REPORT AND RECOMMENDATIONS TO THE MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT: DR. DION GEORGE, IN RESPECT OF THE EXEMPTION APPLICATION OF ESKOM SUBMITTED IN TERMS OF SECTION 59 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT 39 OF 2004

By



17 MARCH 2025

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1. DISCLAIMER

The information contained in these documents is confidential, privileged and only for the intended recipients and may not be used, published or redistributed without the prior written consent of the Minister.

The opinions expressed are in good faith and while every care has been taken in preparing these documents, HNM makes no representations and gives no warranties of whatever nature in respect of these documents including, but not limited to, the accuracy or completeness of any information, facts and/or opinions contained therein.

Furthermore, while every effort has been made to ensure that HNM relies on the most accurate and upto-date information, it shall not be responsible for any oversight in this regard and this report, including the recommendations contained herein, must be understood against the above backdrop.

The work done by HNM and the consulting experts, the outcome of which is reflected in this report, has been conducted under immense pressure. The tight timeframes have demanded that the scope of work be limited to that which is absolutely essential for purposes of advising the Minister in relation to Eskom's exemption applications.

| Abbreviation | Term |
|--------------|----------------------------------|
| AAQ | Ambient Air Quality |
| AEL | Air Emission License |
| AELA | Air Emission Licensing Authority |
| AQ | Air Quality |
| AQMP | Air Quality Management Plan |

2. ABBREVIATIONS

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| Baseline | The emission load that Eskom would have emitted in 2023 had its coal fleet complied with the MES new plant standards |
|-----------------------|--|
| BAT | Best Available Technology |
| BCR | Benefit cost ratio |
| BIP | Baked in Progress, the reference scenario constructed for the Forum power system modelling |
| BPEO | Best Practicable Environmental Option |
| Сарех | Capital cost |
| СВА | Cost Benefit Analysis |
| СВАМ | Carbon Border Tax Adjustment Mechanism |
| СОР | Conference of the Parties |
| CoUE | Cost of Unserved Energy |
| CRPD | Chronic Respiratory Disease |
| CSIR | Council of Scientific and Industrial Research |
| CSP | Concentrated Solar Power |
| DFFE / the Department | The Department of Forestry, Fisheries and the Environment |
| DHP | Dust Handling Plant |
| DMRE | Department of Mineral Resources and Energy |

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| DSI | Direct Sorbent Injection |
|----------------|--|
| EAF | Energy Availability Factor |
| E-BAM | Is a portable real-time beta gauge designed for accurate and precise measurement of fine particulate matter |
| Eskom ERP 2022 | Eskom Emission Reduction Plan 2022 |
| ESP | Electro-static precipitators |
| ESRG | Energy Systems Research Group (of the University of Cape Town) |
| EV | Electric Vehicle |
| ERP 2022 | Emissions Reduction Plan that was approved by the Eskom Board in July 2022. |
| FFB | Fabric Filter Bags |
| FGD | Flue Gas Desulfurization |
| GHG | Greenhouse Gases which include, Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous oxide (N ₂ O), Sulphur hexafluoride (SF ₆), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). |
| GO | General Overall – scheduled maintenance on PS units to do preventative maintenance, ensure mechanical integrity and Health Safety and Environment requirements (e.g. pressure testing of the boilers to ensure they are safe and will not explode). During this time, the PS is offline and cannot generate electricity. GOs are required every 5-6 years, and the duration of a GO is ± 90 days. |

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| GST | Global Stocktake Report |
|----------------|---|
| GW | GigaWatts: an indication of power plant capacity. |
| GWP | Global Warming Potential which is standardised to a CO ₂ equivalent (CO ₂ eq) |
| | Highveld Priority Area |
| НРА | Area that includes the following Eskom Power Stations: |
| | Arnot, Camden, Grootvlei, Hendrina, Kendal, Kusile [outside of this assignment's scope], Kriel, Komati, Majuba, Matla and Tutuka. |
| HFPS | High Frequency Power Supply |
| HQ | Hazard Quotient – quantification of potential risk to health. HQ less than or equal to one there is a negligible risk to human health, HQ above one indicates a potential risk to human health. |
| Hybrid Vehicle | Vehicles that use an Internal Combustion Engine plus a battery for regenerative braking (e.g.Toyota Prius). |
| I&AP | Interested and Affected Parties |
| ICE | Internal Combustion Engine |
| IEA | International Energy Agency |
| IPCC | Intergovernmental Panel on Climate Change |
| IQAir | Swiss technology company that monitors AQ globally to improve air quality through information and collaboration. |

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| IRP | Integrated Resource Plan |
|--------------------|--|
| IVRS | Integrated Vaal River System |
| JETP | Just Energy Transition Partnership |
| JETP-IP | Just Energy Transition Partnership Investment Plan |
| LCOE | Levelised Cost of Electricity |
| LEDS | Low Emissions Development Strategy |
| LNB | Low NO _X burners |
| LNG | Liquified Natural Gas |
| LRTAP Convention | Long-range Transboundary Air Pollution Convention |
| MCDA | Multi-Criteria Decision Analysis |
| МСШАР | Mokolo-Crocodile Water Augmentation Project |
| MES | Minimum Emissions Standards |
| Ml | Million liters |
| Minister | The Minster of Forestry, Fisheries and the Environment |
| | |
| mg/Nm ³ | Milligrams per normal cubic meter |

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| | Arnot, Camden, Grootvlei, Hendrina, Kendal, Kusile [outside of this assignment's scope], Kriel, Komati, Lethabo, Majuba, Matla and Tutuka. |
|------------|--|
| MW | MegaWatts: an indication of power plant capacity. |
| MWh / KWh | MegaWatt hour / KiloWatt hour: a measure of energy output. |
| MT | MegaTonnes: a measure of the volume of air emissions. |
| MTSAO | Medium Term System Adequacy Outlook |
| NAEIS | National Atmospheric Emission Inventory System |
| NAQO | National Air Quality Officer |
| NDC | National Determined Contribution, South Africa's commitment to GHG reduction under the Paris Agreement of the United Nations Framework Convention on Climate Change. |
| NECA Forum | National Environmental Consultative and Advisory Forum |
| NECD | National Emission Ceilings Directive |
| NECOM | National Energy Crisis Committee |
| NEMA | National Environmental Management Act, 1998 (Act No. 107 of 1998) |
| NEMAQA | National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) |
| NERSA | National Energy Regulator of South Africa |

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| NID | New Flue Gas Desulphurisation |
|-----------------|--|
| NH ₃ | Ammonia |
| NO _X | Nitrous Oxide emissions which consist of the various oxides of nitrogen including NO and NO ₂ . |
| Opex | Annual operational and maintenance costs |
| РА | Priority Area |
| PAEL | Provisional Air Emissions Licence |
| PCC | Presidential Climate Commission |
| | Particulate Matter - this includes PM ₁₀ and PM _{2.5} |
| РМ | PM_{10} is particulate matter with a size less than 10 μ m |
| | $PM_{2.5}$ is particulate matter with a size less than 2.5 μ m |
| PS | Power Station |
| REIPPPP | Renewable Energy Independent Power Producer Procurement Programme |
| RMIPPPP | Risk Mitigation Independent Power Producer Procurement Programme |
| SAAQIS | South African Air Quality Information System |
| SARB | South African Reserve Bank |
| SDA | Semi-Dry spray dryer absorber |

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| SETS | Sectoral Emissions Targets (GHG Emissions) | |
|------------------------------------|---|--|
| SO ₂ or SO _X | Sulphur dioxide emissions | |
| SO3 dosing | Dosing of sulphur trioxide (SO ₃) to the flue gas to the ESPs in order to improve the ESP's efficiency and increase the removal of PMs. | |
| Solar PV | Solar Photovoltaics | |
| tCO ₂ e | Tonnes of Carbon Dioxide Equivalent | |
| TOR | Terms of Reference | |
| tpa | Tons per annum | |
| tpd | Tons per day | |
| UAE Consensus | United Arab Emirates Consensus (forged at COP 28) | |
| UCLF | Unplanned Capability Loss Factor | |
| UNFCCC | United Nations Framework Convention on Climate Change | |
| VOC | Volatile Organic Compounds | |
| VRESS | Vaal River Eastern Sub-System | |
| VTAPA | Vaal Triangle Airshed Priority Area that includes the Lethabo Power Station. | |
| WACC | Weighted Average Cost of Capital | |

| WBPA / Waterberg area | Waterberg - Bojanala Priority Area which includes the Matimba and Medupi Power Stations. | |
|-----------------------|--|--|
| WFGD | Wet Flue Gas Desulfurization | |
| WUL | Water Use Licence | |

3. INTRODUCTION AND BACKGROUND

3.1. THE NATIONAL ENVIRONMENTAL CONSULTATIVE AND ADVISORY FORUM (AS IT WAS THEN CONSTITUTED)

The National Environmental Consultative and Advisory Forum ("the Forum"/"NECA Forum") was established by the former Minister of Forestry, Fisheries and the Environment ("Minister Creecy") under section 3A of the National Environmental Management Act, No. 107 of 1998 ("NEMA"). The Forum's primary function was to conduct an extensive consultative process with key stakeholders, assess and present relevant research and analysis in a public forum, and report its findings and recommendations to the Minister.

The Forum was mandated to address issues arising from non-compliance with the Minimum Emission Standards ("MES") and applications for Provisional Atmospheric Emission Licenses ("PAELs"). The legal framework under the National Environmental Management: Air Quality Act, No. 39 of 2004 ("NEMAQA") identifies activities that result in atmospheric emissions with significant environmental impacts. Entities unable to meet the prescribed MES within legislated timeframes could, in terms of the law, apply for compliance postponements to the National Air Quality Officer ("NAQO"). In 2019, the NAQO received the final set of applications for such postponements. The NAQO granted some applications and denied others. The NAQO's decisions led to multiple appeals concerning various entities and facilities, particularly from and related to Eskom SOC Limited ("Eskom"), as well as other emitters.

The Terms of Reference of the Forum initially provided for a six-month period to complete its work, which was later deemed insufficient. Consequently, Minister Creecy extended its timeframe, requiring the Forum to submit its final report by February 2024. The Forum's work focused predominantly on Eskom while also making recommendations on appeals from other industrial emitters.

The Terms of Reference provided that the Forum must consist of a maximum of six highly qualified experts in air quality, human health, economics, engineering, energy and environmental management. The Minister appointed Mr Peter Harris as Chairperson of the Forum. The appointed members included:

- Mr. Peter Harris An attorney and founding partner of Harris Nupen Molebatsi Inc.
- Associate Professor Aneesa Vanker A paediatric pulmonologist specialising in environmental lung health in children.
- Mr. Avishkar Ramandh An expert in air quality management with experience in research, innovation and regulatory compliance.
- Dr. Emily Tyler An energy and climate mitigation economist with expertise in climate policy, carbon strategies and low-carbon transition planning.
- Mr. Etienne Rübbers An engineer specialising in renewable energy, Just Energy Transition and electricity transmission grid development.
- Ms. Lauren Hermanus A researcher in sustainable energy transitions and urban resilience, whose membership was terminated in early 2024 due to non-participation.
- Dr. Maphuti Kwata A researcher at the Council for Geoscience, who was a member of the Forum but resigned in early 2024 due to work commitments.

The Forum members, despite their high level of expertise, worked under challenging conditions, including low reimbursement rates which, at times, impacted their availability and ability to prioritise Forum activities. Nonetheless, several members demonstrated dedication and professionalism, contributing significantly to the Forum's work over an 18-month period.

The establishment of the NECA Forum was a critical initiative in addressing environmental governance and air quality compliance. Through its consultative process and expert analysis, it played a key role in informing the Minister's decisions on MES non-compliance issues and industrial emissions regulation in South Africa.

3.2. SUMMARY OF THE FORUM'S REPORT

As indicated above, the Forum's primary objective was to assess appeals related to Eskom's power stations and provide recommendations to the Minister. To this end, the Forum conducted extensive consultations, technical analyses and stakeholder engagements, culminating in a comprehensive report exceeding 500 pages.

The Forum analysed appeals arising from decisions made by the NAQO in 2021 regarding Eskom's requests for postponements and suspensions of compliance with new plant standards under the MES.

The NAQO refused Eskom's applications for its Matla, Duvha, Matimba, Medupi, and Lethabo power stations entirely and only partially granted postponements for Eskom's Majuba, Tutuka, Kendal and Kriel power stations. Eskom filed a consolidated appeal against these decisions, seeking to set aside the NAQO's decisions and instead be granted the postponements applied for by the Minister.

In addition to the above, environmental advocacy groups, including the Centre for Environmental Rights, Earthlife Africa and GroundWork Trust, lodged appeals against the NAQO's decisions regarding various power stations. An individual appellant also challenged the NAQO's ruling in favour of Eskom's Port Rex power station. The Forum carefully examined the legal merits of these appeals and grouped the power stations accordingly.

Upon review, the Forum recommended that the Minister uphold the NAQO's decisions for Eskom's Arnot, Camden, Hendrina, Grootvlei, Kriel and Port Rex power stations, dismissing the related appeals. However, Eskom's appeals concerning its Matla, Duvha, Matimba, Medupi, Lethabo, Majuba, Tutuka, Kendal and Kriel power stations were found to be unpersuasive. The Forum determined that a sustainable approach to MES compliance should be considered, integrating multiple critical factors.

Sustainable compliance, as defined by the Forum, necessitates balancing regulatory adherence with broader concerns, including health impacts from non-compliance, ambient air quality, national energy security, economic costs, socio-economic ramifications and South Africa's climate commitments. This required a multi-scalar assessment, considering individual plants, municipalities, priority air quality areas, and the national power system. The financial burden of compliance on Eskom was also scrutinised, recognising that costs at a plant level would impact national electricity pricing.

To navigate these complexities, the Forum employed a multi-disciplinary approach, incorporating legal, environmental and energy system analyses. Tools such as power system modelling, conducted by the Council for Scientific and Industrial Research ("**CSIR**") and a plant-level matrix assessment facilitated a comprehensive understanding of implications at different scales. The findings indicated that upholding the NAQO's decisions would significantly impact national electricity supply, resulting in increased loadshedding and higher electricity costs, albeit improving local air quality.

Given these findings, the Forum recommended that instead of upholding or setting aside the NAQO's decisions, the Minister should, using section 43(6) of NEMA, "make any other appropriate decision" in respect of the appeals. The Forum recommended that the Minister provide Eskom with an opportunity to apply for exemptions, under section 59 of the NEMAQA, from provisions in this Act with which Eskom cannot comply. The Forum recommended that such exemptions, if granted by the Minister, should be accompanied by stringent conditions.

