



# Centre for Environmental Rights

Advancing Environmental Rights in South Africa

**Honourable Ms Barbara Creecy**

Minister of Environment, Forestry and Fisheries

By email: [mndamase@environment.gov.za](mailto:mndamase@environment.gov.za)

[msipilica@environment.gov.za](mailto:msipilica@environment.gov.za)

[fshaik@environment.gov.za](mailto:fshaik@environment.gov.za)

[HVanSchalkwyk@dffe.gov.za](mailto:HVanSchalkwyk@dffe.gov.za)

[DMAKHUBELE@dffe.gov.za](mailto:DMAKHUBELE@dffe.gov.za)

[OMATSHEDISO@dffe.gov.za](mailto:OMATSHEDISO@dffe.gov.za)

[VGololo@dffe.gov.za](mailto:VGololo@dffe.gov.za)

**Honourable Ms Thembi Nkadimeng**

Minister of Cooperative Governance and Traditional Affairs

By email: [MandisaMB@cogta.gov.za](mailto:MandisaMB@cogta.gov.za)

[PamelaS@cogta.gov.za](mailto:PamelaS@cogta.gov.za)

[MathoM@cogta.gov.za](mailto:MathoM@cogta.gov.za)

[CarolineM@cogta.gov.za](mailto:CarolineM@cogta.gov.za)

**Ms Margaret Skosana**

Municipal Manager for Nkangala District Municipality

By email: [Skosanam@nkangalam.gov.za](mailto:Skosanam@nkangalam.gov.za)

[mmoffice@nkangala.gov.za](mailto:mmoffice@nkangala.gov.za)

Copied to:

**Mr Calib Cassim**

The Acting Chief Executive Officer, Eskom

By email: [McCourtBA@eskom.co.za](mailto:McCourtBA@eskom.co.za)

[HerbstDL@eskom.co.za](mailto:HerbstDL@eskom.co.za)

9 March 2023

**URGENT**

Dear Honourable Ministers Creecy, Nkadimeng and Manager Skosana

**PROPOSED RELEASE OF UNABATED SULPHUR DIOXIDE EMISSIONS FROM KUSILE COAL-FIRED POWER STATION**

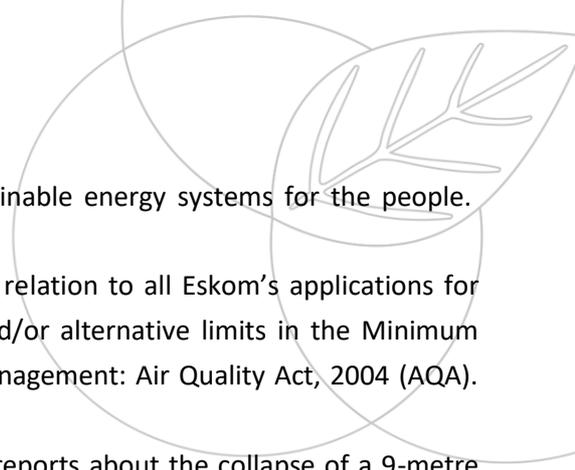
1. We address you on behalf of the Life After Coal Campaign (LAC), which is a joint campaign by the Centre for Environmental Rights (CER), groundWork (gW), and Earthlife Africa Johannesburg (ELA) that aims to: discourage the development of new coal-fired power stations and mines; reduce emissions from existing coal infrastructure

Cape Town: 1<sup>st</sup> floor, Birkdale 2, River Park, 1 River Lane, Liesbeek Parkway, Mowbray, Cape Town 7700, South Africa

Johannesburg: The Cottage, 2 Sherwood Road, Forest Town, Johannesburg, 2193, South Africa

Tel +27 21 447 1647 (Cape Town)

[www.cer.org.za](http://www.cer.org.za)



and encourage a coal phase-out; and enable a just transition to sustainable energy systems for the people.

