



Unmasked: The health and economic cost of delaying **coal phase-out** in **South Africa**



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Unmasked: The health and economic cost of delaying coal phase-out in South Africa

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About Greenpeace Africa

Greenpeace Africa is a growing movement of people working to protect the environment and promote sustainable development across the African continent **through peaceful activism, campaigning, research, and community engagement.**

- We are politically and financially independent from businesses, political parties, and governments.
- Our vision is an Africa where people live in harmony with nature in a peaceful state of environmental and social justice.
- Greenpeace Africa operates physically in Cameroon, the Democratic Republic of Congo (DRC), Kenya, Senegal, Mauritius and South Africa.

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation **focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution.**

Disclaimer

CREA is politically independent. The designations employed and the presentation of the material on maps contained in this report do not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.



Key findings

This study quantifies the air quality impacts of the South African government's plan to delay the phase-out of coal-fired power plants.

- Delaying the phase-out is projected to result in 32,000 additional premature deaths between 2026 and 2050.
- Gauteng is the most affected region, with an estimated 15,200 additional deaths, almost half of the total, despite having no Eskom coal-fired power plants.
- Mpumalanga, which hosts most coal capacity (31.3 GW), is projected to see an additional 4,800 deaths, showing the transboundary nature of pollution and that harm falls both where coal is burned and where pollution travels.
- Children bear a disproportionate burden: delayed phase-out would lead to an estimated 41,000 additional preterm births, 17,000 new childhood asthma cases, and 370 deaths in children under five.
- The estimated economic cost of these health impacts is approximately USD 38 billion (equivalent to ZAR 721 billion), placing a major burden on households, families, and communities, healthcare systems, and the wider economy.
- Delaying coal phase-out is a policy choice with severe public health and economic consequences, disproportionately affecting Gauteng and young children, while diverting resources from cleaner energy alternatives.

Delaying coal retirement in South Africa under the 2025 Integrated Resource Plan (IRP)

In 2025, the South African Department for Mineral Resources and Energy (DMRE) released a new Integrated Resources Plan that continues and formalises plans to extend the operating lifetimes of ten Eskom-operated coal-fired power plants, with some plants running for at least an additional decade (DMRE, 2025).

This shift delays coal phase-out and is in direct opposition to South Africa's climate commitments. The country's updated Nationally Determined Contributions (NDCs) commit to limiting greenhouse gas emissions to 350–420 MtCO₂e by 2030, while the Climate Change Act establishes a legal framework for a just transition to a low-carbon, climate-resilient economy. Extending coal makes these targets harder to achieve and locks in higher emissions from one of the country's largest sources. As the power sector is typically one of the most straightforward to decarbonise, this failure places additional pressure on harder-to-decarbonise sectors to compensate.

The consequences go beyond carbon. Across Africa, climate change is already intensifying. Increasing heat, drought, floods, food insecurity, water stress, and health risks are placing growing pressure on livelihoods and public systems.

In this briefing, we quantify the air quality impacts of extending coal power under the IRP 2025 by comparing two scenarios:

- Base scenario: coal plant retirements proceed on the IRP 2019 timeline.
- Delayed scenario: coal plant lifetimes are extended in line with IRP 2025.

This comparison isolates the impact of the policy decision to delay coal phase-out.



Coal power harms local communities

South Africa has over 40 GW of coal-fired capacity. We find that, under Eskom’s decommissioning plan, these plants are projected to cause an estimated 65,000 (39,000–100,000) deaths over their remaining lifetimes. Under the delayed IRP scenario, this rises to 97,000 (59,000–150,000) deaths. That is, extending coal is projected to contribute to an estimated 32,000 (20,000–50,000) additional premature deaths between 2026 and 2050. Note that these calculations are based on the data and methodology from CREA & Greenpeace (2025).

The extension of coal power doesn’t affect all regions equally. Figure 1 shows the projected number of deaths that air pollution from coal-fired power plants will contribute to up until their phase out in the government’s IRP, as well as how these are distributed across the country.