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In addition to the above, the Forum highlighted shortcomings in the existing legislative framework, noting that it does not adequately account for the operational realities of ageing power plants or provide flexible compliance mechanisms. It recommended regulatory reforms, including introducing load-based emissions limits instead of concentration-based limits and exploring fleet-wide compliance strategies, such as the "bubble approach" and pollution levies. These measures would allow Eskom to optimise its operations while gradually reducing emissions in a cost-effective manner.

In conclusion, the Forum underscored the urgent need for a balanced approach that prioritises air quality improvements without compromising national energy security or economic stability. While acknowledging the necessity of stricter environmental regulations, it emphasised the importance of pragmatic solutions to achieve sustainable compliance.

In sum, the Forum's recommendations provided a structured pathway for Eskom, regulatory authorities and policymakers to navigate this complex transition while minimising negative health and socioeconomic consequences.

3.3. SUMMARY OF THE MINISTER'S DECISION

After reviewing the NECA Forum's report, Minister Creecy concurred with the recommendations made by the Forum and issued her decision reflecting such concurrence on 22 May 2024. In relation to Hendrina, Grootvlei, Arnot, Camden and Kriel, the Minister decided to uphold the NAQO's decisions subject to further conditions. In relation to the remaining facilities, the Minister's decision directed Eskom to submit applications for exemptions under section 59 of the NEMAQA.

Minister Creecy's decision noted the Forum's work in developing a number of conditions and limitations which may be imposed on Eskom should any of its exemption applications be successful.

3.4. ESKOM'S APPLICATIONS PURSUANT TO THE MINISTER'S DECISION

Eskom has filed applications requesting an exemption from the MES in terms of section 59 of the NEMAQA, for eight of its coal-fired power stations, namely: Duvha, Kendal, Lethabo, Majuba, Matimba, Matla, Medupi and Tutuka.

The applications were brought pursuant to the Minister's decision, which is summarised above, and highlight the significant technical and financial challenges faced by Eskom in reducing emissions of particulate matter (PM), sulphur dioxide (SO₂) and nitrogen oxides (NO_x).

Although each application is summarised in more detail below, the thrust of Eskom's submissions in its applications is that immediate compliance with the current MES would necessitate the shutdown of

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approximately 24 000 MW of capacity, which would pose a serious risk to national energy security and economic stability. As an alternative to strict compliance, Eskom proposes a phased approach to emissions reduction through the adoption of abatement technologies and alternative compliance strategies.

Eskom's individual power station applications are comprehensive and encompass a broad array of issues, supported by information and studies from various sources. These applications can be effectively summarised into the following points and supporting facts or evidence. The first point advanced in support of the applications is that compliance with the MES is not feasible due to the advanced age of its power plants and the substantial costs associated with retrofitting them with emissions control technologies. The second point made is that the premature closure of non-compliant stations would severely affect the electricity supply and exacerbate South Africa's ongoing energy crisis. Thirdly, Eskom asserts that its power stations are not the sole contributors to air quality issues, identifying industrial operations, mining, waste burning and domestic fuel use as additional pollution sources. Finally, Eskom emphasises that planned emission reduction measures, such as the installation of Flue Gas Desulfurization ("FGD") systems at Medupi and the prioritisation of cleaner stations in electricity dispatch, will progressively mitigate environmental impacts.

To substantiate its claims, Eskom provides historical air quality monitoring data, projections for emission reductions under various compliance scenarios and financial analyses detailing the costs of different emissions control technologies. In addition, Eskom makes reference to a health cost-benefit analysis, indicating that the costs associated with full compliance may exceed the anticipated health benefits in certain scenarios. It also highlights relevant government decisions, including conditional postponements granted in 2021 and the May 2024 directive requiring new exemption applications, demonstrating its commitment to regulatory engagement.

Ultimately and in summary, Eskom seeks approval for an exemption from the MES limits at several stations until planned abatement projects are completed or station shutdowns take place. It proposes alternative emission limits that, while exceeding existing and/or new plant standards, would remain within historical operating levels. Eskom submits that its exemption requests are justified by the necessity of balancing environmental and health considerations with energy security and economic growth. It posits that rigid enforcement of the MES could lead to unintended adverse effects, while its proposed compliance strategy presents a more sustainable and pragmatic solution.

3.5. HOW THE FORUM IS NOW CONSTITUTED / ITS NEW STATUS

Due to challenges with the terms and conditions of their appointment, the tenure of the Forum members was not extended beyond August 2024. It was however decided by the current Minister of the Department, Dr. Dion George ("**the Minister**"), that Eskom's section 59 applications should still be considered by third party experts. As such, Mr Peter Harris and HNM were appointed to advise the Minister in respect of these applications and to do so with the assistance of a number of experts who were part of the Forum, with the addition of Dr. Ramsay.

The experts who will be assisting HNM in assessing Eskom's applications are listed below, together with a summary of their expertise.

Dr. Aneesa Vanker

Dr. Aneesa Vanker is a paediatric pulmonologist specialising in environmental lung health in children. She holds a PhD from the University of Cape Town, with her research focusing on the impact of indoor air pollution and tobacco smoke exposure on child lung health in South Africa. As an Associate Professor at Red Cross War Memorial Children's Hospital, she has led research on environmental determinants of lung health in low and middle income country settings.

Her expertise in respiratory health, air pollution and environmental exposure has positioned her as a leader in advocating for policy changes and multisectoral engagement to mitigate air pollution risks. She has played a key role in scientific and policy advocacy, including engagements with the South African government on climate and air pollution policy.

Dr. Emily Tyler

Dr. Emily Tyler is an energy and climate mitigation economist with 25 years of experience in policy and advisory work. She specialises in climate finance, carbon pricing, power sector modelling and energy transition planning. She has worked extensively in developing country contexts, particularly South Africa. Dr. Tyler is currently associated with Meridian Economics (Pty) Ltd and holds an Honorary Research Associate position at the University of Cape Town's African Climate and Development Institute. She has published extensively on climate policy and economic transition strategies.

Dr. Tyler's qualifications include a Doctorate in Complexity Studies; Master's in Advanced Financial Management; Honours in Economics (University of Cape Town); and Bachelor of Commerce (Economics and Psychology) (Rhodes University).

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Mr. Etienne Rübbers

Mr. Etienne Rübbers is an engineer with extensive expertise in renewable energy, electricity transmission, and public-private partnerships. His qualifications include a BSc Engineering (University of Witwatersrand); MSc in Industrial Management (KU Leuven, Belgium); BCom (Hons) (UNISA); and CFA Charterholder. He consults on Just Energy Transition strategies and is actively involved in South Africa's energy policy through his membership in industry organisations such as the South African National Energy Association (Board Member); South African Independent Power Producers Association (Management Committee Member); and Business Unity South Africa Energy Sub-Committee.

Dr. Lisa Ramsay

Dr. Lisa Ramsay is an air quality expert with experience in atmospheric dispersion modelling; compilation of atmospheric emission inventories and greenhouse gas inventories; odour modelling and management; health impact assessments; climate change impact assessments and strategic air quality management plans. She has delivered projects at international standards and has worked with a variety of clients in the mining, oil and gas, power and industrial sectors, as well as international funding agencies and government bodies. Dr. Ramsay completed a PhD in 2010 at Cambridge University looking at the political ecology of air pollution and environmental health in Durban, South Africa. She is currently an Associate Professor at the College of Health Sciences, University of KwaZulu-Natal.

Dr. Ramsay's qualifications include a Doctor of Philosophy - University of Cambridge (2010); Master of Philosophy - University of Cambridge (2006); Master of Science - Palaeoclimatology, University of KwaZulu-Natal (2005); Bachelor of Science (Hons) - Atmospheric Science, University of Natal (2003) and Bachelor of Science, University of Natal (2002).

4. TERMS OF REFERENCE

4.1. OVERALL OBJECTIVE AND FUNCTIONS OF HNM AND THE EXPERTS

The Minister has instructed HNM to conduct an assessment and analysis of Eskom's section 59 exemption applications. More specifically, the Minister has requested HNM to provide advice, in consultation with the appointed experts, regarding the merits of Eskom's applications and produce a comprehensive report that incorporates both legal and substantive evaluations. HNM is required to report back on its findings and recommendations pertaining to each application, which will be taken into account when the Minister makes his decision on whether or not to grant the applications. It is important to emphasise, at this stage, that while HNM has been requested to assess the applications and

make recommendations in respect thereof, the ultimate decision remains with the Minister, who has the discretion to accept or reject HNM's recommendations.

The advice to Minister George is given by a number of the same individuals who served on the NECA Forum, but it is not given in their capacity as Forum members. HNM and the experts may, however, refer to and rely on work done by the Forum insofar as it is contained in its published report1, for its analysis of Eskom's section 59 applications. HNM nor the experts have relied on information shared with the NECA Forum that does not appear in its published report.

It also bears mention that HNM and the experts have not been given the same broad scope of work as the NECA Forum. Its task is limited to the evaluation and analysis of Eskom's section 59 applications and recommending an outcome in respect of each application to the Minister. It is not obliged to conduct any public participation process nor consult with I&APs.

In discharging its mandate, HNM nor the experts may take into account new information provided by Eskom that does not form part of its applications to the Minister. That said, HNM and the experts are empowered to consult with Eskom and/or any other party for clarity-seeking purposes.

WSP prepared Eskom's section 59 applications on its behalf and prepared a number of documents submitted by Eskom to the Minister. To the extent that reference is made to WSP in this report, it must be understood as a reference to WSP as the author of the applications and documentation submitted by Eskom to the Minister. These same documents may be referred to elsewhere in the report as "Eskom's applications".

4.2. ROLE OF THE DFFE

The Department in general and specifically the NAQO, will extend support to HNM and the experts. This assistance will encompass both administrative support and substantive expert advice regarding various matters related to air quality issues and Atmospheric Emission Licenses. HNM and the experts are grateful for the Department's assistance and support in this regard.

¹<u>https://www.dffe.gov.za/sites/default/files/legislations/appeals/eskom.ems/neca.forum_may2024repor</u> <u>ttoministercreecy.pdf</u>

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5. LEGISLATIVE FRAMEWORK

5.1. THE CONSTITUTION

The Constitution is the supreme law of the Republic of South Africa. The Bill of Rights, contained in Chapter 2 of the Constitution, is a cornerstone of democracy in South Africa and it enshrines the rights of all people in the country.

Of particular relevance to the work of HNM, is the right contained in section 24 of the Constitution:

"24. Environment – Everyone has the right –

- (a) to an environment that is not harmful to their health or well-being; and
- *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –*
 - *(i)* prevent pollution and ecological degradation;
 - (ii) promote conservation; and
 - *(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*"

Environmental rights and the corresponding obligations are contained in section 24 of the Constitution. Section 24(a) grants everyone – citizens and non-citizens alike – an unqualified right to an environment that is not harmful to their health or well-being and, by implication, simultaneously imposes an obligation on the state and the inhabitants of the Republic to refrain from acting in a manner that creates such an environment.

Section 24(b) confers upon everyone, the right to have the environment protected, for the benefit of present and future generations and, accordingly, enjoins the state to take reasonable legislative and other measures that are geared towards, inter alia, preventing pollution and ecological degradation.

Pursuant to the injunction in section 24(b), Parliament enacted a series of environmental statutes, one of which being NEMAQA, which was assented to on 19 February 2005 and commenced on 11 September 2005.

Further, when limiting any Constitutional right, section 36(1) of the Constitution dictates that such power must be exercised in accordance therewith. The section states:

"36. Limitation of rights

1. The rights in the Bill of Rights may be limited only in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom, taking into account all relevant factors, including:

- (a) the nature of the right;
- *(b) the importance of the purpose of the limitation;*
- (c) the nature and extent of the limitation;
- (d) the relation between the limitation and its purpose; and
- (e) less restrictive means to achieve the purpose."

5.2. THE NEMA

In the preamble of the NEMA, it is noted that everyone has the right to an environment that is not harmful to their health or well-being, but it is also recognised that, for many inhabitants of South Africa, this right has not been realised.

Chapter 1 of the NEMA encapsulates the National Environmental Management Principles, which principles, "serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment."² and "[g]uide the interpretation, administration and implementation of this Act [NEMA], and any other law concerned with the protection or management of the environment."³

Chapter 9 of the NEMA specifies environmental management acts, which include the NEMAQA.

Section 43 of the NEMA governs the appeal process, and the decisions made by former Minister Creecy in terms of subsection 6, which stipulates as follows:

"43. Appeals.—

(1) ...

(6) The Minister or an MEC may, after considering such an appeal, confirm, set aside or vary the decision, provision, condition or directive or make any other appropriate decision,

² Section 2(1)(c) of NEMA

³ Section 2(1)(e) of NEMA.

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including a decision that the prescribed fee paid by the appellant, or any part thereof, be refunded."

5.3. THE NEMAQA

The NEMAQA was enacted to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

According to the objects provision of NEMAQA, the Act was enacted to generally give effect to section 24(b) of the Constitution, with a view to enhancing the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people. More specifically, the Act was enacted to protect the environment by providing reasonable measures for (i) the protection and enhancement of the quality of air in the Republic; (ii) the prevention of air pollution and ecological degradation; and (iii) securing ecologically sustainable development while promoting justifiable economic and social development.

Section 9 of the NEMAQA concerns the national standards of ambient air quality for the purpose of developing air quality plans.

One of the mechanisms in NEMAQA, designed to achieve the above objects, is found in section 21 of NEMAQA. Section 21(1) provides that the Minister must, by notice in the Gazette, publish a list of activities which result in atmospheric emissions and which the Minister reasonably believes have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage.

Section 21(3)(a) of NEMAQA, states that the notice containing the Listed Activities must establish MES in respect of a substance or mixture of substances resulting from a Listed Activity. The MES must include the permissible amount, volume, emission rate or concentration of that substance or mixture of substances that may be emitted. Section 21(3)(c) requires the notice to indicate the date on which the notice containing the Listed Activities and the MES takes effect.

In terms of section 22 of the NEMAQA, no person may, without a PAEL, or an AEL, conduct an activity listed on the national list anywhere in the Republic, or listed on the list applicable to a province anywhere in that province.

Chapter 5 of the NEMAQA provides for the detailed process and procedure applicable to PAELs and AELs. Section 39 stipulates the factors to be taken into account by licensing authorities when considering an application for an AEL.

