2019). Climate change is expected to increase the occurrence of flooding events such as the recent event in Townsville.

Sea level rise

Climate change has already led to a rise in global mean sea levels of around 20 cm since the late 1800s. Sea levels are projected to rise at an increasing rate during this. The Queensland Government has adopted climate modelling indicating a projected sea level rise of 0.8 meters by the year 2100, based on modelling from the IPCC (2014). Higher sea levels contribute to an increase in storm-tide damages. The distribution of storm-tide damages in Australia is very

uneven, with over 80% of damages expected to occur in Queensland. The most highly affected area, the Gold Coast, alone accounts for almost a quarter of projected national damages (Wang et al. 2016). At present, an estimated 227,000 people in southeast Queensland are at risk of inundation from a 1-in-100-year storm tide. The effects of climate change alone on sea level rise could see this number increase to about 245,000 people by 2030 and 273,000 people by 2070 (Wang et al. 2010).

The carbon budget approach

The carbon budget approach is a methodologically rigorous approach for estimating the level of greenhouse gas emissions reductions needed to achieve a given temperature target. The approach is based on the approximately linear relationship between the amount of carbon dioxide (CO_2) emitted since industrialisation, and the increase in the global average temperature. The factors that influence the size of the carbon budget are the probability of reaching a particular target, whether or not other greenhouse gas emissions are included, and whether or not feedbacks in the climate system are included.

The IPCC estimates that for a greater than 66% probability of limiting global average temperature rise to no more than 2°C, cumulative human emissions since 1870 must be less than 1,000 Gt C (emitted as CO_2) (IPCC 2013). From 1870 through 2018 cumulative human emissions have been about 585 Gt C (Collins et al. 2013; Le Quéré C et al.2018). This leaves a remaining budget of 415 Gt C. Going forward, if non-CO_2 greenhouse gases are not reduced at the same rate as CO_2 emissions, the carbon budget must be further reduced by a further 210 Gt C. The remaining budget then becomes 205 Gt C.

At the current rate of CO_2 emissions - around 10 Gt C per year (Le Quéré et al. 2018) - the carbon budget would be consumed in 20.5 years - by around 2040. The carbon budget (205 Gt C) has implications for the emissions reduction trajectory over the next decades. It is critically important that the peaking global emissions occurs as soon as possible. Given that emissions rose in 2018 and are likely to rise again in 2019, 2020 is probably the earliest peaking date for emissions. Delaying the peak just five further years would create a subsequent emission reduction trajectory that would be impossible to follow economically or technologically (Figueres et al. 2017). For any trajectory, the cumulative emissions must be no more than around 205 Gt C before reaching net zero.

It is very clear by looking at the carbon budget that the combustion of fossil fuels - coal, oil and gas - must be phased out rapidly. In addition, existing reserves of fossil fuels that have not yet been exploited must remain in the ground. The exploitation and burning of fossil fuels leads to an increase in CO_2 emissions, when what is needed is a deep and rapid decrease in CO_2 emissions. To meet the Paris climate target, existing fossil fuels need to be phased out. It is obvious that no new fossil fuel developments should be allowed.

Conclusion

To effectively tackle climate change, fossil fuels, like coal, oil and gas, must be phased out and there can be no new fossil fuel projects, such as Adani's Carmichael mine. The window of opportunity to tackle climate change effectively is rapidly closing but the solutions are at our disposal. We need to accelerate the transition to renewables and storage technologies, and non-polluting transport, industry, and food production. Critically, we cannot afford to open any new fossil fuel developments.

References

BoM (Bureau of Meteorology) (2019) - Special Climate Statement 69 - An extended period of heavy rainfall and flooding in tropical Queensland. Accessed at: http://www.bom.gov.au/climate/current/statements/scs69.pdf

CSIRO and BoM (2018) State of the Climate 2018. Accessed at: http://www.bom.gov.au/state-of-the-climate/State-of-the-Climate-2018.pdf

Collins M et al. (2013) Long-term climate change: Projections, commitments and irreversibility, in Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, edited by Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M. Allen, S.K., Boschung, J. Nauels, A., Xia, Y., Bex, V. and Midgley, P.M., Cambridge and New York, Cambridge University Press, pp. 1029-1136.

Deloitte Access Economics (2017) At what price? The economic, social and icon value of the Great Barrier Reef. Accessed at: https://www2.deloitte.com/au/en/pages/economics/articles/great-barrier-reef.html.

Dutta R, Das A and Aryal J (2016) Big data integration shows Australian bush-fire frequency is increasing significantly, Royal Society Open Science, doi: 10.1098/ rsos.150241.

Figueres C et al (2017) Three years to safeguard our climate, *Nature*, 546: 593.

IPCC (2014) Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

IPCC (2018) Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. P.rtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. P.an, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Le Quéré C et al. (2018) Global Carbon Budget 2017, Earth System Science Data Discussions, https://doi.org/10.5194/essd-10-2141-2018.

Marcott SA, Shakun JD, Clark PU, Mix A (2013) A reconstruction of regional and global temperature for the past 11,300 years, *Science,* 339:1198-1201.

NOAA (2016) State of the Climate: Global Analysis for Annual 2015. National Centers for Environmental Information, available at http://www.ncdc.noaa.gov/sotc/global/201513

Wang X, Stafford-Smith M, McAllister R, Leitch A, McFallan S & Meharg S (2010) Coastal inundation under climate change: a case study in South East Queensland. Report prepared for the South East Queensland Climate Adaptation Research Initiative. CSIRO Climate Adaptation Working paper 6, Canberra. Accessed at: https://research.csiro.au/climate/wp-content/uploads/sites/54/2016/03/6_WorkingPaper6_CAF_pdf-Standard.pdf

Wang CH, Baynes T, McFallan S, West J, Khoo YB, Wang X, … Waring A (2016) Rising tides: adaptation policy alternatives for coastal residential buildings in Australia, *Structure and Infrastructure Engineering*, http://doi.org/10.1080/15732479.2015.1020500.