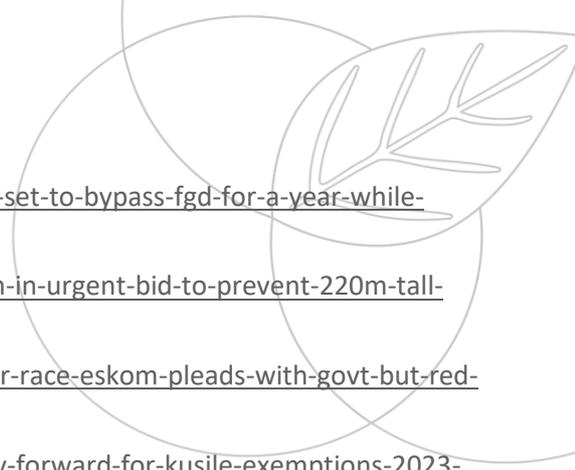
2. CER, gW, ELA are registered interested and affected parties (I&APs) in relation to all Eskom's applications for suspension of compliance with, postponement of compliance with, and/or alternative limits in the Minimum Emission Standards (MES) issued under the National Environmental Management: Air Quality Act, 2004 (AQA).
3. We write to you to respond to statements by Eskom as well as media reports about the collapse of a 9-metre diameter flue duct for Eskom's Kusile unit 1 in October 2022. The flue duct reportedly collapsed under the weight of ash build up inside the pipe. According to a news report, "the position it came to rest in rendered units 2 and 3 that share the chimney inoperable due to the risks of further damage or, potentially, a collapse of the entire chimney".<sup>1</sup> It is reported that Eskom now seeks a temporary solution that would allow the three units to operate, thereby restoring an alleged 2100 megawatts of power to the grid.
4. In this letter, we address the following issues:
  - 4.1. The proposal to bypass SO<sub>2</sub> pollution abatement equipment at Kusile for an undefined period has grave implications for human health. The air quality on the Mpumalanga Highveld has already been found to be in violation of section 24 of the Constitution. Further uncontrolled pollution will significantly exacerbate this Constitutional violation.
  - 4.2. The accuracy of the claim that this proposed stack bypass will result in 2160 MW of generating capacity, based on the past performance at Kusile.
  - 4.3. The cost benefit proposition put forward by Eskom - particularly the value for money proposition, as is required by the Public Finance Management Act, 1999. From information available in the media, it appears that Eskom proposes to incur the full financial and health cost of the temporary bypass in exchange for a possible 13 months of production.
  - 4.4. An alternative proposal that the Kusile FGD malfunction be seen as an opportunity to accelerate the coal phaseout and rather to spend the money on solar photovoltaic (solar PV) or wind installations, at scales ranging from household and commercial, through subsidies, through to large scale Eskom solar (which could be done quickly if on Eskom land, and does not require regulatory approvals in the case of rooftop solar).

**Regulatory requirements applicable to the proposed bypass of the flue gas desulphurisation plant at Kusile power station**

5. Although we have not yet had sight of the correspondence sent to the Minister by Eskom or any written application by Eskom under any applicable legislation for the approval of the construction of new pollution stacks to bypass the flue-gas desulphurisation (FGD) plant at Kusile power station, we have seen various references to such a proposal in the press, including in these articles:

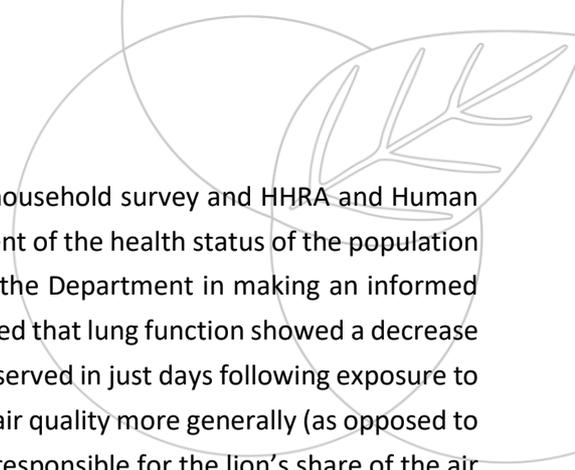
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<sup>1</sup> See Article here: <https://www.news24.com/news24/investigations/kusile-crisis-eskom-in-urgent-bid-to-prevent-220m-tall-chimney-collapse-restore-much-needed-megawatts-20230124>