The majority of the coal power capacity in South Africa is located in Mpumalanga (almost 31.3 GW), followed by Limpopo (8.8 GW), and Free State (3.7 GW). In these provinces, the extension of coal power in the government’s new IRP is projected to have a dramatic impact on public health, leading to an estimated additional 4,800 deaths in Mpumalanga, 2,400 in Limpopo, and 1,100 in Free State.

These results highlight that, for local communities in coal-reliant regions, delayed coal phase-out may lead to a substantial increase in the public health burden. This aligns with previous research, which has identified coal combustion as a major contributor to harmful air pollution and associated health impacts in South Africa’s priority pollution hotspots (Howlett-Downing & Wright, 2026).

Projected deaths attributable to emissions from Eskom’s coal power plants

Cumulative impacts (2026–2050)

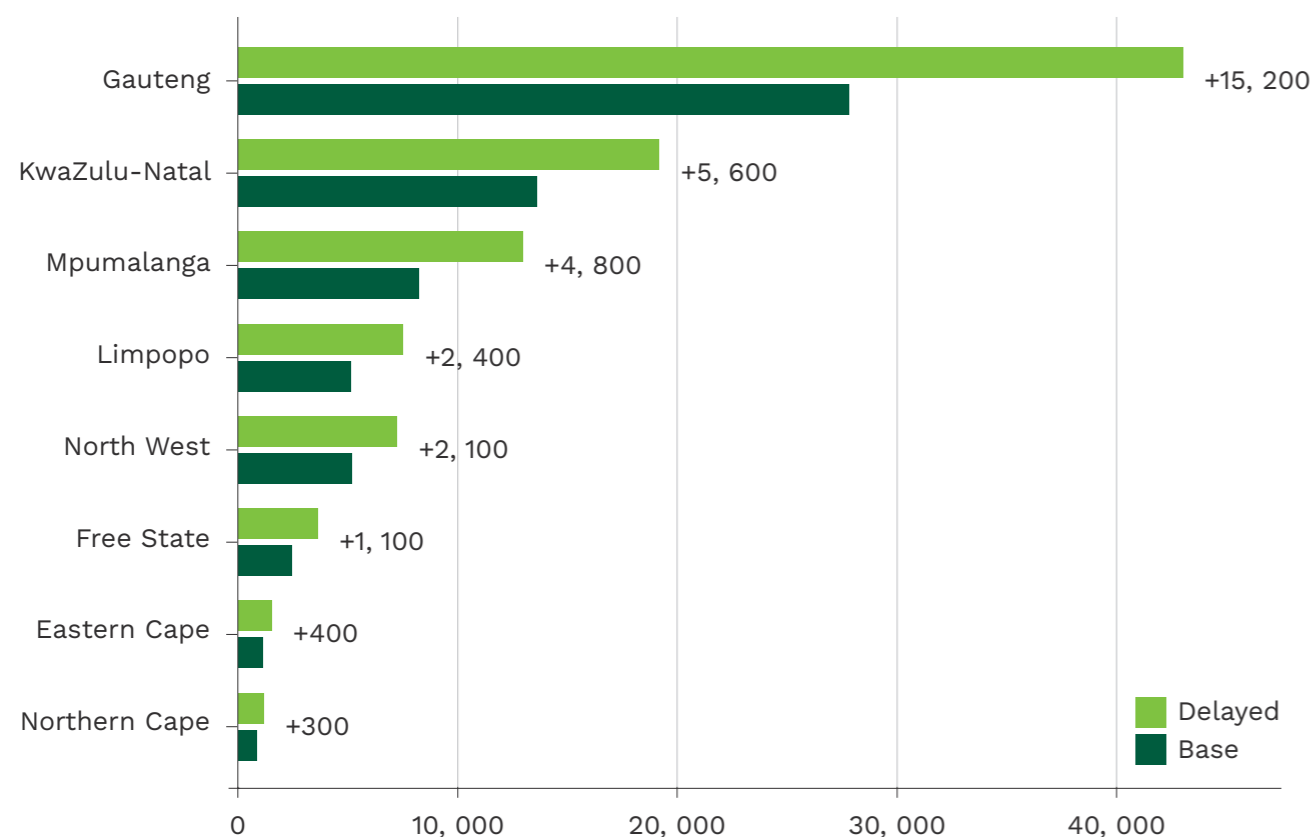


Figure 1 — Projected cumulative deaths due to air pollution from Eskom’s coal power plants, 2026-2050