This section states that,

"39. *Factors to be taken into account by licensing authorities*. — *When considering an application for an atmospheric emission licence, the licensing authority must take into account all relevant matters, including*—

- (a) any applicable minimum standards set for ambient air and point source emissions that have been determined in terms of this Act;
- (b) the pollution being or likely to be caused by the carrying out of the listed activity applied for and the effect or likely effect of that pollution on the environment, including health, social conditions, economic conditions, cultural heritage and ambient air quality;
- (c) the best practicable environmental options available that could be taken
 - *(i) to prevent, control, abate or mitigate that pollution; and*
 - (ii) to protect the environment, including health, social conditions, economic conditions, cultural heritage and ambient air quality, from harm as a result of that pollution;
- (d) section 24 of the National Environmental Management Act and any applicable environmental impact assessment done, the decision taken on the application of the environmental authorisation, and any applicable notice issued or regulation made pursuant to that section.
- (e) any relevant tradable emission scheme.
- (f) whether the applicant is a fit and proper person as contemplated in section 49;
- (g) the applicant's submissions;
- (h) any submissions from organs of state, interested persons and the public; and
- (i) any guidelines issued by the Minister or MEC relating to the performance by licensing authorities of their functions."

Section 59 of the NEMAQA provides for exemptions and states as follows,

"59. Exemptions –

(1) (a) Any person or organ of state may, in writing, apply for exemption from the application of a provision of this Act to the Minister.

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(b) No exemption from a provision of section 9, 22 or 25 may be granted in terms of paragraph (a).

- (2) An application in terms of subsection (1) must be accompanied by reasons.
- (3) (a) The Minister may require an applicant applying for exemption to take appropriate steps to bring the application to the attention of relevant organs of state, interested persons and the public.

(b) The steps contemplated in paragraph (a) must include the publication of a notice in at least two newspapers circulating nationally -

- *(i)* giving reasons for the application; and
- *(ii) containing such other particulars concerning the application as the Minister may require.*
- (4) The Minister may
 - (a) from time to time review any exemption granted in terms of this section; and
 - (b) on good grounds withdraw any exemption.
- (5) The Minister may on such conditions and limitations determined by the Minister delegate any of the powers contained in this section to –
- (a) the MEC responsible for air quality in a province; or
- (b) a metropolitan or district municipality."

5.4. THE MES

On 31 March 2010, the then Minister of Water and Environmental Affairs, Ms Buyelwa Patience Sonjica ("**Minister Sonjica**"), published a notice in terms of section 21, which identified several activities as Listed Activities and prescribed the MES for the said activities ("**List of Activities**").⁴ The List of Activities contains ten categories of Listed Activities, each comprising of smaller subcategories.

In addition to setting the MES for each category, the List of Activities, in paragraph 5, prescribes the time period within which all AEL holders, that are subject to the List of Activities, are required to comply with the prescribed MES. It initially provided that:

⁴ List of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including, health, social conditions, economic conditions, ecological conditions or cultural heritage in GN 248 GG 33064 of 31 March 2010 ("List of Activities")

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"(8) New plant must comply with the new plant minimum emission standards as contained in Part 3 from 01 April 2010.

(9) Existing plant must comply with minimum emission standards for existing plant as contained in Part 3 by 01 April 2015, unless where specified.

(10) Existing plant must comply with minimum emission standards for new plant as contained in Part 3 by 01 April 2020, unless where specified."⁵

On 22 November 2013, the List of Activities was, again, amended.⁶ The MES prescribed for solid fuel combustion installations and the compliance timeframes applicable to all categories of Listed Activities were, however, not altered. Further, in May 2020, the incumbent Minister, Minister Creecy, amended the List of Activities and, save for introducing a new special arrangement in respect of Category 1.1, the List of Activities was largely left unchanged.

The newly introduced special arrangement provides that existing plants⁷ shall comply with a new plant emission limit of 1000mg/Nm³ for SO₂.

Subcategory 1.1 provides for the following MES:

⁷ For the definition of "existing plant", see above note 5

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⁵ The language in this provision has been amended to specifically mention the date when emitters are required to comply with the prescribed MES. It is worth pointing out that the time periods themselves have not changed, only the language. The new paragraph 5 reads:

[&]quot;(8) New plant must comply with the new plant minimum emission standards as contained in Part 3 from 01 April 2010.

⁽⁹⁾ Existing plant must comply with minimum emission standards for existing plant as contained in Part 3 by 01 April 2015, unless where specified.

⁽¹⁰⁾ Existing plant must comply with minimum emission standards for new plant as contained in Part 3 by 01 April 2020, unless where specified." (Own emphasis.)

⁶ List of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage in GN 893 GG 37054 of 22 November 2013.

| Description: | Solid fuels combustion installations used primarily for steam raising or electricity generation. | | | | |
|---------------------------------------|--|----------|---|--|--|
| Application: | All installations with design capacity equal to or greater than 50MW heat input per unit, based on the lower calorific value of the fuel used. | | | | |
| Substance or mixture of substances | | Plant | mg/Nm ³ under normal conditions of | | |
| Common name | Chemical symbol | status | 10% O ₂ , 273 Kelvin and 101.3kPa. | | |
| Particulate matter | N/A | New | 50 | | |
| | N/A | Existing | 100 | | |
| Sulphur dioxide | 50- | New | 500 | | |
| | 302 | Existing | 3 500 | | |
| Oxides of nitrogen | NO _x expressed | New | 750 | | |
| | as NO ₂ | Existing | 1 100 | | |

Table 1: Amended MES subcategory 1

As stated above, with effect from 27 March 2020, the MES for subcategory 1 were amended to state that "*existing plants shall comply with a new plant limit of 1000 mg/Nm³ for sulphur dioxide (SO₂)*". This increased the applicable limit from 500 mg/Nm³ as provided for in the Table 1 above.

5.5. NATIONAL FRAMEWORK (INCLUDING REFERENCE TO ESTABLISHMENT OF PRIORITY AREAS)

The 2017 Framework was published in terms of section 7(5) of the NEMAQA in Government Gazette No. 41996, on 26 October 2018.

In paragraph 1.3 of the 2017 Framework, its purpose is set out as being "to achieve the objectives of the AQA, and as such the National Framework provides a medium-to long-term plan of the practical implementation of the AQA. The Framework provides mechanisms, systems and procedures to promote holistic and integrated air quality management through pollution prevention and minimisation at source, and through impact management with respect to the receiving environment from local scale to international issues. Hence, the National Framework provides norms and standards for all technical aspects of air quality management."

On page 61 of the 2017 Framework, under paragraph 5.4.3.4, reference is made to the once-off suspension. In this regard, it is stated that, "[e]xisting facilities that will be decommissioned by 2030 may apply for a once-off suspension of compliance timeframes with new plant standards for a period not beyond 2030. An application must be accompanied by a clear decommissioning schedule and no such application shall be accepted after 31 March 2019."

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5.6. THE CLIMATE CHANGE ACT (NO. 22 OF 2024)

The Climate Change Act (No. 22 of 2024) highlights the importance of policy alignment and the need for 'climate change considerations to be integrated into the making of decisions which may have a significant effect on the Republic's ability to mitigate or which exacerbate its vulnerability to climate change'.

5.7. PROMOTION OF ADMINISTRATIVE JUSTICE ACT 3 OF 2000 ("PAJA")

The PAJA governs administration action, which includes a decision made or a failure to make a decision by administrators. Such action is reviewable under the PAJA if it is not rational considering the factors listed in section 6 of the PAJA, which are: the purpose for which it was taken; the purpose of the empowering provision; the information available to the administrator and the reasons provided by the administrator.

5.8. APPLICABLE CASE LAW

On 18 March 2022, Collis J handed down judgment in the matter of The Trustees for the time being of Groundwork Trust and another v The Minister of Environmental Affairs and four others (commonly referred to as the "Deadly Air Case").

There were a number of issues which the Court was called upon to decide, including: Whether there had been a breach of section 24(a) of the Constitution and the proper interpretation of section 20 of the NEMAQA, in particular "whether section 20 provides for discretionary power to make regulations or whether it provides for an obligation or duty to do so…"

At paragraph 241, Collis J's order included the following: "It is declared that the poor air quality in the Highveld Priority Area is in breach of residents' section 24(a) constitutional right to an environment that is not harmful to their health and wellbeing. It is declared that the Minister of Environmental Affairs ("Minister") has a legal duty to prescribe regulations under section 20 of the National Environmental Management: Air Quality Act 39 of 2004 to implement and enforce the Highveld Priority Area Air Quality Management Plan ("**Highveld Plan**")."

HNM is cognisant of the significance of this judgment and its far-reaching impact.

5.9. INTERNATIONAL LAW OBLIGATIONS

5.9.1. United Nations Obligations

General Comment No. 26, issued by the United Nations Committee on the Rights of the Child (CRC),⁸ outlines the obligations of States and other entities regarding children's rights in relation to the environment, with a particular focus on climate change. It emphasizes that environmental harm, including climate-related impacts, directly affects children's rights, such as the rights to life, health, and development.

In particular, it imposes an obligation on States to prevent environmental harm that affects children's rights by implementing laws, policies, and regulations to mitigate climate change.

5.9.2. Paris Agreement and Updated 2021 Nationally Determined Contribution

The Paris Agreement⁹ is a legally binding international treaty under the United Nations Framework Convention on Climate Change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016.

South Africa's intended nationally determined contribution (INDC)¹⁰ was submitted on 25 September 2015 prior to COP 21 and became its first NDC on 1 November 2016, following ratification of the Paris Agreement.

In September 2021, South Africa updated its NDC, meeting its obligation under Article 4.9 of the Paris Agreement to communicate NDCs every five years, and responding to the requests in paragraphs 23 to 25 of decision 1/CP.21.

In its updated NDC of 2021, South Africa commits to absolute emissions target levels in the range of 350 - 420 million tonnes carbon dioxide equivalent (MtCO₂e), including 'land use, land-use change and forestry' (LULUCF), for 2030. Assuming LULUCF remains at the average level over 2007 - 2017 (-16

⁸ CRC/C/GC/26, United Nations Committee on the Rights of the Child, General Comment No. 26 (2023) on children's rights and the environment with a special focus on climate change.

⁹ Paris Agreement. (2015). United Nations Treaty Series, 2316 (entered into force on November 4, 2016).

¹⁰ http://www4.unfccc.int/submissions/INDC/Published Documents/South Africa/1/South Africa.pdf.

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MtCO₂e), this NDC target range translates to emission levels in 2030 of between 366 - 436 MtCO₂e excluding LULUCF, equivalent to a 3–23% increase above 1990 levels excluding LULUCF.

A second NDC must be communicated in 2025 as specified in UNFCCC decision 1/CP.21.

A key principle of the UNFCCC and the Paris Agreement relevant to this assessment concerns "*common* but differentiated responsibilities and respective capabilities" of developed and developing countries, in "the light of national circumstances", which forms the basis for the "just transition" narrative.

5.10. ADDITIONAL LEGAL OBLIGATIONS

5.10.1. National Development Plan 2030

The NDP 2030¹¹ is a long-term strategic plan for South Africa developed to guide South Africa's economic and social development over the period 2012 to 2030. The plan was developed through a consultative process that involved extensive engagement with stakeholders from government, civil society, and the private sector. The NDP sets out the country's long-term goals, including the transition to a lower-carbon economy. The plan aims to reduce South Africa's GHG emissions by 42% by 2025 and increase the share of renewable energy in the energy mix to 30% by 2030. The NDP also includes measures to improve energy efficiency and to reduce the country's reliance on fossil fuels.

The NDP has several objectives related to climate and energy, including:

- *Transition to a lower-carbon economy*: The NDP seeks to transition South Africa to a lower-carbon economy by reducing GHG emissions and promoting the use of renewable energy sources.
- *Energy security*: The NDP aims to ensure that South Africa has a reliable and secure supply of energy to support economic growth and development.
- *Access to energy*: The NDP aims to ensure that all South Africans have access to affordable and reliable energy services.

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¹¹ National Planning Commission. (2011). National Development Plan 2030: Our Future - Make It Work. Pretoria: The Presidency, South Africa. https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf

The NDP has several key strategies to achieve its objectives, including:

- *Renewable energy*: The NDP promotes the development and use of renewable energy sources, such as solar and wind power, to reduce GHG emissions and increase energy security.
- *Energy efficiency*: The NDP promotes energy efficiency measures to reduce energy demand and improve the efficiency of energy use.
- *Energy mix*: The NDP advocates for a diversified energy mix that includes renewable energy, nuclear energy, and fossil fuels, to ensure a reliable and secure supply of energy.
- *Innovation*: The NDP supports research and development of new technologies, promotes innovation and new technology adoption in the energy sector to improve energy efficiency and reduce GHG emissions.

5.10.2. National Energy Efficiency Strategy and National Energy Efficiency Action Plan

The White Paper on Energy Policy (1998)¹² gives a mandate to the Department of Energy (DoE, now part of DMRE) to pursue energy efficiency programmes which is one of the lowest cost options for reducing energy consumption. The National Energy Efficiency Strategy (NEES) was approved by Cabinet and released in 2005 to explore the potential for improved energy utilisation through reducing the nation's energy intensity (thus reducing GHG emissions) and decoupling economic growth from energy demand.

The vision of the NEES is to reduce the energy intensity of the economy through energy efficiency. In 2008, DoE undertook the first review of the NEES¹³, however the review document was not favourably received by a significant proportion of the stakeholders as evident from the comments during the public consultation process. Key concerns around definitions were established, including definitions of fundamental terms, such as energy efficiency, monitoring system and baseline information. A point of contention was the dates upon which baselines would be established (which dates the DoE needed to begin looking from) and the lack of clear criteria for sector-specific level of achievement.

¹² White Paper on the Energy Policy of the Republic of South Africa, Department of Minerals and Energy, Pretoria, December 1998.

¹³ National Energy Efficiency Strategy. First Review October 2008. https://www.gov.za/sites/default/files/gcis_document/201409/32249580.pdf

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In 2011, the second review of the NEES commenced. As part of the review process¹⁴, there were intense sectoral workshops to address the controversial elements of NEES identified by stakeholders in the original documentation. Furthermore, an EE Policy Mapping Study was conducted in collaboration with SANEDI and GIZ. This policy assessment allowed for an interrogation of the needs of a diverse range of stakeholders and for the development of a framework for a monitoring tool and action plan to guide a coordinated and unified approach. The outputs of these assessments provided a comprehensive policy and legislative context for the development of the National Energy Efficiency Action Plan (NEEAP)¹⁵ for the Republic of South Africa. The NEEAP has listed priority activities to be implemented annually, including adjustments of sector/sub-sector baselines, and post-2015 NEES targets and programmes¹⁶.

NEES and NEEAP are considered technical documentation that do not explicitly tackle the E&S elements of energy efficiency strategies. One key critique is that the NEES and NEEAP do not address barriers to energy efficiency adoption.

