

Report: Climate Concerns and Impact of Coal Seam Mining in Australia

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Overview

History and Emergence of Coal Seam Gas (CSG) and Fracking in Australia

What is Fracking?

Hydraulic fracturing, commonly known as **fracking**, is a method used to extract **coal seam gas (CSG)** and other unconventional gas sources from underground. The process involves injecting a mixture of water, sand, and chemicals at high pressure into coal seams or rock formations to fracture them, allowing the gas to flow to the surface. This method has gained prominence in Australia as the country explores alternative sources of energy to meet growing demands and reduce reliance on traditional fossil fuels.

History of Fracking

Fracking originated in the **United States** in the 1940s, but it wasn't until the 1990s that technological advancements made it commercially viable on a larger scale. In Australia, the development of CSG extraction began in earnest in the early 2000s, with significant commercial production taking place in **Queensland** and **New South Wales**. The introduction of fracking techniques allowed companies to access previously uneconomical gas reserves, transforming Australia's energy landscape.

Emergence and Development of CSG in Australia

Australia's exploration of CSG resources has primarily occurred in **Queensland** and **New South Wales**, where large reserves of coal seam gas have been discovered. Queensland, in particular, has become the hub for CSG development, leading to the establishment of **liquefied natural gas (LNG)** projects that export CSG to international markets. The state's Surat and Bowen Basins have been extensively developed for this purpose.

Inquiries and Investigations into Fracking in Australia

The rise of CSG and fracking has led to environmental and community concerns, prompting inquiries and regulatory actions at both the state and federal levels:

1. **Senate Inquiry (2011):**

- The federal government held a Senate inquiry into the impacts of CSG extraction, which assessed the environmental, social, and health effects of fracking. The inquiry highlighted concerns around groundwater contamination, land use conflicts, and the cumulative impact of gas extraction activities on local communities and ecosystems.

2. **Queensland's Independent Review of CSG Activities:**

- In 2013, the Queensland Government established the **GasFields Commission Queensland** to oversee and manage the coexistence of CSG development and agriculture. The commission's role includes mediating land access issues, monitoring environmental impacts, and promoting transparency in the CSG industry.

3. **New South Wales Chief Scientist's Review:**

- In response to public concern, the **NSW Chief Scientist and Engineer** conducted a comprehensive review of CSG extraction in 2014. The report acknowledged the economic benefits but raised several concerns about environmental risks, regulatory gaps, and the need for more stringent monitoring and reporting practices.

4. **Victorian Parliamentary Inquiry (2015):**

- Victoria imposed a moratorium on fracking in 2012, which was made permanent in 2017 after a state parliamentary inquiry examined the environmental, health, and economic risks associated with fracking. The inquiry recommended a ban due to the potential impact on groundwater and agricultural productivity.

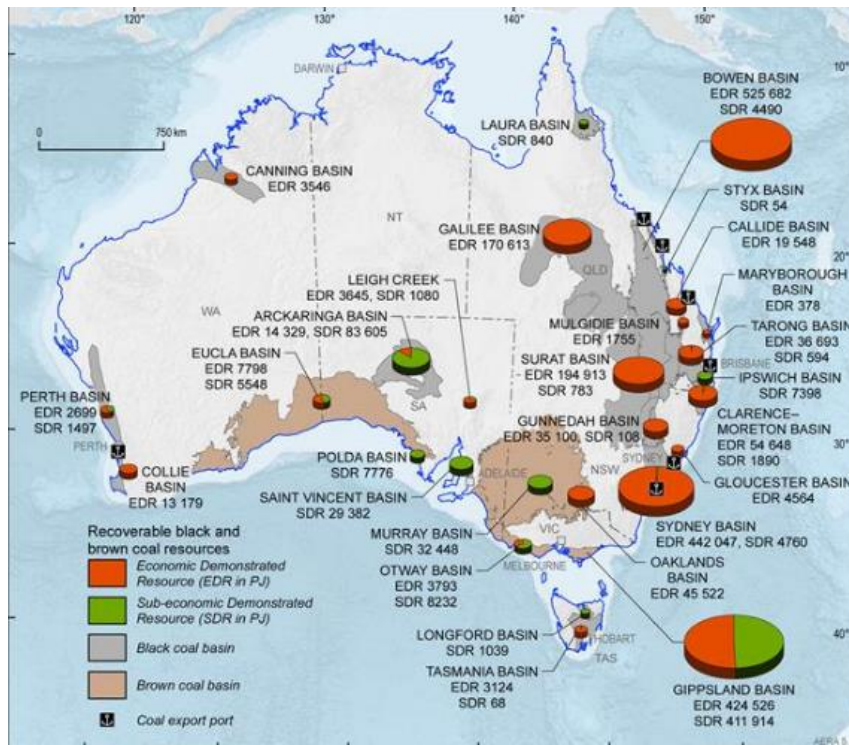
5. **Federal Inquiry into Unconventional Gas Mining (2016):**

- This inquiry evaluated the social and environmental impacts of unconventional gas mining, including CSG. It resulted in calls for improved regulatory oversight, a national strategy for groundwater management, and stricter adherence to environmental protection laws.