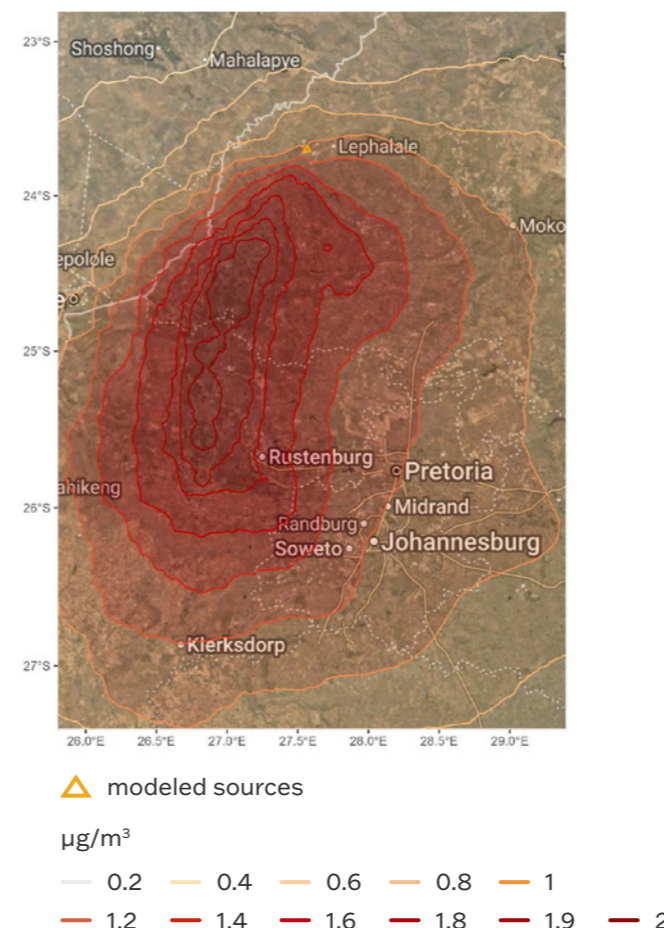
Transboundary pollution — Coal exports pollution nationwide

Despite having no large Eskom coal-fired power plants, air quality modelling indicates that the provinces of Gauteng and KwaZulu-Natal will still be highly impacted by their emissions. In Gauteng, the delayed retirement schedule of coal is projected to cause an estimated additional 15,200 deaths, and in KwaZulu-Natal, 5,600 are expected. The reason for this is that coal-related PM_{2.5} can persist for one to two weeks and be transported over long distances by regional wind patterns, allowing it to cross provincial borders and affect large populations far from the power plant stack.

To illustrate this, Figure 2 shows the contribution of emissions from Eskom’s Medupi power station to atmospheric levels of annual mean fine particles (PM_{2.5}) in the larger region. The figure shows how emissions can cross provincial and even national boundaries, damaging human health far from the pollution source due to the transboundary nature of pollution. High levels of PM_{2.5} persist in Johannesburg, even though the power plant is over 300 kilometres away.

Annual mean PM_{2.5} concentration from Industrial sources

Medupi



Our previous research has already highlighted that Gauteng is the province most heavily impacted by ambient PM_{2.5}, with total ambient PM_{2.5} concentrations from all sources

exceeding the World Health Organisation (WHO) air quality guideline level by a factor of 10 (Greenpeace & CREA, 2025). Last year, reporting indicated that in Gauteng, only 39% of air quality monitoring stations were fully operational, leaving residents ‘monitoring-blind’ to hazardous levels of pollution in the province and limiting public accountability for cross-boundary pollution transported into it (Daily Maverick, 2025). In other words, the same coal plants that are often presented as economic lifelines for local communities are simultaneously contributing to thousands of premature deaths in those very regions.