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- 5.1. <https://www.engineeringnews.co.za/article/temporary-kusile-stacks-set-to-bypass-fgd-for-a-year-while-remediation-works-are-completed-2023-01-30>
  - 5.2. <https://www.news24.com/news24/investigations/kusile-crisis-eskom-in-urgent-bid-to-prevent-220m-tall-chimney-collapse-restore-much-needed-megawatts-20230124>
  - 5.3. <https://www.news24.com/news24/investigations/inside-kusile-repair-race-eskom-pleads-with-govt-but-red-tape-delays-urgent-construction-20230304>
  - 5.4. <https://www.polity.org.za/article/creecy-to-decide-this-week-on-way-forward-for-kusile-exemptions-2023-03-08>
6. We have also taken note of this statement by Eskom: <https://www.eskom.co.za/duct-chimney-failure-shuts-unit-1-of-kusile-power-station/>
  7. Reference is made in the media articles to a range of legal options being considered in terms of AQA, section 30A of the National Environmental Management Act, 1998 (NEMA), and the regulations issued in terms of section 27(2) of the Disaster Management Act, 57 of 2002 on 27 February 2023 (“the Electricity Disaster Regulations”).
  8. We will only be able to consider the legal position in detail once we have had sight of an application by Eskom as submitted to the DFFE. However, at this stage we record that we have grave concerns about the legality of allowing Eskom to emit SO<sub>2</sub> in excess of the MES, particularly in significant volumes, whether under the Electricity Disaster Regulation or otherwise. In particular, it is hard to see how such approval would pass Constitutional muster - with special reference to the decision of the Pretoria High Court in *Groundwork Trust and Another v Minister of Environmental Affairs and Others* [2022] ZAGPPHC 208 (referred to as the “Deadly Air case”). Given the anticipated health impacts of the proposed bypass of FGD proposed by Eskom (see below), it is unlikely that such a measure would survive a Constitutional challenge. We are instructing senior counsel on advice in this regard.

### **Initial assessment of health impacts of unabated SO<sub>2</sub> emissions from Kusile units 1-3**

9. We assume that Eskom has produced or is in the process of producing a health impact assessment of this proposal, since it would in any event not be lawful for any decision to exempt Eskom from any of the regulatory requirements, including the MES and its atmospheric emission licences, without understanding the impacts of its proposed action on human health.
10. In 2018, an expert panel (“the SO<sub>2</sub> Panel”) was appointed to provide strategic and technical guidance towards effective management of sulphur dioxide (SO<sub>2</sub>) from old and existing power generation plants. This SO<sub>2</sub> Report looks at the health impacts of SO<sub>2</sub> emissions and acknowledges the adverse effects of SO<sub>2</sub>. It states: “around the world, SO<sub>2</sub> is known to have major impacts on human health that cannot be ignored. South Africa’s dire inequality and inequity means that the vulnerable and indigent communities are most affected by SO<sub>2</sub>.” The SO<sub>2</sub> Report recognises that even in instances when SO<sub>2</sub> levels meet the NAAQS, adverse respiratory health impacts related to SO<sub>2</sub> exposure occur, especially among children. From epidemiological studies focused on the HPA and the Vaal Triangle Airshed Priority Area (VTAPA) specifically, there are health impacts in these regions due to exposure to air pollution and SO<sub>2</sub>.