5.10.3. Integrated Resource Plan

In May 2011, the then DoE released the Integrated Resource Plan 2010¹⁷ in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The IRP 2010 was intended to be a 'living plan' that would be periodically revised by the DoE. IRP 2010 stated that at the very least the IRP should be revised by the DoE every two years, but this did not happen. This lapse contributed to an energy mix that failed to adequately meet the constantly changing supply and demand scenarios in South Africa, nor did it reflect global technological advancements in the efficient and responsible generation of energy.

IRP 2019¹⁸, updating IRP 2010, plans for the decommissioning of 11.5 gigawatts (GW) of coal-fired power plants, and a major new-build comprising 14.6 GW of utility-scale wind, 6.0 GW of utility-scale solar photovoltaic (PV), and about 5 GW of distributed self-generation by electricity consumers, all

¹⁷ DoE (2011). Integrated Resource Plan 2010. https://www.energy.gov.za/irp/irp%20files/irp2010_2030_final_report_20110325.pdf.

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¹⁴ https://www.gov.za/documents/draft-second-national-energy-efficiency-strategy-review-commentsinvited

¹⁵ https://www.energy.gov.za/files/aboutus/DMRE-Strategic-Plan-2020-2025.pdf

¹⁶ https://www.energy.gov.za/files/policies/Annex-B-Energy-Efficiency-Measures.pdf

¹⁸ DoE (2018). Integrated Resource Plan (IRP) 2019, Government Gazette 42784. https://www.gov.za/sites/default/files/gcis_document/201910/42778gon1359.pdf

complimented by 3 GW of gas- or diesel-fired power, and 2 GW of battery storage. In addition, IRP 2019 includes 1.5 GW of new coal-fired power, 2.5 GW of hydropower imports and 1.8 GW of nuclear power (a 20-year extension of the operating license of the existing Koeberg power station in the Western Cape). The 1.5 GW of new coal power are unlikely in line with decarbonisation policy and recent court judgements¹⁹. The 2.5 GW of imported hydropower from the Inga Project by 2030 is generally considered to be an unrealistic goal.

It is relevant that the 1.5 GW of new coal-fired power would increase greenhouse gas emissions to levels that are incompatible with South Africa's commitment to reduce its emissions under the Paris Climate Agreement. This contradiction between the revised NDC and IRP 2019 highlights the urgent need for an update of the IRP. We understand that the next draft IRP will be made available for comment in July 2023, but Cabinet approval is not likely to happen until 2024 at the earliest. A study released by the Energy Systems Research Group at the University of Cape Town²⁰ found that in addition to the GHG implications, the proposed 1.5 MW of new coal-fired power will cost at least R23-billion more than a least-cost optimal electricity plan for South Africa and will result in 25,000 economy-wide job losses by 2030. The study also found that if South Africa intends to meet its revised climate targets (350 - 420 MtCO₂e) by 2030 and still go ahead with its plans for 1,500MW of new coal-fired power, it will cost an additional R74- to R109-billion.

The IRP 2010 contained capacity allocations for electricity generated from renewable technologies, and it is against these allocations that the then Minister of Energy issued Ministerial Determinations for renewable energy, which included the technologies of solar PV, concentrated solar power (CSP), wind, landfill gas, biomass, biogas and small hydro. To date, there have been six bidding rounds for renewable energy projects under the Renewable Energy Independent Power Producer Procurement Program (REIPPPP). There remain projects under Bid Window 5 that have not yet reached financial close. Bid Window 6 received 56 bids by October 2022. NERSA approved generations licenses for five preferred bidders, all solar, and in the North West and Free State provinces.

¹⁹ Centre for Environmental Rights (2020). Celebrating a major climate victory: Court sets aside approval for Thabametsi coal power plant. URL: https://cer.org.za/news/celebrating-a-major-climate-victory-court-sets-aside-approval-for-thabametsi-coal-power-plant.

²⁰ Merven, B. *et al.* (2021). Assessment of new coal generation capacity targets in South Africa's 2019 Integrated Resource Plan for Electricity, Energy Systems Research Group, University of Cape Town. https://cer.org.za/wp-content/uploads/2021/11/ESRG_New-coal-plants-South-Africa_021121.pdf.

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The dominant technology in the IRP 2019 is renewable energy from wind and solar PV technologies, with wind being identified as the preferred technology. There is a consistent annual allocation of 1,600 MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1,000 MW per year is incremental over the period up to 2030, with no allocation in the years 2024 (the year the Koeberg nuclear extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2,000 MW of gas is expected in the year 2027). The IRP 2019 states that although there are annual build limits, in the long run such limits will be reviewed to consider demand and supply requirements.

The IRP 2019 includes a nominal value of 200 MW per annum for embedded energy. This is likely to be gross underestimation of the contribution of embedded energy to the energy mix with approximately 58 projects with a combined generation capacity of 4,500 MW at various stages of development in May 2022²¹.

5.10.4. The National Greenhouse Gas Reporting Regulations and Carbon Tax Act, 15 of 2019

The Greenhouse Gas Reporting Regulations²² were released in 2017 under the National Environmental Management: Air Quality Act. These regulations require any company or entity that exceeds the thresholds stipulated in Annexure 1 to report their GHG emissions annually, using the National GHG Inventory Guidelines as the framework. The regulations apply to a wide range of business sectors, including power generation, mining, manufacturing, transport, and waste management. By requiring companies to report their emissions, South Africa aims to improve transparency around carbon emissions, promote carbon reduction, and meet its international commitments.

The Carbon Tax Act 15 of 2019^{23} implements an environmental levy or tax for CO₂ emissions resulting from the combustion of fossil fuels and selected industrial processes. The tax is designed to be revenueneutral, with the revenue generated by the tax being used to fund a range of measures aimed at reducing GHG emissions and promoting sustainable development.

²¹ Operation Vulindlela: Progress Update: Q1 Report (2022). https://www.thepresidency.gov.za/download/file/fid/2498

²² National Environmental Management: Air Quality Act (Act 39 of 2004): National Greenhouse Gas Emission Reporting Regulations. DEA. 2017. Government Gazette, No. 40762.

²³ Carbon Tax Act 15 of 2019. Government Gazette, No. 42483.

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The Carbon Tax Act implements a tax for CO_2 emissions resulting from the combustion of fossil fuels. The tax is designed to be revenue-neutral, with the revenue generated by the tax being used to fund a range of measures aimed at reducing GHG emissions and promoting sustainable development.

The Carbon Tax Act also provides several allowances for companies or entities to reduce their tax liability. This includes basic allowance for fossil fuel combustion, industrial processes, and fugitive emissions (to be phased out over time), trade exposure allowance (for companies that may be adversely affected by imports), performance allowance (for companies below sector carbon intensity benchmarks), carbon budget allowance (for companies that set and stay with voluntary carbon budget), and offset allowance. The offset allowance allowed for the creation of a Carbon Offsets Administration System (COAS) to manage carbon offsets. Carbon offsets allow companies to earn credits by investing in projects that reduce GHG emissions, such as renewable energy projects or reforestation. These credits can then be used to offset their own emissions, reducing their tax liability.

5.10.5. The Just Energy Transition Investment Plan

The Just Energy Transition Investment Plan (JET-IP)²⁴ was released in 2021 as a framework for investing in the clean energy sector as part of a transition away from fossil fuels and towards renewable energy sources. JET-IP focus sectors are:

- The electricity sector (decommissioning of coal-fired power stations, new generation capacity, transmission grid and distribution network).
- The new energy vehicle sector (investment, green/sustainable manufacturing, penetration potential)
- The green hydrogen sector (infrastructural planning, investment and market focus).

The plan aims to address the economic and social challenges that arise from this shift in energy sources by ensuring that workers and communities that are affected by the shift are supported through the transition.

²⁴ South African Government (2021). South Africa's Just Energy Transition Investment Plan (JET-IP) 2023-2027. https://www.thepresidency.gov.za/content/south-africa%27s-just-energy-transition-investment-plan-jet-ip-2023-2027.

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JET-IP focuses on a range of key areas, including the deployment of renewable energy technologies, the development of new skills and training for workers in the renewable energy sector, and the creation of new green jobs to replace jobs lost in the fossil fuel industry. The plan also prioritizes the development of clean energy infrastructure, including energy-efficient buildings, smart grids, and electric vehicle charging stations.

5.10.6. Just Transition Framework

The Presidential Climate Commission's Just Transition Framework (2022)²⁵ is a plan that focuses on ensuring an equitable and fair transition to a lower-carbon economy for workers, communities, and businesses that may be negatively impacted by policies and efforts to align with South Africa's NDC commitments.

The framework aims to identify new opportunities for job creation, training, and education for people in industries that are affected by the transition. This includes providing support for workers who may lose their jobs as certain industries decline while others grow. The Just Transition Framework also recognises the importance of engaging with and supporting local communities, including those disproportionately affected by pollution and the physical risks of climate change, to ensure they have a voice in the decision-making process and benefit from the economic opportunities arising from the transition.

5.10.7. Draft National Mine Closure Strategy

The Draft Mine Closure Strategy²⁶ was published for comment in May 2021, for comments to DMRE by 23 July 2021. The draft strategy highlights the environmental degradation and economic hardships associated with mine closure. Section 3.2 of the draft strategy are summarised as objectives of the draft strategy. Of standout importance in these objectives would be the concepts of; "demarcated areas", "mine working together", "self-sustaining ecosystems", "no negative impact on adjacent mines", "strategic water management", "post closure water management strategy for an area", "post closure provisions", "post closure stewardship" and "integration environmental and social management plans". The strategy highlights that the Environmental Management Programmes (EMPr's) should be aligned

²⁵ Presidential Climate Commission (PCC), (2022). A Framework for a Just Transition in South Africa https://pccommissionflo.imgix.net/uploads/images/A-Just-Transition-Framework-for-South-Africa-2022.pdf.

²⁶ DMRE (2021). Draft National Mine Closure Strategy. Government Gazette 44607.

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to post-mining impact management. The situational challenges of how one mine closure might impact on another operational mine in the same area is also presented.

Related regulations include the Financial Provisioning Regulations²⁷, the guidelines for mine closure contained in the Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA²⁸), the EIA requirements in the National Environmental Management Act 107 of 1998 and guidelines in the NWA. Also of relevance would be international standard presented by amongst other the International Council on Mining and Metals (ICMM) and International Finance Corporation (IFC). The three plans, namely the Annual Rehabilitation Plan; Final Rehabilitation, Decommissioning and Mine Closure Plan; and an Environmental Risk Assessment Report (i.e., assess residual impacts), as required by the Financial Provisioning Regulations, could in future be contextualised by the Regional Mine Closure Strategies (RMCS) as suggested in the draft strategy.

The RMCSs are positioned as a reference that sets specific closure standards for mines in a specific cluster or region to promote closure alignment. It is shown that the RMCS, which is understood to be subjected to a National Mine Closure Strategy (NMCS), will also guide the requirements for; closure application process, inclusions to the EMPrs as well as financial provisions.

6. ADDITIONAL CONTEXT AND ISSUES CONSIDERED

6.1. MARKET REFORM CONTEXT

South Africa's power sector has historically been structured as a state-owned, vertically integrated monopoly. Eskom generates, transmits and, together with municipalities, distributes power. The Energy White Paper of 1998 introduced a liberalisation objective, the main components of which include unbundling Eskom into separate generation and transmission companies, promotion of competition in the generation space, encouraging private sector participation, and providing open and non-discriminatory access to the transmission system.

In 2021, the 1MW licencing threshold for embedded power generation contained in the Electricity Regulation Act (2006) was lifted, with a rapid response from the private sector developing embedded renewables projects. At the time of writing, total registered private generation capacity exceeds

²⁷ https://www.dffe.gov.za/sites/default/files/crr.pdf

²⁸ Mineral and Petroleum Resources Development Act 28 of 2002. Government Gazette 23922.

9000MW, with investment surpassing R200Bn.²⁹ The Electricity Regulation Amendment Act of 2024 signalled the most significant commitment to liberalisation to date. The Amendment Act:

- Introduces a multi-market system for wholesale power, to create an environment where Eskom Generation competes with the private sector to supply power. This market is anticipated to be operational within five years.
- Requires the development of a Market Code to govern this market system.
- Provides for the establishment of the Transmission System Operator ("**TSO**") with the National Transmission Company of South Africa ("**NTCSA**") as the acting TSO until a new entity is established. The NTCSA is the former Eskom Transmission and remains under Eskom Holdings.
- Supports the unbundling of Eskom into separate Generation, Transmission (NTCSA) and Distribution entities.

Work is well underway within the NTCSA to establish the multi-market system, aiming for a transition period of five years (2030). Ultimately, Eskom's power plants, acting as individual 'trading units' will compete with private generators to sell power into the spot wholesale market. In the transition period however, the market price signal will be weak for the legacy Eskom Generation and Independent Power Producer Procurement Programme Office projects: The coal plants are protected from full market exposure by the requirement that NERSA approve individual plant bids into the wholesale market, based on costs, and each coal plant will also establish a Vesting Contract for Differences with the Central Purchasing Agency (a transitional entity) to cover legacy costs. Until there is sufficient new capacity coming online, the coal plants will set the market price, continuing to essentially act as a monopoly. As the transition period progresses, this should reduce, but it is incremental and will take time. The pace of bringing new plants online is dependent on many different factors and is highly uncertain.

The significant majority of new capacity built in South Africa will be renewables, as these technologies can provide electricity at least cost (IRP, 2024; Meridian Economics IRP 2023 Review, ESRG 2021). Exposed to the full economics of power provision, including the carbon tax, through the market structure, the South African power system will evolve significantly over the coming decades. The nature of a renewables dominant system is very different from the coal dominant system the country currently has.

²⁹ Yelland, C, March 2025. Eskom's load shedding crisis: Confusion, contradictions and uncertainty in EE Business Intelligence new and announcements, Issue 146, March 2025.

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Renewables are non-dispatchable, meaning they only generate when the sun shines or the wind blows. This requires a greater amount of storage and peaking capacity on the power system than is demanded by a 'baseload' dominant system like the one we have at present. For Eskom's coal fleet, there will be value in being able to similarly evolve and operate more flexibly – running at fewer hours in the year and at lower utilisation rates. This will likely involve greater inefficiency and some technical and operational expenditure to enable this flexibility. Ultimately, some degree of flexibilisation is anticipated to outweigh these costs in terms of revenue achievable on the market. Eskom's exemption application states that to meet the country's GHG emission commitments, an average load factor for the coal fleet of 40-45% in 2030-2035 and 48-55% post 2035 is anticipated.