Note: This was simulated using the CALPUFF dispersion model.

Figure 2 — Contribution of emissions from Eskom’s Medupi power station to annual mean PM_{2.5} concentrations, 2022



Children and infants bear a disproportionate health burden

Exposure to air pollution from coal-fired power plants has particularly severe consequences for early-life health, with effects that can persist throughout a lifetime. Fine particulate matter (PM_{2.5}) and other pollutants are strongly linked to adverse birth outcomes, impaired lung development, and increased risk of respiratory disease in childhood.

Table 1 shows the projected impacts of coal-fired power plants on selected early-life health outcomes.

Table 1 — Projected cumulative health impacts related to newborn babies and young children over the remainder of the lifetime of Eskom's coal power plants, 2026-2050

HEALTH OUTCOME	BASE	DELAYED
Preterm births	95,000 (46,000–101,000)	136,000 (66,000–144,000)
New cases of asthma in children	34,000 (7,000–81,000)	51,000 (10,000–122,000)
Deaths in children under 5	970 (630–1,470)	1,340 (870–2,050)

Note: The ranges represent the 95% confidence intervals for the pollutant dose-response functions.

By delaying the retirement of coal plants, the IRP effectively locks in preventable harm to the youngest and most vulnerable members of society, impacts that in some cases cannot be reversed once they occur. We estimate that delayed coal retirements would lead to an additional 41,000 preterm births, 17,000 new cases of asthma in children, and over 370 deaths in children under the age of five. These outcomes do not only represent immediate health crises for affected families, but also long-term burdens on the healthcare system and future workforce productivity.

Delaying coal retirement increases health-related economic losses

To phase out coal-fired power plants, financial investment is required to replace them with other energy sources. Because of this, government officials and Eskom often justify delays in coal phase-outs by citing the associated costs. While clean energy sources are increasingly competitive with existing coal power generation on price alone, it's also essential to consider the societal costs of coal-fired power. Extending the lifetime of coal increases the health damage it causes to society, which has economic impacts.

Air pollution from coal-fired power plants negatively impacts the economy in several different ways, including increased medication and medical expenses, and loss of labour and productivity.