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11. The 2019 Highveld Health Study: Final Integrated Report: (medical and household survey and HHRA and Human Health Impacts) (“Highveld Health Study”) to provide a baseline assessment of the health status of the population in the HPA in relation to air quality and public health, in order to assist the Department in making an informed decision on air quality management in the HPA. The Health Study confirmed that lung function showed a decrease after exposure to PM10, PM2.5, SO2, CO and NOx. These effects were observed in just days following exposure to pollution.<sup>2</sup> While the Highveld Health Study concerns itself with ambient air quality more generally (as opposed to specific facility emissions from Eskom), Eskom’s coal power facilities are responsible for the lion’s share of the air pollution in the HPA. We also wish to draw the link between SO2 and Secondary PM2.5 in light of Eskom’s failure to abate SO2 emissions, the SO2 Panel report (discussed above) states that from the perspective of population exposure and public health, regional-level exposure to secondary PM2.5 pollution is the dominant impact of SO2 emissions.<sup>3</sup>
  12. Exposure to SO2 has the following typical health impacts:
    - 12.1. Respiratory health impacts;<sup>4</sup>
    - 12.2. Chronic wheeze;<sup>5</sup>
    - 12.3. Decline in lung function;<sup>6</sup>
    - 12.4. Upper respiratory irritation and bronchoconstriction.<sup>7</sup>
  13. The Life After Coal campaign commissioned the Centre for Research on Energy and Clean Air (CREA) to project the expected health impacts, including air pollution related deaths, from unabated SO2 emissions from Kusile Units 1-3 - for 13 months or 36 months, and at low (33%) or high (100 %) utilisation. This report is attached.
  14. The report projects that:
    - 14.1. At low utilisation for 13 months, there will be 195 air pollution related deaths;
    - 14.2. At high utilisation for 13 months, there will be 492 air pollution related deaths;
    - 14.3. At low utilisation for 36 months, there will be 540 air pollution related deaths;
    - 14.4. At high utilisation for 36 months, there will be 1362 air pollution related deaths.
  15. The report further estimates that “The societal costs associated with the health impacts would be a projected R3.6bn (R2.3–R5.0bn) in the low utilization, 13 months scenario, and R25bn (R16–R35bn) in the high utilization, 36 months scenario.”

#### **Proposed financial cost of and implications of Eskom’s proposal for loadshedding**

16. As mentioned above, we question the accuracy of the claim that the proposed stack bypass will result in 2160 MW of generating capacity, based on the past performance at Kusile. Prior to the stack failure during 2022, it appears that the plant only produced at approximately 33% of its capacity, equivalent to 700 MW of capacity, less than 1 stage of loadshedding.

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<sup>2</sup> Highveld Health Study at page 45.

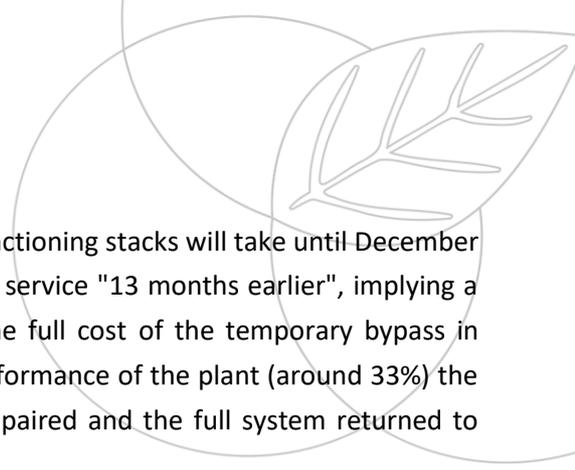
<sup>3</sup> SO2 Panel Report at page 9

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

<sup>7</sup> Highveld Health Study at page 10.

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17. According to Eskom (as reported in the media), fully repairing the malfunctioning stacks will take until December 2024. The temporary bypass will allegedly enable the plant to return to service "13 months earlier", implying a date of November 2023. This implies that Eskom proposes to incur the full cost of the temporary bypass in exchange for a possible 13 months of production. With the low past performance of the plant (around 33%) the bypass equipment will be redundant as soon as the original stack is repaired and the full system returned to service.
18. In addition, there is the very real risk - we will go as far as to say likelihood - that the bypass construction will take longer than "by the end of November 2023" and will cost much more than whatever figure Eskom quotes as the estimated cost.