Ultimately, the coal fleet cannot expect to operate at full utilisation for their full technical life as remains the basis in Integrated Resource Planning to date. Under a market system, coal plants will run at full utilisation only until there is sufficient renewables capacity on the system to outcompete them. This is currently anticipated to start around 2030. Further investment in the coal fleet assuming all plants will operate at full utilisation until the end of their technical lives may end up in this investment not realising its full benefit, which could result in wasteful public expenditure.

6.2. THE CER'S OBJECTIONS TO ESKOM'S SECTION 59 EXEMPTION APPLICATIONS

In response to Eskom's section 59 exemption application, the Centre for Environmental Rights made a submission in its own name and on behalf of its clients, groundWork Trust and Earthlife Africa. The three organisations, together, comprise the Life after Coal / Impilo Ngaphandle Kwamalahle Campaign (hereinafter referred to as "Life after Coal").

Below is a summary of the assertions contained in the above submission, which were taken into account by HNM in reaching the findings and recommendations contained in this report, and in no way seeks to set out all of the assertions made by Life after Coal therein.

The general position of Life after Coal, in its submission, is that "*it is untenable to pit load shedding against the constitutionally protected health and well-being of communities in priority areas*" and that "[c]ompliance with the law is not negotiable".

At the outset, Life After Coal asserts, in its submission, that Minister Creecy directed Eskom to apply for exemptions in respect of its Matla, Duvha, Tutuka and Kendal power stations only, but that Eskom applied, instead, for exemptions in respect of 8 of its power stations.

In relation to the Health Cost Benefit Analysis ("**CBA**") submitted by Eskom in its application, Life after Coal asserts that it contains a number of flaws. In support of its assertion, Life after Coal sets out the main points of a high-level review of the CBA conducted by the Centre for Research on Energy and Clean Air ("**CREA**"):

- 1) "[T]he CBA systematically undervalues the health benefits of MES compliance by omitting critical health impacts, relying on outdated population data and applying a narrow geographical scope and oversimplified risk modelling";
- 2) "[T]he use of CBA introduces ethical issues, including inequitable distribution of costs and benefits, manipulative framing through electricity tariff increases, and disregard for the intrinsic value of clean air as a public good"; and
- 3) "[T]he analysis fails to meet global standards by using South Africa's weaker legal air quality thresholds rather than the stricter guidelines set by the World Health Organization (WHO) and ignoring international best practices for pollution control".

Life after Coal, in its submission, also refers to several studies conducted by interested parties into the effects of compliance with the MES on, *inter alia*, health. One such study is a 2023 report by the CREA which concludes the following:

- "Full compliance with the MES would reduce emissions of SO₂ by 60%, PM by 50%, NO_x by 20% and mercury by 40%, compared with a scenario of no improvements in emission control technology";
- 2) Full MES compliance at all plants that are scheduled to operate beyond 2030 would avoid a projected 2 300 deaths per year from air pollution and economic costs of R42 billion per year; and
- 3) "Other avoided health impacts would include 140 000 asthma emergency room visits, 5 900 new cases of asthma in children, 57 000 preterm births, 35.0 million days of work absence and 50 000 years lived with disability".

In relation to Eskom's failure to comply with the MES, Life after Coal then goes on to assert that "*[i]n these applications, Eskom fails to set out how it intends to mitigate the health impacts of its non-compliance and the infringement of residents' constitutional rights*", reiterating that, according to the Polluter Pays principle, Eskom should bear the cost of remedying the adverse effects of its pollution and of preventing, controlling or minimising further pollution and the effects thereof.

According to Life after Coal, Eskom asserts, in its exemption applications, that it has implemented several corporate social investment projects which aim to improve the standard of living of communities

that are most affected by the pollution however, Eskom fails to provide detailed information regarding these projects, which Life after Coal now requests.

In relation to Eskom's Offsets Programme and Indoor Air Pollution, Life after Coal noted, *inter alia*, that Eskom's Offset proposal fails to outline the cost implication of such a proposal on the recipients thereof. Life after Coal also stated that they "*do not agree with the principle of air quality offsetting as a means to avoid legal compliance*" and stated that Eskom has failed to provide evidence that its air quality offsets have, to date, offset the impacts of its non-compliance with the MES, thus disputing the "*notion that the overall improvement in ambient air quality can be achieved through the use of offsets*".

Life after Coal asserts that, should Eskom be granted the exemption it requests, it must be obligated to put measures in place to mitigate the harm that the excess emissions will cause. In this regard, Life after Coal proposes the following conditional measures:

"Eskom must provide financial support to be used specifically for a meaningful and effective health impact mitigation programme at community level to counter, at least to some extent, the harmful impacts of the MES non-compliance...it must secure formal collaboration with the Department of Heath and other government departments where necessary. Eskom must:

- 1) Provide facilities and resources that can be used to conduct ongoing health surveillance and community screening for health outcomes linked to air pollution.
- 2) Cause and fund, or arrange funding for, the design, construction, equipment and operation of a sufficient number of mobile clinics to provide free asthma outreach and respiratory diagnostic and treatment services in target zones.
- *3)* Conduct an outreach campaign to advise residents in target zones of the mobile clinics' services and to provide respiratory health prevention and management education.
- *4)* Secure formal collaboration from public health and other necessary decision-makes and service providers to support the genesis and operation of the mobile clinics.
- 5) Ensure targeted critical respiratory-related care and services to affected individuals who lacked proper access to adequate healthcare.
- 6) The programme must include a register of air pollution related health cases and dedicated liaison with state public health role players must be established.
- 7) The National Department of Health (NDoH) and academic institutions involved in researching the health impacts of air pollution must be invited to participate in the process of evaluating in an ongoing basis the health impacts of the MES non-compliance.
- 8) The approach to health impact mitigation must be holistic. It cannot be limited purely to the treatment of individuals who are experiencing symptoms of respiratory and pollution-

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related health ailments. Further health impacts must be prevented and proactive health management for affected communities must be implemented.

Eskom should install continuous emissions monitoring equipment measuring ambient air quality at sites around each power station and this data must be provided in real-time to all stakeholders on the DFFE SAAQIS system or a dedicated data-free micro-site. Eskom must provide live daily emission data of each of the pollutants on Eskom's website.

Eskom must implement, or cause to be implemented, enhanced air quality monitoring including:

- Increased air quality monitoring stations at sensitive receptor sites, communities around its power stations, and areas further downwind. The readings from such stations should be able to be monitored remotely and the information published in real-time and publicly accessible via the internet; and
- 2) An effective community alert system during high pollution events and during exceedance at the plant level.

Eskom must ensure that appropriate filtration systems are installed in all community and public buildings in the target areas – including schools, clinics, hospitals, community halls and the like – as follows:

- 1) Where such buildings are equipped with heating, ventilating and air conditioning ("HVAC") systems, the filtration should be integrated into the HVAC system; and
- *2)* Where there is no HVAC, mobile filtration devices must be supplied and maintained, along with the appropriate training on their use.

Furthermore, progress reports and evaluations of these mitigation measures must be publicly made available at three-monthly intervals. In addition, the DFFE and Eskom must regularly report back to the Highveld Priority Area Multi-Stakeholder Reference Group (HPA MSRG) and affected communities on the progress and results of the mitigation measures proposed in this submission.

Further, Eskom must formally commit to engaging with stakeholders, community beneficiaries and appropriate state actors to formulate the establishment of a Community Grants Programme which will support, fund and manage ongoing mitigation actions. The programme must be premised on transparency, and the governance thereof must be formulated so that beneficiary representatives have meaningful oversight of the programme, as well as a say in how its implemented."

6.3. ESKOM'S RESPONSE TO THE FORUM'S REPORT

6.3.1. Limitations and Conditions

In relation taking further action to mitigate emissions affecting air quality in the Priority Areas where it operates, Eskom stated that it complies with licensing requirements at most of its stations, has completed air quality offsets, and plans to expand the program. Furthermore, its emission reduction plan ensures continuous reduction of emissions and any additional costs must be recovered through electricity tariffs, with consideration for consumer affordability.

In relation to the Forum's once- off emission reduction conditions, Eskom accepted the forum's approach, recommended reasonable timeframes for reviews and stated that conditions affecting Eskom's ability to generate electricity, such as the security of supply, must be considered, particularly given delays in renewable energy implementation.

In relation to the request for Eskom to work towards making plants unavailable, either temporarily for retrofitting or permanently, while balancing the need for reduced air emissions with the risk of increased load shedding until 2030, Eskom stated that any conditions requiring Eskom to use costly peaking plants should be evaluated for their financial impact on both Eskom and consumers, while maintaining a reliable electricity supply at affordable costs.

6.3.2. Conditions Relating to PM

In relation to the implementation of its PM projects regardless of loadshedding, Eskom stated this approach would be irresponsible in view of the economic, environmental and health impacts. Furthermore, that it is actively working on PM projects, with an updated delivery schedule included in its exemption applications, subject to potential amendments based on various considerations.

In relation to investigating into fast-tracking ESP projects at Lethabo and Tutuka, and for same to be concluded within 60 days of Minister Creecy's decision in relation to the exemption applications, Eskom stated that this approach is not practical in view of the issues regarding security of supply and the projects commercial status.

In relation to complying with the 2022 project completion dates, Eskom reiterated that a revised project plan in its exemption applications shows improved certainty for completing ESP retrofitting, as contracts are in place and projects are underway.

6.3.3. Conditions Relating to NOx

In relation to complying with MES limits stated in their applications Eskom reiterated its intention to meet the requested limits in accordance with its submissions in its exemption applications.

In relation to the expedition and reporting of the LNB projects at Lethabo, Majuba and Tutuka, Eskom reiterated the impracticality due to security of supply and the projects commercial status.

In relation to the early retirement or reduced utilization of Duvha and Matla in view of MES noncompliance, Eskom affirmed NOx compliance with standards and stated that such decision must consider system adequacy and economic and social implications.

In relation to the completion of optimization within stated timeframes at Kendal and Matimba, Eskom reiterated its intended compliance in accordance with its submissions in its exemption applications and stated that any schedule tied to an MES approval must allow for amendments, considering the practicalities of Eskom's operations and mandate.

6.3.4. **Conditions Relating to SOx**

In relation to compliance with limits in its applications, Eskom reiterated its intended compliance in accordance with its submission in its exemption applications.

In relation to providing an updated CBA evaluating the costs of FGD at Medupi with the inclusion of a comparison of health benefits to abatement costs, Eskom confirmed the submission of an updated CBA in its exemption applications, which deemed such installation unfavorable.

In relation to providing an updated CBA evaluating the costs of FGD at Medupi with the inclusion of a comparison of health benefits to abatement costs, Eskom indicated that they have done a CBA that shows that the installation of FGD at Matimba and Medupi to be unfavorable in part due to the low population density of the impacted area.

6.3.5. Conditions Based on Socio-Economic Considerations

In relation to considering investment into strategies to reduce other sources of air pollution that adversely affect AAQ and cause/exacerbate pulmonary and cardio vascular diseases by increasing the scope of its interventions near Lethabo and in the Nkangala and Gert Sibande District Municipality; undertaking research programmes on the suitability offset programs subject to specific communities and reporting findings and its implementation plans in relation to its ash dumps and establishing green spaces for planting large scale tree farms to improve AAQ, Eskom affirmed its commitment to the

implementation of the stove-swap programme and waste minimization interventions in the Highveld, Vaal and Waterberg areas with projects such as road-surfacing using ash. Eskom stated that implementation schedules must allow for amendments, considering the practicalities its operations and confirmed the inclusion of planning, monitoring and verification components in its offset programme. Furthermore, Eskom confirmed rehabilitation plans for its ash facilities and noted that focus of MES is not on CO2 reduction.

6.3.6. Health Interventions

In relation to the requirement to ease the burden on and provide support to the public health sector in areas where it operates, Eskom denied stack-related impacts on its employees and stated that it supports communities through its Corporate Social Responsibility programme. Moreover, Eskom distanced itself from the proposition of assuming the role of a healthcare services funder as it is a mandated responsibility of other state entities.

In relation to where shortfalls in its medical surveillance and fitness policy exists, the requirement to monitor personal air quality exposure; conduct lung health, cardiovascular and general health screening; improve referral and treatment pathways and compile comprehensive reports in relation thereto, Eskom confirmed its current processes which include air quality surveys, spirometry, health screening, retention of employee health care reports and the availability of survey reports at each station.

In relation to the requirement to provide financial support for health-related interventions by providing screening facilities accessible to communities biannually, donating mobile screening clinics, developing awareness programmes, conducting detailed health assessments and installing continuous emissions monitoring equipment, Eskom reiterated its contention regarding assuming the role of a healthcare services funder and the findings that its emissions do not cause chronic or emergency response situations thereby deeming such responsibilities inappropriate.

6.3.7. Transparency and Governance

In relation to installing continuous emissions monitoring equipment, Eskom confirmed its extensive AAQ monitoring network which provides real-time information to the DFFE and Saaqis system.

In relation to providing daily emission data of each pollutant on its website, Eskom stated that an investigation into increased visibility of its stack emission data is underway and that it publishes monthly data on its data portal.

In relation to recording and voicing emissions data in its annual sustainability report and AGM respectively, Eskom confirmed its reporting of emission performance in its annual report and other relevant submissions.

In relation to holding a quarterly multi-stakeholder engagement session for each power station to discuss mitigation measures, Eskom confirmed its quarterly participation in government stakeholder air quality forums and questioned the practicality of quarterly meetings in view of limited public interest in air quality issues.

In relation providing real time electronic messaging regarding state of air quality based on AAQ data, Eskom reiterated the unsuitability of such responsibility particularly in view that Eskom is only one contributor to air quality issues.

In relation to inviting public health stakeholders and academic institutions that research health implications of air pollution to participate in the evaluation of impacts of postponements, Eskom stated that such is the responsibility of state health facilities.

In relation to the installation of air filtration systems in affected areas, Eskom deemed the recommendation inappropriate and an overreach in view that Eskom is only one source of PM emissions which, albeit add to the base load, do not result in acute health responses.

In relation to engaging with stakeholders, community beneficiaries and state actors to formulate the establishment of a Community Grants Programme to support, fund and manage mitigation actions, Eskom deemed the recommendation inappropriate in view of its established CSR programme and, stated further, that it is not a mandated provider of healthcare services.

All Eskom's responses to the recommendations were considered by HNM in reaching its findings and recommendations.

7. METHODOLOGY

7.1. LEGAL BASIS FOR RECOMMENDING CONSIDERATION OF SECTION 59 EXEMPTION APPLICATIONS

As stated in the introduction to this report, the NECA Forum recommended that Former Minister Creecy issue a procedural order under section 43(6) of the NEMA which allows the Minister to make "*any other appropriate decision*" in respect of an appeal brought before her and that Eskom apply for exemptions under section 59 of the NEMAQA should it wish to seek an exemption from the application of the MES in the light of its asserted inability to comply with new plant standard at certain of its plants.