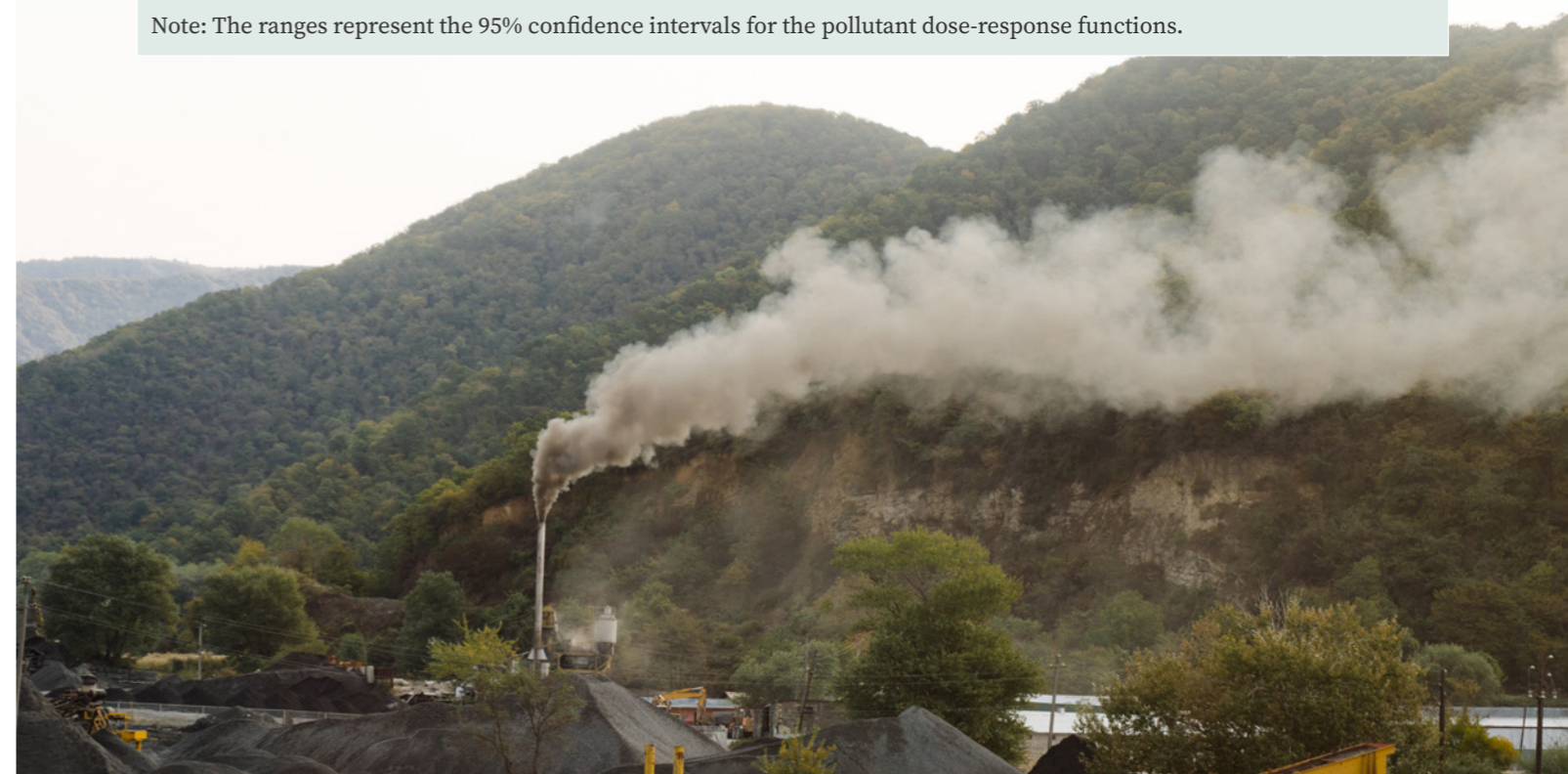
For instance, under the government's plan to extend coal power by an additional 10 years in the most recent IRP, air pollution from these plants is projected to cause 27 (23–31) million individual work absences ('sick days'). Table 2 shows the total projected economic cost of air pollution from coal power plants under the recent IRP.

Overall, delaying these plants is projected to cause an additional ZAR 721 (438–1,080) billion in economic damage, equivalent to USD 38.3 (23.2–57.4) billion. For context, since 2011, over ZAR 290 billion has been invested in the renewable energy sector (BDO, 2025). Hence, phasing out coal would save billions in health damages.

Table 2 — Projected economic cost of air pollution health damages from coal-fired power plants until the end of their lifetime, 2026-2050

ECONOMIC COST	BASE	DELAYED
USD (billion)	78 (47-117)	116 (70-174)
ZAR (trillion)	1.5 (0.9-2.2)	2.2 (1.3-3.3)

Note: The ranges represent the 95% confidence intervals for the pollutant dose-response functions.



Clean energy can replace delayed coal capacity

Approximately 32 GW of coal capacity can be retired in South Africa by the mid-2030s within a reliable power system, alongside a rapid expansion of wind, solar, and storage to around 50–60 GW by 2030 and over 100 GW by 2040, according to Bloomberg analysis (BloombergNEF, 2023). By contrast, the South African Renewable Energy Grid Survey identifies a development pipeline of around 220 GW of wind, solar and storage projects. This pipeline far exceeds the scale of buildout required to enable coal retirement.