### **Requests for information and the right to make representations**

19. We request copies of any application made by Eskom to permit the FGD bypass at Kusile, together with an opportunity for interested and affected parties, with special reference to people living in the pollution airshed of Kusile, to make representations.
20. We further request that the following information be placed in the public domain before any decision is made:
- 20.1. What is a reasonable estimate of the time it will take to build and commission the proposed bypass stacks, including all engineering and procurement timelines, and what is the estimated cost of such a measure? (News24 reports that "temporary exhaust stacks manufactured from either steel or concrete would need to be almost 100m tall and would take at least 12 months to build. There is yet no firm cost estimate for the work."
  - 20.2. Do Eskom's plans include the simultaneous repair of the FGD plant, in parallel with the construction of the bypass stacks? If so, how long will this take, and what is the estimated cost? If the repair of the FGD plant is not planned to be done in parallel with the proposed bypass stacks, when will this be done?
  - 20.3. What was the monthly output of the malfunctioning units at Kusile for the past 18 months?
  - 20.4. What is the load factor that Eskom anticipates that the units will function at post the bypass?
  - 20.5. What is the estimated volume of SO<sub>2</sub> emissions that would be released through the bypass stacks, and over what period does Eskom propose to use these bypass stacks?
  - 20.6. Has Eskom carried out any modelling to estimate the impacts of such unabated SO<sub>2</sub> emissions on the ambient air quality? If so, please provide a copy.
  - 20.7. Has Eskom carried out any health impact assessment to estimate the impacts of such unabated SO<sub>2</sub> emissions on the people living in the airshed of the power station? If so, please provide a copy.
  - 20.8. What insurance did Eskom carry in respect of the malfunction of the FGD plant and/or the affected units? Has any insurance been paid out to Eskom?
  - 20.9. Has any claim related to the malfunction been made against the original equipment manufacturer, which has been reported to be General Electric?

## **An opportunity to accelerate the coal phase-out: Alternatives to the FGD bypass**

21. We are of the view that the trade-off that should be considered is not the cost of 2 stages of loadshedding (which we in any event have good reason to question) and value of the power produced over the 13 month period (recognising that the risk is that the plant may not perform even at the 33% load factor level during this period), but rather the expenditure of the same amount of money on solar PV or wind, at scales ranging from household and commercial, through subsidies, through to large scale Eskom solar (which could be done quickly if on Eskom land).
22. We therefore propose that serious consideration be given to using the Kusile malfunction to accelerate the coal phase-out, as well as the roll-out of solar PV and/or wind power generation. We propose that the state applies the funds it would have spent on building the bypass stacks to invest in a large rooftop solar PV programme, both residential and industrial, in Mpumalanga.
23. Such a programme would not only take such demand off the grid and therefore reduce loadshedding and would not require major investment in grid expansion, but would also reduce energy poverty and outdoor and indoor air pollution, thereby saving lives and health costs.
24. Since rooftop solar installations do not require environmental authorisation, this proposal would also avoid the delay of complex regulatory approvals.
25. We request that a formal and public response to this proposal, as an alternative to Eskom's dangerous, expensive and lengthy proposal, be provided.

## **Conclusion**

26. The legal permissibility of an application to bypass SO<sub>2</sub> pollution control at Kusile Units 1-3 is highly questionable. Due consideration should be given to the significant health impacts associated with exposure to SO<sub>2</sub> and other pollutants emitted by Eskom's coal-fired power stations - including hundreds of projected air pollution related deaths.
27. Moreover and in any event, no such decision could be made lawfully without giving an opportunity for interested and affected parties to make representations.
28. We believe the malfunction at Kusile Units 1-3 to provide a major opportunity for an accelerated coal phaseout and solar PV roll-out, including rooftop solar PV and publicly owned solar PV.
29. We reserve the right to take appropriate legal action upon consideration of advice and information received, should a decision be made to permit the FGD bypass at Kusile.
30. We look forward to your response, which we hope to receive by no later than **Friday, 17 March 2023**.

