Water is vital for life
Coal is taking too much

- Each year, the coal industry in NSW and QLD consumes **as much water as the entire population of greater Sydney,** or every household in Queensland.
- Coal-fired power plants **compete for water in farming communities** like the Bowen Basin and Hunter Valley—and withdraw 30 per cent as much water as agriculture does.
- The coal industry does not always pay a **fair amount** for the water it uses.
- Each year the coal industry in NSW and QLD uses 2353 billion litres of freshwater, around 1970 billion litres of which is released back into the environment in a state that can **harm fish, plants and other freshwater species.**
- Coal power uses **120 times the water of wind or solar** to produce the same amount of electricity.
- Lack of consistent reporting requirements and poor transparency in water reporting mean the **full impact of coal activities on water resources is not well understood.**

Background

Australians have always been keenly aware of the importance of water for life on this dry land. Australia is the driest inhabited continent on earth.

Our water resources have made it possible to sustain agricultural production, sheep and cattle grazing, natural ecosystems and thriving communities, yet Australia's water resources have clear limits.

Sustainable water use is more and more critical as climate change alters rainfall patterns, increases the frequency and intensity of drought and raises average temperatures and evaporation rates.

Large parts of Australia have experienced extreme drought in recent years, with record dry conditions threatening the livelihoods of farmers, the future of regional communities and even the viability of towns that have faced severe water shortages.

Meanwhile, the coal industry is quietly taking huge quantities of water – largely unnoticed and in some cases with limited reporting requirements or transparency.

It is well-documented that the coal industry is one of the main drivers of climate damage in Australia and around the world. What is less known is that the coal industry is responsible for taking huge quantities of water – the equivalent of what's used by 5.2 million Australians, or one-fifth of the Australian population, every year. While burning coal is driving climate change, increasing drought and reducing rainfall in Australia, coal-fired power plants and coal mines are taking huge amounts of water, the lifeblood of our communities and environment.

In the context of significant and growing concern about Australia's water resources, the Australian Conservation Foundation (ACF) commissioned an independent water expert to conduct a detailed research effort to determine when and how the coal industry uses water in their operations, the source of this water, how much is used and where there are gaps in monitoring and reporting.

The research used publicly accessible information to examine the impact of coal mining and coal-fired power stations on water resources in New South Wales and Queensland.

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Above. Tarrawonga Coal mine. *Photo*. Dean Sewell

The remainder of this briefing outlines findings of this research.

Key report findings

- Total freshwater consumed (i.e. unavailable for other uses) by the coal industry is about 383 billion litres per year. This is equivalent to the domestic water use of 5.2 million people and represents about 4.3 per cent of all water used in Australia.
- The total value of this water is at least $770 million and at most $2.49 billion. The Queensland government granted Adani's Carmichael coal mine a 60-year licence to take an unlimited amount of groundwater virtually for free.
- Total freshwater withdrawn (includes water consumed, but also water that is then available for other uses) by the coal industry is about 2,353 billion litres per year. While some of this water can be reused, many power stations release heated water back to the environment, which can have negative consequences for aquatic life.
- In NSW and Queensland the coal industry withdraws about 30 per cent as much water as is withdrawn for agriculture. Many coal activities are co-located in agricultural regions such as the Hunter Valley and the Bowen Basin.
- The average amount of water required to produce one tonne of coal is about 653 litres.
- Clean energy requires much less water to produce electricity than coal. Solar and wind power, for example, typically use 10 litres per megawatt hour (L/MWh) compared to 1,245 L/MWh for average black coal energy generation.
- A lack of transparency and poor regulatory frameworks means this report is likely to have underestimated the overall impact of the coal industry on Australia's precious water resources.

Lack of consistent data, reporting requirements and transparency

It is clear from this research that coal is a major water user in Australia and is competing for freshwater resources with other water activities, including water for people.

However, there is a lack of understanding about the true impact the coal industry has on Australia's water resources, in part due to a lack of consistent reporting, poor transparency and complex regulatory frameworks.

In NSW and Queensland data on water use for coal activities is only available through written reports that use different formats. Despite the existence of Australian and international water accounting frameworks, there is no reporting to these standards.

Lack of consistent and available data means water take and impacts by the coal industry have not been widely reported or understood as a national issue, despite their significance.

Freshwater

The evidence suggests the amount of water used and impacted by coal activities is much greater than 7.2 per cent of Australia's freshwater.

Coal industry activities also affect water resources by polluting waterways, diverting streams, reducing the quality of groundwater and releasing toxic mercury into the air from burning coal, which then rains down into rivers and streams.

Water consumption, withdrawal and impacts in coal mining

- In coal mining, water is used in coal processing, handling and preparation; dust suppression; onsite facilities, irrigation, vehicle washing, etc.
- Almost all water used in coal mines is consumed and cannot be re-used. Estimated water use based on 2018 annual reviews is 653 litres per tonne, giving a total water use of 292,500 million litres for 448 million tonnes of coal production.
- Approximately 80 per cent of the source water is freshwater from rainfall and runoff, extracted from rivers and water bodies, groundwater inflows or transferred from other mines. The other 20 per cent comes from water already entrained in tailings, recycled water and seepage from the mines. This means 234,000 million litres of freshwater is used in one year by coal mines in Australia.

Water consumption, withdrawal and impacts in coal-fired power plants

- Burning coal to generate energy uses a lot of water. A typical 1000-megawatt coal-fired power station uses enough water in one year to meet the basic needs of nearly 700,000 people.
- Most of this water is for cooling systems. Most power stations use freshwater for cooling—either from rivers or water stored in ponds.
- Carbon capture technologies increase the amount of water required from 30 per cent (for wet cooled systems) to 700 per cent (for dry cooled systems).
- It's important to distinguish between water withdrawn and water consumed by power stations. A typical 500MW coal station withdraws an Olympic-sized swimming pool amount of water every 3.5 minutes. Those with 'once through' cooling systems that use a continuous flow of water withdraw water for this purpose then discharge it back into the original source at higher temperatures. Water consumed is not returned and is no longer available for any other use.
- In addition to water withdrawal and consumption, coal-fired power plants also contaminate water during the combustion process. This toxic waste water is stored in ash ponds or is evaporated during cooling processes.

Conclusions

- Australia's coal-fired power generators are huge water takers. Water consumption and contamination, alongside the greenhouse pollution that is emitted by coal-fired power plants, are added reasons why coal-fired power stations should be replaced with clean energy as rapidly as possible. Around 75 per cent of Australia's coal-fired power plants are past their design life use-by dates. They are old, increasingly unreliable and extremely polluting.
- Coal mining in Australia is already facing a bleak future as the world acknowledges the enormous threats posed by global heating. Many of the countries that import Australia's coal also face serious health issues related to air pollution, influenced by burning coal. Added to this is the water consumption, withdrawal and impacts of coal mining in Australia, which is unsustainable in the context of current and increasing future drought.

Recommendations for improving reporting

- Standardise accounting for water consumed, withdrawn and impacted by coal mining.
- Require mandatory monthly reporting of full water balances.
- Require comprehensive water modelling that is updated yearly and audited.
- Require a single point of data storage for all water data with open access.

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Above. Drought affected farmland. *Photo*. Shutterstock