Extending the life of coal-fired power stations is not required to ensure an adequate electricity supply. Rather, these delays represent a policy choice, not a technical necessity, and come at the cost of prolonged exposure to harmful air pollution and increased difficulty in meeting South Africa's climate commitments.

Policy recommendations

The South African government's decision to extend the operating lifetimes of coal plants under IRP 2025 has consequences, including a considerable projected human toll. The right to a healthy environment is enshrined in Section 24 of South Africa's Constitution.

CREA and Greenpeace Africa, therefore, call on the South African government and Eskom to take the following actions.



RETIRE COAL PLANTS ON THE ORIGINAL SCHEDULE OR FASTER

The government must reverse the IRP 2025 life extensions and commit to retiring Eskom's coal fleet no later than the decommissioning timeline set out in IRP 2019. Every year of operation beyond that schedule is a policy decision to continue exposing communities to preventable harm, to communities that have already subsidised South Africa's electricity system with their health for decades. The government must stop presenting delay as a technical necessity. This report shows the consequences of failing to transition to clean energy. It shows what the delay costs and who pays.



DELIVER A JUST TRANSITION THAT CENTRES THE COMMUNITIES MOST HARMED BY COAL

The speed of the phase-out is necessary but not sufficient. The workers and communities whose economies have been structured around coal for generations deserve a transition that is planned, adequately resourced, and shaped by their meaningful participation, not a transition that happens to them, while decisions are made elsewhere.

This means legally binding commitments: worker retraining programmes with guaranteed income support during transition; economic diversification plans for coal-dependent municipalities like Emalahleni and Steve Tshwete; community representation in transition governance structures at both provincial and national level; and prioritised investment in renewable energy infrastructure in the regions that have borne the greatest pollution burden. These are not goodwill gestures. They are obligations to workers who have powered South Africa's economy, and to communities whose health was never adequately protected in the process.

A just energy transition must be measured not only by how quickly coal exits the grid, but by whether the people most harmed by coal are the first to benefit from what replaces it.



NO NEW COAL

South Africa's renewable energy development pipeline stands at over 220 GW of wind, solar, and storage, more than sufficient to replace retiring coal capacity while expanding energy access. New coal investment would lock in decades of additional health damage, carbon emissions, and stranded asset risk at precisely the moment when clean alternatives are cheaper and more available than at any point in the country's history.

This is not only an economic argument. New coal means new coal infrastructure with pollution that will again impact the communities least able to refuse it — fenceline communities who did not choose their proximity to a power station and have never been compensated for what living next to one has cost them. Building new coal in 2026 is not an energy security decision. It is a decision to lock in the harm that this report describes. The government must explicitly and permanently rule out new or extended coal in all future Integrated Resource Plans and energy policy instruments.



Methodology

This analysis builds on data and methods from our previous report (CREA, 2023), applying them to two scenarios: a Base scenario, reflecting originally scheduled coal plant retirements as specified in the IRP 2019, and a Delayed scenario, based on the extended plant lifetimes proposed in IRP 2025. The analysis uses 2021 meteorological conditions as a representative base year, with impacts for subsequent years scaled according to plant-specific emissions trajectories. Population exposure is updated annually using projected population data to reflect changes over time. Eskom's reported plant-level emissions serve as the baseline, with future emissions projected under each scenario based on plant operating lifetimes and phase-out schedules. As in the previous analysis, plant emissions assume the implementation of the planned pollution-

control upgrades. These emissions are translated into ambient concentrations of fine particulate matter (PM_{2.5}), nitrogen dioxide (NO₂), and sulphur dioxide (SO₂) using the CALPUFF dispersion model, which accounts for meteorology, atmospheric processes, and topography to simulate how pollutants form, travel, and accumulate across regions. The resulting changes in pollution exposure are then linked to health outcomes using established concentration-response functions, allowing us to estimate impacts on premature mortality and disease, including effects on infants and children. Finally, these health impacts are monetised using standard economic valuation approaches to quantify the broader societal costs of coal-related air pollution.



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