Yours sincerely

**CENTRE FOR ENVIRONMENTAL RIGHTS**

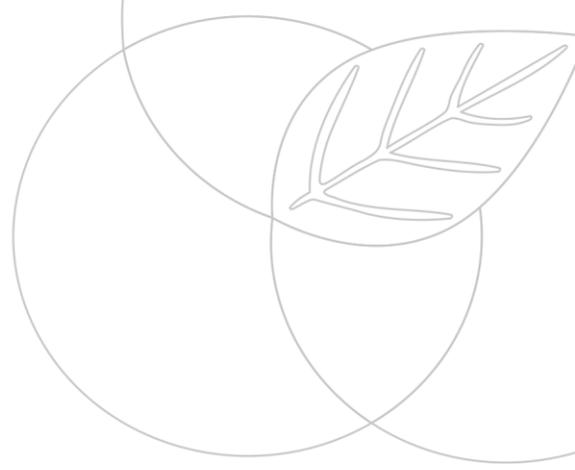


per:

Brandon Abdinor

**Programme Head: Pollution & Climate Change (Acting)**

Direct email: [babdinor@cer.org.za](mailto:babdinor@cer.org.za)



Briefing note, March 9, 2023

# Potential health impacts of bypassing SO<sub>2</sub> controls at Kusile

*Lauri Myllyvirta, lead analyst*

The health impacts of allowing three units at the Kusile power station to operate without SO<sub>2</sub> control devices, using temporary stacks, were assessed for four different scenarios, corresponding to combinations of “low utilization”, based on the recent average load factor of the three units of 33% (for the period from July 2021 to June 2022), and “high utilization”, corresponding to average output of 2,000 MW. The duration of the bypass was assumed to be either 13 or 36 months.

The bypass would result in an estimated 6-fold increase in SO<sub>2</sub> emissions from the plant, based on the ratio of the average flue gas concentrations of SO<sub>2</sub> at Kendal, the nearest power station to Kusile, and at Kusile itself before the issues with flue gas desulfurization started. The base period used for all calculations is July 2021 to June 2022.

The total excess SO<sub>2</sub> emissions resulting from the exemption, compared with normal operation at the same utilization, would be 87,000 to 610,000 tonnes (Table 1). At the high end, this corresponds to almost 40 years worth of emissions from normal operation of the plant.

The resulting health impacts from these excess emissions were assessed following the methodology and data in the CREA [report](#) “Health impacts of Eskom’s non-compliance with minimum emissions standards”<sup>1</sup>. The health impacts would include a projected 200 air pollution-related deaths (95% confidence interval: 120–270) in the low utilization scenario, assuming the bypass is utilized for 13 months, and 1,400 (870–1,900) in the high utilization scenario, assuming the bypass is utilized for 36 months (Table 2).

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<sup>1</sup> <https://energyandcleanair.org/publication/health-impacts-of-eskoms-non-compliance-with-minimum-emissions-standards/>

The societal costs associated with the health impacts would be a projected R3.6 bln (R2.3–5.0 bln) in the low utilization, 13 months scenario, and R25 bln (R16–35 bln) in the high utilization, 36 months scenario.

Table 1: Emissions in the different scenarios

scenario	SO <sub>2</sub> emissions, t/year	excess SO <sub>2</sub> emissions compared with normal operation, cumulative, t
base period	16,100	–
low utilization 13 months	96,600	87,100
high utilization 13 months	244,000	220,000
low utilization 36 months	96,600	241,000
high utilization 36 months	244,000	609,000

Table 2: Excess health impacts in the different scenarios, compared with the normal operation of the plant at the same utilization.

scenario	air pollution-related deaths			economic costs		
	central estimate	95% CI: low	95% CI: high	central estimate	95% CI: low	95% CI: high
high utilization 13 months	492	314	693	9,109	5,730	12,593
high utilization 36 months	1,362	869	1,919	25,226	15,869	34,874
low utilization 13 months	195	124	274	3,607	2,269	4,987
low utilization 36 months	540	344	760	9,989	6,284	13,810