

Improving the management of non-road diesel emissions at NSW coal mines

Diesel emissions are known to adversely affect human health and the environment. They contain oxides of nitrogen, volatile organic compounds (short-lived climate pollutants), particulate matter (mainly fine particles, PM_{2.5}) and a range of air toxics.

The EPA proposes to improve the management of non-road diesel emissions at NSW coal mines, by requiring all new large non-road diesel equipment used on the surface at coal mines to meet US EPA Tier 4 final emission standards (or better).

For existing licensees, we will implement this requirement using a licence variation, which will apply as existing diesel equipment is retired and replaced. As a transitional arrangement, the requirement will not apply to machinery that has already been ordered.

This proposal will help to bring emissions standards for non-road diesel equipment in line with global best practice and encourage greater uptake of low-emission technologies in NSW. It supports:

- EPA's <u>*Climate Change Action Plan 2023–26,*</u> including Action 17, which states that the EPA will 'prepare or adopt climate change mitigation guidance for key industry sectors we license, including the performance outcomes we seek'
- EPA's <u>Diesel and Marine Emissions Management Strategy</u>, which focuses on the reduction of nonroad diesel and marine emissions
- <u>NSW Clean Air Strategy 2021–2030</u>, which prioritises the progression of policies and incentives to ensure cleaner transport, engines and fuels.

Short-lived climate pollutants include black carbon (air particulates that are products of combustion), methane, tropospheric ozone and hydrofluorocarbons. These pollutants have short atmospheric lifetimes but, per molecule, they can warm the Earth faster than carbon dioxide (EPA 2021c; CARB 2022; CCES 2022).

Is this a new proposal?

No. This isn't a new proposal. The EPA has been consulting with the mining industry about this proposal over many years.

Some approved coal mine developments and extensions are already meeting the Tier 4 final emissions standard. Their development consents require the use of reasonable and feasible diesel emission reduction technology; this means US EPA Tier 4 final or better.

The prior consultation section below provides more details. Most recently our *Climate Change Action Plan 2023–26* states that we would be looking to adopt this approach.



How does this compare with international requirements?

Tier 4 final emission standards or their equivalent are already required for new diesel machinery in many overseas jurisdictions (the European Union, the USA, all OECD countries, India, Russia, China, Brazil, Singapore, Japan and South Korea). Once the EPA applies the standard to coal mines, we will start to work with other sectors of our regulated community to require better performance from non-road diesel engines and equipment.

Why is this needed – what's the contribution of $PM_{2.5}$ and NO_x from the mining sector?

Non-road diesel engine emissions are the largest source of unregulated air pollution in Australia.¹ Particulate ($PM_{2.5}$) and nitrogen oxide (NOx) emissions from large mining non-road diesel vehicles and equipment account for the majority of total non-road diesel emissions in NSW.² Coal mining is the largest contributor of non-road diesel combustion emissions in NSW, at 3.4 MtCO₂e or 17% of total diesel emissions in 2019.³

Non-road diesel engines in NSW were estimated to have emitted about 2,600 tonnes/year of PM_{2.5} emissions in 2018.⁴ This is an increase from the EPA's 2013 *Air Emissions Inventory for the Greater Metropolitan Region in NSW*, which found that non-road diesel vehicles and equipment emitted about 1,330 tonnes/year of PM_{2.5} and coal mining accounted for over 80% of total non-road diesel PM_{2.5} emissions.

In 2018, NSW accounted for 20% of the diesel use in non-road engines in Australia, with mining accounting for about half of the diesel use in NSW. In addition, non-road diesel engines accounted for around 6% of national greenhouse gas emissions in 2018.⁵

Non-road diesel vehicles and equipment such as cranes, gantries, bulldozers, loaders and trucks, used in construction and industrial activities and at ports and coal mines, make a significant contribution to human-made particulate and ozone precursor emissions in the Greater Metropolitan Region. (Source: NSW EPA's <u>Diesel and Marine Emissions Management Strategy</u>.)