This recommendation was informed by months of analytical work conducted by the Forum, including power system modelling, and a view that the applicable regulatory regime was not fit for purpose. Absent regulatory reform, which was a recommendation made by the NECA Forum to which due consideration should be given, the Forum took the view that exemptions in terms of section 59 were the only way Eskom could potentially comply with the applicable legislative framework in a way that ensured security of electricity supply at an affordable price.

In reaching this recommendation, the NECA Forum also conducted a legal analysis of section 59 of the NEMAQA to confirm that it was a lawful mechanism on which to rely. The Forum needed to answer two interrelated questions: (i) whether an exemption from a provision of the List of Activities would be legally permissible, and (ii) what the scope of the Minister's powers are when granting a section 59 exemption.

The first question arose in response to legal advice given to the Department at the time and shared with the NECA Forum, which argued that section 21 of NEMAQA must be read in conjunction with section 9(c). According to this view, the Minister does not have the authority to exempt an emitter from the application of a notice (i.e., the List of Activities) published under section 21 of the NEMAQA because section 59(1)(b) specifically excludes an exemption from the provisions of section 9.

To formulate a response to these questions, the NECA Forum sought advice from Prof. Halton Cheadle, whose legal opinions were extensively quoted in the Forum's report.

The legal advice can be summarised as follows:

Section 59(1) of the NEMAQA provides for an application for exemption from any provision of the Act excluding the provisions of section 9, 22 or 25. The Act is defined in section 1 as including its regulations and '*any other subordinate legislation issued in terms of the Act*' which clearly includes the List of Activities Notices. Those Notices are promulgated in terms of section 21 of NEMAQA and are accordingly not, on the face of it, excluded from the Minister's power to exempt.

There are four important aspects of the wording in section 9 to take note of when interpreting the section, as well as sections 21 and 59. They are:

- While paragraphs (a) and (b) are mandatory, paragraph (c) is discretionary. Being discretionary, if the Minister did exercise a power under paragraph (c), she could withdraw any standard established in terms of that power.³⁰
- Paragraph (c) refers to the establishment of 'national standards for emission'.
- Those standards of emission are in respect of the substances and mixture of substances identified in terms of subsection (a) and in respect of which national standards of ambient air quality are established in subsection (b). Those substances and national standards have been identified and established by GN1210 of 24 December 2009. No notice in terms of section 9(3) in respect of those substances and national standards has been promulgated.
- There is an express incorporation of provisions of section 7 in subsection (2).

The purpose of section 21 of the NEMAQA is to identify the list of activities and establish minimum emission standards in respect of those activities for the purposes of the licensing system for emitters contained in Chapter 5 of the NEMAQA.

There are also two aspects of the wording of section 21 that need to be addressed. Firstly, the section is mandatory. The Minister must publish a list of activities and must establish minimum emission standards in respect of them. The Minister may alter the list and the standards, but they cannot be withdrawn. Secondly, the section refers to '*minimum emission standards*'.

Contrary to the argument advanced in the legal advice given to the Department, Prof. Cheadle contended that sections 21 and 9 of the NEMAQA must be read separately, as they serve distinct purposes. Section 9 concerns national standards of ambient air quality, for the purpose of developing air quality plans. Section 21 lists activities in respect of which an emitter must be licensed and minimum emission standards set. Furthermore, if section 9 were intended to incorporate section 21, this would have been explicitly stated — similar to the way section 7 is specifically referenced within section 9.

While Prof. Cheadle acknowledged that an exemption from certain provisions of the List of Activities, under section 59, would be legally permissible, he cautioned that granting such an exemption could temporarily infringe upon the constitutional right to a healthy environment, including the right to clean air.

³⁰ Section 10(3) of the Interpretation Act, 33 of 1957 reads: "Where a law confers a power to make rules, regulations or by-laws, the power shall, unless the contrary intention appears, be construed as including a power exercisable in like manner and subject to the like consent and conditions (if any) to rescind, revoke, amend or vary the rules, regulations or by-laws."

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Section 59 authorises the Minister to grant exemptions from compliance with provisions of the NEMAQA, which necessarily means limiting the application of existing environmental standards giving effect to the constitutional right to a healthy environment. Accordingly, the power under section 59 must be exercised in accordance with the factors listed in section 36(1) of the Constitution.

Based on this advice, the NECA Forum recommended that if Eskom applies for an exemption under section 59 of the NEMAQA, each application must be assessed on its own merits and the Minister should impose conditions to mitigate any adverse effects on people's right to an environment that is not harmful to their health. Since the Forum was uncertain whether Minister Creecy would adopt its recommendation and allow Eskom to apply for exemptions under section 59, it did not explore in detail how such applications should be evaluated or how decisions should be made under section 59. That is now a necessary exercise to undertake and will be addressed in more detail below.

7.2. MINIMUM CRITERIA FOR A SUCCESSFUL SECTION 59 APPLICATION

Unlike other provisions in the NEMAQA and related legislation, section 59 does not provide extensive criteria for exemption applications.

According to section 59(1)(a), an application must be submitted in writing and be accompanied by reasons necessitating the exemption application (section 59(2)). Furthermore, as stated above and in terms of section 59(1)(b), an exemption cannot be sought from compliance with sections 9, 22, or 25 of the NEMAQA. The exemptions in question, however, are sought from a list of activities promulgated under section 21.

Under section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. If such notification is mandated, section 59(3)(b) requires the publication of a notice in at least two nationally circulated newspapers, providing reasons for the application and any additional details as specified by the Minister.

Beyond these minimum requirements, section 59 does not offer further guidance on the substantive criteria for a successful exemption application.

7.3. CONSIDERATIONS WHICH SHOULD INFORM THE MINISTER'S DECISION TAKEN UNDER SECTION 59 OF THE NEMAQA

In addition to the criteria set out above, with which an applicant must comply, HNM has identified three additional considerations that should inform the Minister's decision-making process.

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First, section 2 of the NEMA establishes a set of principles that apply across South Africa and guide the conduct/decisions of all state organs, where such conduct/decisions may have a significant environmental impact. These principles must inform any decision made under the NEMA or other environmental legislation, including the NEMAQA³¹.

Second, since section 59 of the NEMAQA authorises limitations of a constitutional right, as discussed above, the Minister must apply his mind to and address each of the following factors, drawn from section 36 of the Constitution:

- The nature of the right. Although this is a purely legal question, it should form part of the reasons for the decision. The right specifically situates the right to a healthy environment in the context of economic and social development.
- The purpose of the exemption. The Minister must be satisfied that the refusal to grant the exemption will lead to a social and economic catastrophe. This is a fact-based consideration and should be established on the advice of independent experts.
- The nature and extent of the exemption. The Minister must set conditions and time limits. This too is a fact-based decision and should be made on the advice of independent experts.
- The relationship between the exemption and its purpose. If the Minister is satisfied as to the importance of the purpose of the exemption and that it will prevent a crisis, this factor is fulfilled but must be addressed.
- Whether less restrictive means exist. The Minister must be satisfied that there are no less restrictive alternatives that cannot be accommodated through conditions and the transitional nature of the exemption.

Thirdly, any decision made under section 59, including the imposition of any conditions, constitutes administrative action as defined by the PAJA.

Administrative action is reviewable under the PAJA if, among other factors, it is not rationally connected to:

- The purpose for which it was taken.
- The purpose of the empowering provision.
- The information available to the administrator.

³¹ Section 2(1)(c) of NEMA.

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• The reasons provided by the administrator.³²

Additionally, a decision may be challenged if the Minister's exercise of power is so unreasonable that no reasonable person could have reached the same decision. The courts have developed a two-stage test for reasonableness:

- Rationality—there must be a logical connection between the decision and its intended purpose.³³
- Proportionality—even if rational, the decision must not be unduly harsh or disproportionate to its objective.³⁴

The PAJA requirements will be met if the factors derived from section 36 of the Constitution, as discussed above are followed.

7.4. STRUCTURE OF THE CONDITIONS

For reasons set out above, it is both appropriate and necessary for the Minister to attach conditions to any exemption granted under section 59. However, the legislative framework does not specify how such conditions should be formulated or applied.

With input from the experts and building on work done by the NECA Forum in 2024, HNM has developed criteria for these conditions, which are explained in section 8 below. The substance of the recommended conditions is therefore based on both the governing principles enshrined in the NEMA, the Constitution and the PAJA, as well as on expert analysis of the available facts.

On a more practical level, consideration must be given to how the conditions will be applied and implemented, including which entity will be responsible and for how long they will remain in effect.

In this regard, HNM has adopted the following approach:

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³² Section 6(2)(f) of PAJA.

³³ Bato Star Fishing (Pty) Ltd v Minister of Environmental Affairs and Others [2004] ZACC 15; 2004 (4) SA 490 (CC); Law Society of South Africa v President of the Republic of South Africa [2018] ZACC 51; 2019 (3) SA 30 (CC).

³⁴ Minister of Home Affairs v Scalabrini Centre, Cape Town [2013] ZASCA 134; 2013 (6) SA 421 (SCA).

- The Minister has the discretion to determine both the duration of an exemption and the period for which any associated conditions will apply. Based on the analysis of section 36 of the Constitution, it is advisable to limit the duration of an exemption as much as possible. Conditions may apply for the full duration of the exemption or for only a portion of that period.
- Section 59 of the NEMAQA states that "*any person*" may apply for an exemption under this section. In this case, Eskom, as a juristic person, is the applicant for an exemption from the MES at a fleet level. Eskom has also submitted applications for specific plants where compliance with the MES is not possible and where an exemption under section 59 is required.
- Any decision by the Minister to grant Eskom an exemption (with or without conditions) will therefore bind Eskom, which holds multiple AELs, including those for plants for which separate exemption applications have been submitted.
- Given Eskom's approach in applying for exemptions, HNM will recommend an outcome for each application, including its fleet application. Where an exemption is recommended for approval, HNM will further propose conditions applicable either at a fleet level or to a specific plant.
- While it will be recommended that some conditions be incorporated into the relevant AELs, it will also be recommended that others apply more generally to Eskom and must be implemented by Eskom itself, rather than by the Plant Manager of a specific power station. The Plant Manager will only be responsible for implementing conditions included in an AEL.
- Section 59(4) of the NEMAQA grants the Minister the power to review any exemption and, by implication, any associated conditions. On valid grounds, the Minister may also withdraw an exemption. Accordingly, if an exemption is granted to Eskom subject to conditions, Eskom will be accountable to the Minister for any breach of those conditions, which could result in the exemption being revoked. Where a condition is incorporated into an AEL, the relevant licensing authority will also have the power to act on any breach, in addition to the Minister.

7.5. ATMOSPHERIC EMISSION LICENCES

7.5.1. Introduction

The purpose of an AEL is to regulate emission sources from power plants with the overall objective of reducing potential adverse impacts on the health of community members and the broader environment. An AEL specifies the limits under which an emitter can or may emit, subject to the provisions contained in the NEMA, NEMAQA and in some instances, by-laws of specific districts and municipalities.

Compliance with AELs is monitored by licensing authorities situated in the relevant districts where the power plants are situated. In relation to the section 59 exemption applications, the relevant licensing authorities that will be required to implement the Minister's decisions are the:

- Nkangala District Municipality in respect of the Duhva, Kendal, Kusile and Matla power stations;
- Gert Sibande District Municipality in respect of the Majuba power station;
- Fezile Dabi District Municipality in respect of the Lethabo power station; and
- Waterberg District Municipality in respect of the Matimba and Medupi power stations.

Section 43 of the NEMAQA

Section 43 provides an outline for the content of PAELs and AELs:

"(1) A provisional atmospheric emission licence and an atmospheric emission licence must specify—

- *a) the activity in respect of which it is issued;*
- b) the premises in respect of which it is issued;
- c) the person to whom it is issued;
- *d) the period for which the licence is issued;*
- *e) the name of the licensing authority;*
- *f) the periods at which the licence may be reviewed;*
- *g)* the maximum allowed amount, volume, emission rate or concentration of pollutants that may be discharged in the atmosphere—
- *(i) under normal working conditions; and*
- *(ii) under normal start-up, maintenance and shut-down conditions;*
 - *h)* any other operating requirements relating to atmospheric discharges, including nonpoint source or fugitive emissions;
 - *i) point source emission measurement and reporting requirements;*
 - *j)* on-site ambient air quality measurement and reporting requirements;
 - *k)* penalties for non-compliance;
 - *l)* greenhouse gas emission measurement and reporting requirements; and
 - *m*) any other matters which are necessary for the protection or enforcement of air quality.
- (2) A licence may
 - *a)* specify conditions in respect of odour and noise;

- b) require the holder of the licence to comply with all lawful requirements of an environmental management inspector carrying out his or her duties in terms of the National Environmental Management Act, including a requirement that the holder of the licence must, on request, submit to the inspector a certified statement indicating—
- *(i) the extent to which the conditions and requirements of the licence have or have not been complied with;*
- (ii) particulars of any failure to comply with any of those conditions or requirements;
- (iii) the reasons for any failure to comply with any of those conditions or requirements; and
- (iv) any action taken, or to be taken, to prevent any recurrence of that failure or to mitigate the effects of that failure."

7.5.2. Analysis of the AELs

In the light of the above, below we explain and summarise the type of information and details contained in various sections of the AELs:

- 1. *Atmospheric Emission Licence Administration* included in this section are the details of the licencing authority, the relevant municipality, the licence number, date of issuance of the AEL and expiry or renewal thereof.
- Atmospheric Emission Licence Holder addressed in this section are the contact details of the licence holder's emission control officer, the specific sector in which the holder operates its business as well as details of the land use and zoning of the holder's registered property.
- Location and extent of the plant contains specific details of the licence's holder site/plant, including a description of the surrounding areas and other industries in close proximity to the plant. Arial photos of the plant and surrounding area are usually exhibited in this section.
- 4. *General conditions* the conditions set out in this section of the AEL are usually similar, and, amongst others, include:
- 4.1 Process and ownership changes

In terms of this condition, licence holders are required to ensure that all processes and apparatus used for the purpose of undertaking a listed activity are, at all times, properly maintained and operated.

Changes to processes, alterations to the plant or site, increases in production, changes to materials and products used, changes of ownership, cessation or decommissioning of listed activities are amongst

some of the aspects that require the licence holder to inform and/or obtain written approval from the licensing authority for.

4.2 General duty of care

Section 28 of the NEMA states that "[e]very person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment."

The section sets out specific positive and negative conduct a licence holder is required to undertake in its operations in relation to listed activities.