While CSG and fracking have emerged as significant components of Australia's energy sector, they have also sparked controversy and led to multiple inquiries. These investigations highlight the need for stringent regulation, robust environmental safeguards, and transparent community engagement to balance the economic benefits of CSG with the protection of Australia's ecosystems and communities.

1. Introduction

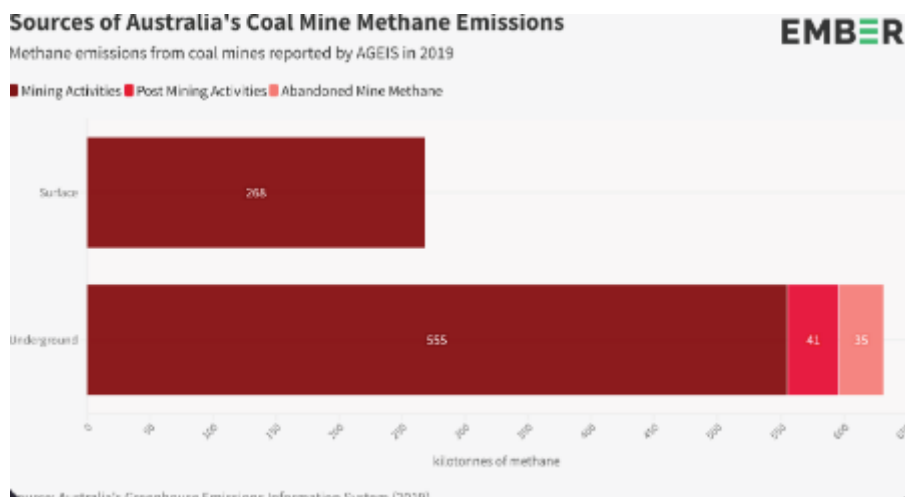
Coal seam mining in Australia, particularly in Queensland and New South Wales, has been a focal point of environmental and climatic debates. As new coal projects continue to receive approval despite international climate commitments, this report examines the significant impacts of coal seam mining, including greenhouse gas emissions, water resource depletion, land degradation, and the importance of community engagement in addressing these concerns.



2. Greenhouse Gas Emissions

Coal seam mining contributes significantly to Australia’s greenhouse gas emissions, with methane being a key pollutant. Methane has a global warming potential approximately 25 times higher than carbon dioxide over a century. Reports indicate that coal mines in New South Wales and Queensland collectively emit around 31 million tonnes of CO₂ equivalent annually [1]. Notably, mines such as Appin and Tahmoor are among the highest emitters [2].

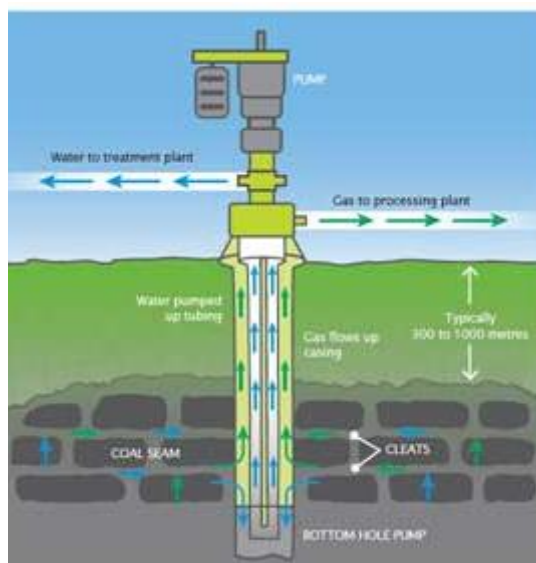
Projects like the expansions of Whitehaven Coal’s Narrabri and Mount Pleasant mines are expected to release up to 1.4 billion tonnes of carbon dioxide over their operational lifetimes, equivalent to three times Australia's current annual emissions [1].



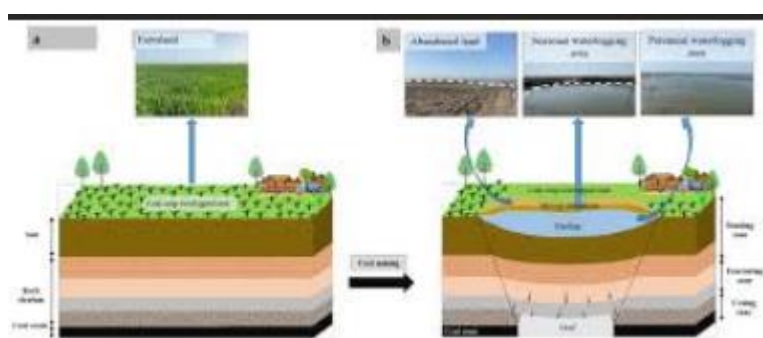
3. Water Usage and Aquifer Depletion

The hydraulic fracturing (fracking) method used in coal seam gas (CSG) extraction demands significant water resources, posing risks to vital groundwater sources like the Great Artesian Basin. The CSIRO has identified this basin as particularly vulnerable, with potential for reduced water pressure and sustainability concerns due to CSG activities [3]. Additionally, the Queensland Department of Environment and Science highlights the risk of groundwater contamination through

chemical leaks, which could have long-term effects on ecosystems and communities reliant on these resources [4].