¹<u>https://www.dcceew.gov.au/environment/protection/air-quality/national-clean-air-agreement/evaluation-non-road-diesel-engine-emissions</u>

² <u>https://www.dcceew.gov.au/environment/protection/air-quality/national-clean-air-agreement/evaluation-non-road-diesel-engine-emissions</u>

³ NSW State of the Environment, NSW EPA, 2021 – <u>https://www.soe.epa.nsw.gov.au/all-themes/climate-and-air/greenhouse-gas-emissions-2021</u>

⁴ Non-road diesel engines – cost-benefit analysis, Department of Climate Change, Energy, the Environment and Water, 2022

⁵ <u>https://www.dcceew.gov.au/environment/protection/air-quality/national-clean-air-agreement/evaluation-non-road-diesel-engine-emissions</u>



The use of non-road diesel stock is increasing in Australia; it is projected to increase from 640,000 units in 2018 to around 750,000 units by 2028 and around 945,000 units by 2043.⁶ Market analysis in Australia has shown that there has been a low passive uptake of low-emission engines that meet international emission standards.⁷ The EPA's proposal will encourage the uptake of low-emission non-road vehicles, which are now readily available.

What does this mean for human health?

The reduction of fine particle emissions ($PM_{2.5}$) to air is important because of the strong evidence that associates exposure with a range of significant health impacts. $PM_{2.5}$ can get deep into the lungs and into the bloodstream. Long-term exposure can cause disease and increase the rate of disease progression.⁸ As there is no safe threshold for $PM_{2.5}$ exposure, all emissions reductions can have positive health benefits for communities.



Figure 1 The relative sizes of PM2.5 and PM10 (Source: USEPA, 2013). Image reproduced with permission from the USEPA, Office of Research and Development)

⁶ Non-road diesel engines – cost-benefit analysis, Department of Climate Change, Energy, the Environment and Water, 2022

⁷ Non-road diesel engines – cost-benefit analysis, Department of Climate Change, Energy, the Environment and Water, 2022

⁸ https://www.health.nsw.gov.au/environment/air/Pages/particulate-matter.aspx



For the period 2006–16, it was estimated that 940 premature deaths (or 13,956 years of life lost) each year were attributable to PM_{2.5} exposure **from all sources** in NSW and ACT.⁹ The health burden associated with air pollution **from non-road diesel** engines alone, in 2018, was estimated to be 1,469 years of life lost per year in NSW and ACT.

In 2022, the Commonwealth Government released the *Non-road diesel engines – cost-benefit analysis* report,¹⁰ which found that there would be a **\$2.2 billion net benefit nationally** from the early introduction of best-practice US Tier 4 final non-road diesel engine standards. The Commonwealth Government also prepared a <u>draft Impact Analysis</u> (formerly a Regulation Impact Statement), which assesses the potential impact of implementing emissions standards.

Our proposal in detail

New licensees

The EPA expects **all new** coal mining licensees to use non-road diesel equipment that meets Tier 4 final emissions standards (as a minimum) or better (for example, zero-emissions equipment) for all non-standby vehicles and equipment used on the surface of the facility. If equipment meeting Tier 4 final emission standards (or better) is unavailable, the licensee is expected to use equipment that meets the best available emission standard.

Existing licensees – licence variation

Existing licensed coal mine operators will be required to replace their surface non-road diesel equipment with equipment that meets US EPA Tier 4 final standards or better, as equipment within their **existing fleet is retired and replaced**.

The EPA proposes to amend coal mine licences to include a special licence condition. This will apply to equipment with gross engine power of 560 kW or more, which commences operating at the premises nine months from the date the special licence condition is imposed. Existing equipment or equipment ordered prior to the licence condition being imposed is not subject to the US EPA Tier 4 final emission standard. Equipment ordered during the transition period must meet the performance requirements, whether it is new or second-hand and/or supplied by a fleet management entity.

Licensees can also meet this requirement by commissioning other low or zero-emission equipment, such as hydrogen fuel-cell technology, rather than diesel-fuelled engines.

This requirement will also apply to the purchase of any second-hand non-road diesel equipment for surface use at the facility. However, equipment owned by a company on another NSW site (that the company also holds an environment protection licence for) may be transferred between sites.