4.3 Sampling and/or analysis requirements

Licence holders are required to comply with nationally or internationally accepted standards, set out in Annexure A of the NEMAQA, when undertaking measurements, calculations, sampling and analysis.

Other methods of calculations and measurement may be relied upon, but these are subject to written approval by the NAQO. In such instances, the licence holder bears the responsibility to undertake quality assurance of the methods used and performance of such methods.

4.4 General requirements for licence holder

The licence holder is responsible for ensuring that all persons or stakeholders associated with the holder comply with the conditions of the AEL and other statutory requirements. This is not a closed listed, stakeholders include employees and service providers.

4.5 Statutory obligations

Licence holders are required to comply with the obligations set out in Chapter 5 of the NEMAQA, which regulates the licensing of listed activities.

5. Nature of the process

5.1 Process description

This section in the AEL describes the steps involved in coal-fired power generation. The specific process undertaken at each power plant varies therefore, the following is just a general process: (a) Coal is

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5.2 Listed activity or activities

Details of categories of listed activities, authorised under section 21 of the NEMAQA, conducted at the premises of the licence holder are addressed in this section. The categories may include:

- 5.2.1 Combustion installation, specifically solid fuel combustion installation, which involves burning solid fuels (excluding biomass) primarily for generating electricity and steam.
- 5.2.2 Petroleum industry, specifically storage and handling of petroleum, which involves petroleum product storage tanks and product transfer facilities excluding those used for liquified petroleum gas.
- 5.2.3 Mineral process, storage and handling, which involves storage and handling of ore and coal not situated on the premises of a mine or works as defined in the Mine Health and Safety Act 29 of 1996.

5.3 Unit process or processes

Lists all unit processes associated with the listed activities to be undertaken at the site of work and the relevant time period. These, amongst others, include: (a) the boiler units (potentially 1 to 6 where applicable) used for power generation; (b) coal stockyards used to store coal; (c) fuel oil storage tanks; and (d) ashing facilities such as the ash dumps. In addition, most units operate 24 hours per day, 365 days of the year.

5.4 Graphical process information

Process diagrams depicting how electricity is generated at a power plant are laid out in this section of the AEL.

6 Raw material and products

6.1 Raw material used

The predominant raw materials used to generate electricity are coal, heavy fuel oil, underground coal gasification gas and water.

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The measuring unit and period for the maximum consumption rate in respect of coal and fuel oil is tons per month, and it varies from plant to plant. The unit used to measure water is litres per month and underground coal gasification gas is measured using normal meter cubed per hour (Nm³h).

6.2 Production rates

This section provides details of the production capacity that is permitted at a power station, and the unit of measurement is megawatts.

6.3 Materials used in energy source

The material characteristics of the raw materials referred to in paragraph 6.1 are capped based on the type of material used. The material characteristics found in coal and fuel oil are sulphur and ash.

6.4 Sources of atmospheric emissions

Sources of atmospheric emissions are classified as point, area or line sources. A point source is a fixed, concentrated emission location (such as a power station stack), a line source is a linear release of emissions (such as along roads or railways), and an area source is a diffuse release with length and breadth dimensions (such as agricultural areas or stockpiles)

6.4.1 Point source parameters

Point source specifications include source code, stack name, locational details (longitude and latitude), release height, diameter of release point, gas exit temperature, volumetric flow, emission hours and type of emission (continuous or batch).

6.4.2 Area and/or line source parameters

Area and line source parameters include source name, source description, location details (longitude and latitude), height of reference above ground, length and width, emission hours and type of emission (continuous or batch).

7 Appliances and measures to prevent air pollution

7.1 Appliances and control measures

The abatement equipment used at a power plant includes technology such as fabric filter plants, low NO_x burners and FGDs. The purpose of this equipment is to prevent the discharge of smoke, fumes and other prescribed pollutants.

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7.2 Point sources (maximum emission rates)

This section sets out the maximum emission rate at which a specific pollutant can be released into the environment from a particular point source (such as a stack) or process, often regulated in terms of mass per unit of time or per unit of fuel burnt.

The measurements provided address two aspects, emissions under normal circumstances and emissions when the process is under start-up, maintenance and shut-down conditions.

7.3 Area and/or line source – management and mitigation measures

This section deals with measures the licence holder is required to put in place to minimise emissions from coal stockpiles, ash dumps and coal and ash handling equipment. These measures may include compaction of stockpiles, rehabilitation of ash dumps by planting vegetation and spraying of water to suppress dust.

7.4 Routine reporting and record-keeping

7.4.1 Complaints registers

A licence holder is required to have a register to record details of complaints, including the complainant's information, the date and time of a complaint and the nature of the issue. The licence holder must investigate complaints and provide a monthly summary report to the licensing authority which should include details such as the source of the issue, root cause analysis, impact calculations, corrective measures and implementation timelines. Furthermore, the licensing authority must receive a copy of the complaints register, and records of complaints must be kept for at least five years.

7.4.2 Emergency incidents

The licence holder must ensure operations do not cause pollution that exceeds specified limits. Any deviations leading to excessive emissions or nuisances must be immediately reported to the NAQO, and incidents falling under section 30 of the NEMA must be reported within 24 hours. In the event of harmful emissions, the licence holder must take immediate corrective actions to minimise or contain the impact. Any required remediation must meet the approval of the licensing authority or relevant government agencies.

7.4.3 Monthly / Annual reporting

The licence holder may be required to submit monthly or annual reports to the licensing authority. The report must cover key details such as pollutant emission trends, compliance audit reports, major

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equipment upgrades and greenhouse gas emissions. The licence holder must keep a copy of all reports submitted to the licencing authority for, at least, a period of five years.

7.5 Investigation

A licence holder may be required to conduct investigations into various aspects related to its operations. The types of investigations will be specified in this section of the AEL. These may be required to be conducted with a view to developing, *inter alia*, a:

- a) Fugitive Emissions Management Plan;
- b) Operations and Maintenance Plan;
- c) Public Education and Awareness Plan; or
- d) Ambient Air Quality Monitoring Plan.

8 Disposal of waste and effluent produced by abatement equipment control technology

The disposal of any waste and effluent from abatement equipment technology must comply with regulations. For example, ash must be disposed of at an ash dump.

9 Penalties for non-compliance with licence or statutory conditions and/or requirements

Non-compliance with licence conditions and/or requirements is an offence, punishable under Section 52 of the NEMAQA.

10 Appeal of the licence

The appeal process requires the licence holder to notify all registered I&APs of the appeal in writing within five working days of receiving the AEL. The notification must specify the date on which the license was issued and inform recipients of the appeal procedure outlined in Chapter 7 of GN No R543 of 18 June 2010. All appeals against the conditions in the AEL must be submitted in writing to the Director of Environmental Health and Emergency Services.

7.5.3. Conclusion

Based on the above, an AEL is a crucial document because it spells out the conditions and parameters a licence holder is expected to adhere to. The licencing authority is not only responsible for issuing an

AEL, but it must also monitor compliance. Non-compliance with an AEL could have dire consequences for a licence holder, such as suspension or a complete shutdown of the licence holder's operations.

7.6. EXPLANATION OF CRITICAL FACTORS

7.6.1. Air Quality Considerations

In order to manage air quality, one must understand what levels of specific pollutants are being emitted into the atmosphere, and what levels (concentrations) are occurring in the atmosphere (subject to dispersion and dilution). AAQ management relies on tools such as emission point monitoring (telling us what is being emitted at what rate and concentration) and reporting, AAQ monitoring (measuring concentrations in the atmosphere at various distances from source) and atmospheric dispersion modelling (to simulate the dispersion of pollutants through the airshed). AAQ concentrations are compared with local standards (AAQS) and international guidelines (e.g. those of WHO).

Air quality in South Africa is administered under the NEMAQA³⁵. The objectives of the NEMAQA are to:

- Protect the environment by providing reasonable measures for the protection and enhancement of air quality, the prevention of air pollution and ecological degradation, and securing ecologically sustainable development while promoting justifiable economic and social development.
- 2) Give effect, in terms of air quality, to the constitutional right "to an environment that is not harmful to health and well-being".

7.6.1.1. The NEMAQA: Section 21 – Minimum Emission Standards

Section 21 of the NEMAQA tasks the Minister of the National Department responsible for environmental affairs, currently the DFFE, with the responsibility of publishing a list of activities which result in atmospheric emissions, and which he/she reasonably believes have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions,

³⁵ South Africa (2005): *National Environmental Management: Air Quality Act* (No. R. 39 of 2004) Government Gazette, 24 February 2005 (No. 27318)

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ecological conditions or cultural heritage. MES for these listed activities were originally published in 2010 with a revision of the schedule in 2013³⁶.

Eskom falls under *Category 1: Combustion Installations of the Minimum Emission Standards (MES) regulations*, as outlined in Government Notice No. 893 of 2013 under the NEMAQA.

Table 2 presents the current and new plant emission limits applicable to those power stations applying for exemptions. New plant limits are due to come into effect on 1 April 2025, if not already in effect at a particular station. Eskom's exemption requests are being made in respect of the new plant MES which are due to come into effect 1 April 2025.

| | PM (mg/Nm ³) | | NOx (mg/Nm ³) | | SO ₂ (mg/Nm ³) | |
|--|--------------------------|--------------|---------------------------|--------------|---------------------------------------|--------------|
| | Current | 1 April 2025 | Current | 1 April 2025 | Current | 1 April 2025 |
| Duvha | 100 | 50 | 1,100 | 750 | 2,300 | 1,000 |
| Matla – U5, U6 | 100 | 50 | 750 | 750 | 2,600 | 1,000 |
| Matla – South Stack, U4 | 200 | 50 | 750 | | | |
| Kendal | 100 | 50 | 1,100 | 750 | 3,500 | 1,000 |
| Lethabo | 100 | 50 | 1,100 | 750 | 2,600 | 1,000 |
| Majuba | 100 | 50 | 1,500 | 750 | 3,200 | 1,000 |
| Tutuka | 300 | 50 | 1,100 | 750 | 3,400 | 1,000 |
| Matimba | 50 | 50 | 750 | 750 | 3,500* | 1,000 |
| Medupi | 50 | 50 | 750 | 750 | 3,500* | 1,000 |
| *Approval received for monthly average | | | | | | |

Table 2: Current and future emission limits applicable to the Eskom fleet

Table 3 below presents average emissions for each station for the period April 2019 – October 2024; importantly, these averages include emissions during upset conditions, which are not regulated by the MES, and therefore the averages presented should be considered as worst-case. As evident, all power stations complied with their applicable (current) emission limits for SO₂, with no exceedances of the limit during FY2023/24 (during normal operations). However, as is evident from the averages, no power stations will comply with the new plant MES for SO₂ (1 000 mg/Nm³) without the installation of abatement technology.

³⁶ Department of Environmental Affairs (2013): List of Activities which result in Atmospheric Emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions, or cultural heritage. Government Gazette (No. R. 893), 22 November 2013, (No. 37054), as amended by GN 551 in 2015 and GN 1207 in 2018.

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| | PM (mg/Nm ³)* | NOx (mg/Nm ³)* | SO ² (mg/Nm ³)* | | |
|--|---------------------------|----------------------------|--|--|--|
| Duvha U1, U2 | 28 | 700 | 4.000 | | |
| Duvha U4, U5, U6 | 100 | 790 | 1,003 | | |
| Matla | 184 | 765 | 1,936 | | |
| Kendal | 341 | 785 | 2,055 | | |
| Lethabo | 101 | 837 | 1,856 | | |
| Majuba | 20 | 1,004 | 1,934 | | |
| Tutuka | 239 | 818 | 2,141 | | |
| Matimba | 36 | 441 | 2,522 | | |
| Medupi | 27 | 379 | 2,689 | | |
| Red text indicates the average is non-compliant with the current limit | | | | | |

Orange text indicates that although the average complied with the current limit, exceedances of this limit occurred.

*Emission averages include upset conditions, which are not regulated by the emission limits, and therefore averages presented are worst-case, and not representative of normal operations as regulated by the emission limits.

Table 3: Average station emissions between 2019-2024 (mg/Nm³)

Regarding NO_x emissions between April 2019 – October 2024, emission averages have complied with current emission limits at all power stations, except for Lethabo, where although the average remains compliant, exceedances of the limit did occur in FY2023/24. While Medupi, Kusile, Matimba, and Kendal will comply with the new plant MES for NO_x (750 mg/Nm³), the remaining stations will not be able to comply without installing NO_x abatement technology.

From April 2019 to October 2019, PM emissions were the greatest air quality management challenge at most stations, except for Duvha Unit (U)1 and U2, Majuba, and Medupi, all of which have pulse jet fabric filters (PJFF). Although the average emissions at Matimba comply with the new plant MES, exceedances of this have occurred recently. While Medupi, Matimba, Majuba and Duvha U1 and U2 will comply with the new plant MES for PM (50 mg/Nm³) by 1 April 2025, the remaining stations cannot comply until the necessary PM abatement projects are complete.

7.6.1.2. NEMQA Section 9 – National Ambient Air Quality Standards

South Africa's NAAQS were promulgated in 2018³⁷ and 2019³⁸ and regulate a range of pollutants deemed to be commonly emitted and which pose a threat to human health and the environment. Ambient air quality standards are defined as "*targets for air quality management which establish the permissible*

³⁷ Department of Environmental Affairs (2009): National Ambient Air Quality Standards. Government Gazette (No. R 1210 of 2009), 24 December 2009 (No. 32816)

³⁸ Department of Environmental Affairs (2012): National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter less than 2.5 Micro Metres (PM_{2.5}). Government Gazette (No. R 486 of 2012), 29 June 2012 (No. 35463)

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*concentration of a particular substance in, or property of, discharges to air, based on what a particular receiving environment can tolerate without significant deterioration*³⁹. The NAAQS relevant for the purposes of this report are presented in Table 4. Each pollutant has specific averaging periods, compliance timeframes, permissible frequencies of exceedance and recognised measurement reference methods. The NAAQS apply nationwide, regardless of the activity.

The NAAQS define the acceptable levels of environmental risk associated with human exposure to air pollutants. If an area meets the NAAQS, it is considered to have an air quality that poses a legally acceptable level of risk to the environment and human health in South Africa.