<https://www.iesc.gov.au/publications/csg-extraction-and-co-produced-water>



4. Land Degradation and Ecosystem Disruption

<https://www.mdpi.com/2077-0472/12/8/1235>

Land clearing for coal seam mining disrupts habitats and threatens native species, including the endangered black-throated finch. Mining

infrastructure further contributes to landscape degradation, reducing ecosystems' resilience to climate change. These disruptions also have cultural implications, particularly for Indigenous communities whose heritage sites may be compromised [5][6].

5. Community Awareness and Electoral Relevance

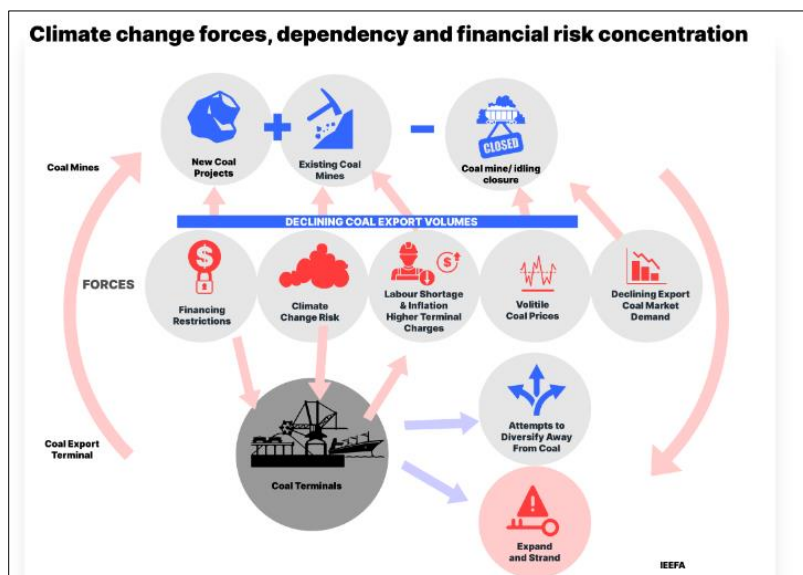
Engaging communities and raising awareness about coal seam mining's impacts is essential to drive policy change. It is not only an environmental concern but also an electoral issue, as voters increasingly prioritise climate action. The Australia Institute found that most Australians support stronger regulations on mining activities, and public awareness campaigns have effectively influenced policy at state and federal levels [7].



<https://maulescreek.org/impacts-exposed-public-meetings-address-coal-seam-concerns/>

When communities are informed, they can advocate for policy changes that prioritise environmental sustainability. Mobilising voters to express these concerns ensures that environmental issues remain central to political agendas and decision-making.

6. Policy and Economic Context



Despite coal seam mining's economic contribution, its long-term environmental costs are substantial. The federal government's approval of new coal projects conflicts with Australia's international climate obligations under the Paris Agreement. Critics argue that this dual approach—promoting renewable energy while expanding fossil fuel development—is unsustainable and risks locking Australia into a high-emission future [8].

<https://ieefa.org/resources/financial-risk-australias-coal-ports>

To align economic development with climate goals, policy adjustments are necessary. Engaging communities and ensuring they have a platform to influence political decisions is key to achieving a sustainable, low-carbon future.

7. Recommendations

To mitigate the climate impacts of coal seam mining:

- **Enhanced Methane Capture and Monitoring:** Implement stricter regulations and monitoring technologies to reduce methane emissions from coal mines.
- **Aquifer Protection Programs:** Strengthen safeguards for groundwater sources to prevent contamination and ensure long-term water availability.
- **Community Engagement Initiatives:** Expand public information campaigns to educate communities about the environmental impacts and promote advocacy efforts.
- **Transition to Renewable Energy:** Develop strategies for coal-dependent regions to transition towards renewable energy, ensuring economic stability and support.
- **Electoral Accountability Measures:** Encourage community groups to engage with political representatives, making environmental issues a focal point in elections.

8. Conclusion

The expansion of coal seam mining presents significant environmental challenges and undermines Australia's climate commitments. By enhancing community awareness and encouraging electoral advocacy, there is an opportunity to drive policy change that aligns with Australia's sustainability goals. Informed communities can exert the necessary pressure on political leaders to prioritise environmental protection and climate action.

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