⁹ Hanigan, I.C.; Broome, R.A.; Chaston, T.B.; Cope, M.; Dennekamp, M.; Heyworth, J.S.; Heathcote, K.; Horsley, J.A.; Jalaludin, B.; Jegasothy, E.; et al. Avoidable Mortality Attributable to Anthropogenic Fine Particulate Matter (PM2.5) in Australia. Int. J. Environ. Res. Public Health 2021, 18, 254. https://doi.org/10.3390/ijerph18010254

¹⁰ <u>https://www.dcceew.gov.au/environment/protection/air-quality/national-clean-air-agreement/evaluation-non-road-diesel-engine-emissions</u>



All equipment, including equipment transferred between premises, will need to be upgraded to an improved air emission standard when it is refurbished. The EPA expects licensees to use their best endeavours to upgrade to the best reasonable and feasible emissions control technology during refurbishments.

The special licence condition will not apply to underground mining equipment (covered by WHS standards) or to electric/fuel-cell equipment.

While it would not be a requirement, the EPA strongly encourages licensees:

- to seriously consider investing in cleaner non-diesel options such as hydrogen fuel cells and electric vehicles and equipment, which would have additional benefits for reducing and avoiding air pollutants and greenhouse gas emissions specifically
- to meet the special licence condition requirements earlier than nine months, where possible.

What if US EPA Tier 4 final equipment is not available?

Licensees will be able to request an exemption from the NSW EPA if US EPA Tier 4 final equipment is genuinely not available, or the only available models have significant productivity or reliability issues. Licensees would need to provide adequate evidence to the EPA to support such a claim. Where the licensee demonstrates the above, the EPA will give written approval for them to use the alternative equipment on their premises.

Equivalent standards include any other international non-road emission standard with emission limits equal to or lower than the applicable US EPA Tier 4 final standard.

The EPA has consulted on this proposal over many years

The EPA consulted NSW Minerals Council and individual coal mine operators many times on previous iterations of this proposal. The EPA considered all feedback and made practical adjustments.

Previous proposals

In 2016, the EPA held an industry information workshop and sought feedback on a proposed pollution reduction program that would have required licensees to identify the most practical options for improving emission performance of their non-road diesel equipment used in surface operations.

In 2017, the EPA consulted on a revised approach that included a proposed special licence condition and study. The purpose of that proposed study was to seek detailed information about the non-road mobile diesel equipment fleet used by coal mine licensees in their surface operations.

Amendments addressing feedback

The EPA received feedback from licensees on the 2016 and 2017 proposals. The approach in this current proposal paper takes that feedback into account.



We no longer propose to include the study proposed in 2017, at least for now. We will consider how the objectives of that study might be achieved through a broader information request that considers other climate change matters as well, as we continue to implement our *Climate Change Action Plan 2023–26*.

During the 2017 consultation process, the mining industry raised concerns about:

- the proposed time frame for introducing new equipment and preparing the study (four months)
- the availability of Tier 4 final equipment
- the inclusion of all non-road diesel equipment, with requests that the special licence condition should apply only to larger plant and surface equipment, and to new equipment, not retrofits
- the need to allow approved exclusions and exemptions in the special licence condition and study
- the availability of data and the assessment period
- the complexity of verification procedures
- the public availability of confidential information.

In 2024, the EPA consulted with its Climate Change Mining Advisory Group, which raised issues related to biofuels and the transfer of equipment from one site to another.

We have amended the proposed special licence condition to address feedback from the above processes. We now propose that the condition apply to engines 560 kW (gross) or greater. We also propose to exempt underground machinery and electric and fuel-cell-driven equipment from the proposal. In addition, we propose to allow exemptions for special machinery, if Tier 4 final equipment is genuinely unavailable.

To further address the concerns raised in 2017, we contacted mining equipment suppliers. They advised us that equipment that meets Tier 4 final emission standards (or better) with comparable payloads is generally available. The time frame for introducing new equipment has been extended to nine months. Given the number of times the EPA has consulted on similar proposals and the notice we provided most recently in our *Climate Change Action Plan 2023–26*, we believe this is reasonable and still accommodates the time required to specify and order equipment.

In 2024, the EPA sought feedback on regulatory requirements for coal mines through its statewide coal mine consultation. Community members asked the EPA to take strong action on reducing greenhouse gas emissions and diesel emissions from coal mines. Suggestions included placing limits for diesel emissions on environmental protection licences. In 2024, we also consulted our Climate Change Community and Environment Advisory Group, which raised similar issues.

The EPA's proposal balances the feedback received from industry with the community's expectation that the EPA and NSW Government take strong action to reduce air pollution and improve human health outcomes in NSW.