The NAAQS relevant to the Eskom Power Stations and this exemption application are sulphur dioxide (SO_2) , nitrogen oxides (NO_x) , and particulate matter $(PM_{10} \text{ and } PM_{2.5})$. The NEMAQA defines ambient air to exclude air regulated by the Occupational Health and Safety Act (No. 85 of 1993), i.e. excluding air within the fence line of the facility.

| Pollutant | Averaging Period | Concentration (µg/m3) | Permissible Frequency of Exceedance | Reference method | |
|---|------------------|--------------------------|--|---------------------|--|
| | 1-hour | 350 | 88 | | |
| Sulphur dioxide (SO ₂) | 24-hour | 125 | 4 | ISO 6767 | |
| | 1-year | 50 | 0 | | |
| Nitrogen dioxide (NO ₂) | 1-hour | 200 | 88 | ISO 7996 | |
| | 1-year | 40 | 0 | | |
| Particulate matter less than 10 microns (PM ₁₀) | 24-hour | 75 | 4 | | |
| | 1-year | 40 | 0 | EN 12341 | |
| Particulate matter less | | 40 | 4 | | |
| than 2.5 microns (PM _{2.5}) | 24-hour | 25 (a) | 0 | EN 14907 | |

³⁹ Department of Environmental Affairs (2000): Integrated Pollution and Waste Management Policy for South Africa. Government Gazette (No. R227 of 2000), 17 March 2000 (No. 20978)

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| Pollutant | Averaging Period | Concentration (µg/m3) | Permissible Frequency of Exceedance | Reference method | |
|--|------------------|--------------------------|--|-------------------------|--|
| | 1-year | 20 | 4 | | |
| | | 15 (a) | 0 | | |
| Benzene (C ₆ H ₆) | 1-year | 5 | 0 | EPA TO-14 A or TO-17 | |
| Carbon monoxide (CO) | 1-hour | 30 000 | 88 | ISO 4224 | |
| | 8-hour (average) | 10 000 | 11 | | |
| Notes: | | | | | |
| (a) - Effective date is 01 January 2030 | | | | | |

| Table 4: | South African | National | Ambient Air | Ouality | Standards |
|----------|---------------------------------------|----------|-------------|---------|-----------|
| | , , , , , , , , , , , , , , , , , , , | | | ~~~~~ | |

7.6.1.3. Priority Areas

The Vaal Triangle is a major industrial hub located between Vereeniging, Vanderbijlpark and Sasolburg. The Vaal Triangle Airshed Priority Area (VTAPA) was the first Priority Area declared in terms of NEMAQA in 2006. Key emission sources in the VTAPA are industry (including coal-fired power plants, steel manufacturing, foundries and chemical production, including Sasol's activities in Sasolburg), major transportation routes that include routes for heavy duty vehicles, domestic fuel burning (including the use of coal and wood for heating and cooking), mining activities, including coal mining, and agriculture (crop burning and pesticide use).

The Highveld region became a hub for coal mining and heavy industries, particularly in the mid-20th century, which greatly contributed to economic growth but also led to increased air pollution. Recognising the deteriorating air quality, the HPA was declared in 2007 in terms of NEMAQA. As with the VTAPA, key air pollution sources in the HPA are industry (including coal-fired power plants, steel manufacturing and chemical processing), major transportation routes that include routes for heavy duty vehicles, domestic fuel burning (including the use of coal and wood for heating and cooking), mining activities, including coal mining, and agriculture (crop burning and pesticide use).

The Waterberg-Bonjanala Priority Area (WBPA) was declared the third Priority Area in 2012. Key emission sources include industry (including coal-fired power stations, cement production, gold and platinum processing, copper smelting, ferrochrome production, fertiliser manufacturing, tyre

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production and brick manufacturing), mining activity (particularly coal and platinum) and motor vehicles, with domestic fuel burning and biomass burning also contributing.

The Regulation for Implementing and Enforcing Priority Air Quality Management Plans of 26 August 2024 (GNR 5153) is a framework for the implementation and enforcement of a priority area's AQMP, published in terms of section 19(1(b) and 19(5) of the NEMAQA. It was published for public comment.

GNR 5153 applies to various proponents including those involved in activities such as mining reclamation or operating controlled emitters such as power stations. These proponents are required to submit emission reduction and management plans in terms of the Regulations, within six months of the publication of a priority area AQMP. Once these emission reduction and management plans are approved, they must be implemented within specified timeframes. Additionally, any existing priority area AQMPs, published prior to the commencement of the regulations, must be reviewed by the DFFE within two years to include updated emission reduction targets. Once reviewed, stakeholders (such as industries, municipalities and other entities operating within a priority area) will be required to develop emission reduction and management plans indicating how they will comply with the agreed emission reduction targets.

GNR 5153 provides enforcement mechanisms, including fines or penalties for non-compliance, making adherence to AQMPs legally enforceable, strengthening governance of air quality management in priority areas.

7.6.1.4. Baseline ambient air quality monitoring data

The Eskom Minimum Emission Standards Exemption – Eskom Fleet Report (November 2024) presents data from the various South African Weather Services ("SAWS") and Eskom AAQ monitoring stations for baseline comparison with the NAAQS:

- AAQ monitoring shows PM₁₀ and PM_{2.5} exceedances of the NAAQS in the Highveld, Vaal Triangle and Waterberg.
- For the period 2021 2023, measured/monitored ambient NO₂ concentrations in the Highveld and Vaal Triangle are compliant with the NAAQS.
- For the period 2021 2023, measured/monitored ambient SO₂ concentrations in the Highveld and Vaal Triangle are compliant with the NAAQS.

7.6.1.5. Dispersion modelling – cumulative air quality impacts

California Puff Mode (CALPUFF) dispersion modelling was undertaken by uMoya-NILU Consulting (Pty) Ltd (reports uMN220-24 and uMN219-24) to assess various operational scenarios anticipated by Eskom for the HPA, VTPA and WBPA in the coming years for PM (PM₁₀ and PM_{2.5}), NO and SO.

The reports also present various atmospheric dispersion modelling scenarios (Eskom's emissions only), including a baseline (current) Eskom scenario and ERP 2024A, ERP2024B and ERP 2024C (each incorporating various abatement configurations). The findings, as set out in these reports, include:

- Non-compliances with regard to PM₁₀ and PM_{2.5} NAAQS are predicted under all the Eskom abatement scenarios.
 - WSP asserts that the exceedances are predominantly due to low-level fugitive sources (e.g. windblown ash from ashing facilities) rather than the stack emissions themselves.
 - WSP also highlights model conservatism.
- All WSP dispersion modelling scenarios predict NO_X compliance with the NAAQS. This includes the current scenario, which assumed no NO_x abatement technology being installed at Eskom's Matla, Duvha, Tutuka and Lethabo power stations.
- SO₂ ambient concentrations are predicted to decrease below current levels (currently compliant) in line with completion of the wet FGD at Medupi, Despatch Prioritisation, efficiency improvement projects, and assumed shutdown of the Arnot, Kriel, Camden, Hendrina, Grootvlei, Duvha, and Matla power plants.

7.6.2. Local Environmental Impacts

7.6.2.1. Water

South Africa is classified as a water-scarce country, with an average annual rainfall of approximately 450 mm, significantly below the global average of 860 mm. The country's water resources are under pressure due to climate change, population growth and industrial demands. This scarcity poses a substantial challenge to Eskom, particularly in Mpumalanga and Limpopo, where the majority of its coal-fired power stations are located. These regions rely heavily on water for electricity generation, particularly for cooling processes and pollution control technologies.

Eskom's coal-fired power stations in Mpumalanga and Limpopo require vast amounts of water for their operations. Many of these plants utilise water-intensive wet cooling systems, further straining local water supplies. Given the already stressed water resources in these provinces, securing sustainable water supplies for continued power generation remains a growing concern. The competition between

industrial, agricultural and municipal water users exacerbates the situation, making it critical to explore alternative water management strategies.

Power generation is identified as a strategic water use in terms of the National Water Act (Act No. 36 of 1998) and is provided with the highest assurance of supply (99.5 %) in the operation of all water resource systems in the country (National Water Resources Strategy -3 (NWRS-3), Department of Water and Sanitation (DWS) 2023). However, a key goal of the NWRS-3 is reducing water demand, and while water supply for electricity generation is afforded priority, it is not unlimited and has to be balanced with other strategic objectives of the NWRS-3. The NWRS-3 does refer to the disadvantage of the proposed FGD technology with its high-water usage, and due to water scarcity in the country, recommends further research on alternative technologies and options to meet the future Eskom water demand (DWS, NWRS-3, 2023). Future allocations to meet the increased water supply, should FGD's be installed, to Eskom can thus not be guaranteed if it's not aligned with the strategic goals of the NWRS-3 and imperatives to reduce water demand, increase water conservation and improve water use efficiency.

Eskom is a strategic water user, which in a water deficit situation, would mean that other users will have to reduce consumption to ensure supply to Eskom.

Water Use Licences (WUL) across Eskom's coal fleet are in aggregate 403 million m³/annum. Eskom used an average of 320 million m³/annum of water over the past 10 years. The forecasted consumption of water by Eskom's power stations in the HPA amounts to 179 liters per person per day, which is almost as much as the average 237 liters/day which residents use. When the coal-fired power stations are retired, the additional water will be made available for other uses. The water saving is important for a water scarce country such as South Africa.

Wet FGD, while having higher efficiency in SO_2 removal (up to 98%), has higher operational complexity and environmental impact, due to its high-water usage. Semi-dry FGD's have a lower water requirement than wet FGD and a smaller footprint, with no wastewater production, simplifying water management, however there will still be an increase in water usage from current operations.

In the Waterberg, the largest additional water requirements occur at Medupi due to wet FGD being installed and should the semi-dry FGD at Matimba be installed, a total of 15.3 million m³/annum of water would be required, in addition to the current water requirements, with both Medupi and Matimba extracting from the Mokolo River Catchment area. The increase in water consumption by these power stations would increase by 164%. It should be noted that both Matimba and Medupi were designed to be dry-cooled power stations, so that less water was required.

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While the water balance of the Mokolo system has allocated for this, authorised until 2051, this is allocated from both the Mokolo Dam and MCWAP-2A, with Phase 2A only being available from 2028. Further, based on the 2023/2024 DWS Annual Operating Analyses (AOA) conducted for the Mokolo River System, a deficit in the water supply in the Mokolo catchment is expected in 2025, with water security predicted to be low between 2025 to 2028. All scenarios analysed for the AOA indicated that a shortage of water and the risk of violating the assurance of supply to Eskom could happen as early as 2025 (prior to FGD technology installation). Severe water restrictions will be required from 2025 to 2028 for all users (including Matimba and Medupi power stations for its current water requirement).

Water for Kendal, Majuba, Lethabo and Tutuka power stations is suppled from the IVRS, via various subsystems. Should SO₂ MES compliance be enforced (i.e. semi-dry FGD need to be installed at Kendal, Lethabo and Tutuka), an additional 16.1 million m³/annum of water will be required to operate the FGDs. Each station could meet this additional requirement due to their low current water use due to low load factors. However, should loads increase, stations may require additional allocations from the IVRS. This additional supply is not necessarily available over the short-term, with limited water supply development potential existing in the IVRS, and with water security remaining at risk. The water security risk from the IVRS will be alleviated with the Lesotho Highlands Water Project (LHWP) - Phase 2 expected to be online post 2030.

Eskom estimates that the installation of FGD at all of its units will require an additional 31 million m³ per annum of water, which is equivalent to an increase of Eskom's total water consumption of approximately 10%.

The water savings are also important for JET because the agriculture, livestock rearing and food processing sectors have been identified by the PCC to play key roles in creating jobs in Mpumalanga post coal.

This reiterates the preferred long-term solution to reduce utilisation and eventually retire Eskom's coalfired power stations as opposed to installing abatement equipment and, in particular, wet FGD, given its high water requirements.

7.6.2.2. Solid waste

At all power stations, after the coal is burnt, the ash left behind must be disposed of in a landfill. Landfills create water challenges in their own right (ground water contamination and surface water pollution), but unfortunately some landfills are also not adequately covered. Therefore, on windy days, they create air pollution and are a source of PM emissions too. There is the opportunity to reduce these PM emissions by covering ash landfills completely with vegetation.

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As a power plant's PM emissions are reduced to meet the MES, slightly more ash will be captured from the flue gases. However, the quantity of additional solid generated from the enhanced PM abatement technology will not materially impact the total ash that needs to be disposed of.

On the other hand, NO_X abatement is done with LNBs, and no solid wastes are produced, while SO_X abatement with FGD produces a large amount of by-product, known as calcium sulphates (gypsum in the case of wet FGDs). This by-product unfortunately contains contaminants, including trace metals and unreacted by-products, making it unsuitable for direct use, in many applications, without further treatment. Further, the market demand for the product is small compared to the quantity of the gypsum that Eskom would produce with FGD retrofits.

Therefore, the FGD by-product is a waste and must be landfilled. Based on the DFFE's waste management requirements, this waste must be managed and stored separately from existing waste streams like ash. Implementing FGD increases both the volume of waste generated and the complexity of waste handling infrastructure required. Since co-disposal is not permitted by the DFFE, stations will be required to design and construct new facilities to accommodate the gypsum, which requires additional approvals, water management, operational adjustments and new handling infrastructure. This added waste stream, combined with the increased water use needed for the FGD process, can substantially impact the overall environmental footprint of the facility, making waste management a critical aspect of FGD implementation.

Medupi alone would produce 2.7 million tons per annum of solid waste which is a 54% increase to the amount of solid waste that it currently must dispose of.

7.6.2.3. Sorbent Requirements

A significant quantity of sorbent is required to operate FGD at Eskom's power stations. This sorbent would likely need to be transported from the Northern Cape which, most probably, would necessitate the development of associated rail infrastructure. The transport of the sorbent would result in unintended environmental impacts, notably GHG and fugitive dust emissions.

7.6.2.4. CO₂

South Africa's revised NDC will significantly impact Eskom, as most mitigation in the updated NDC target needs to come from the electricity sector, which now accounts for approximately 41% of South Africa's GHG emissions. Eskom will need to decommission multiple coal-fired power stations over the next decade for South Africa to align to the objectives of international climate agreements. This means that the operating coal-fired power stations would need to be supplemented with generation capacity

from renewable and lower carbon technologies to meet South Africa's climate change commitments while maintaining security of supply. Preliminary analyses by the DFFE shows that GHGs from fossil fuel power generation will need to be limited to $125 - 140Mt \text{ CO}_2$ per annum in 2030 for South Africa to remain within the upper end of the NDC for 2030.

The SO_X abatement retrofits increase CO₂ emissions because CO₂ is released when the SO_X is abated by reacting with limestone to produce gypsum. Also, the abatement retrofit consumes parasitic power for its operations (e.g. pumping of slurries, injection of the sorbent) and this can amount to 2-4% of the power station's gross output. This makes the net electricity sent out more carbon intensive (the kg CO_2/kWh increases).

7.6.3. Health Considerations

Clean air is a fundamental human right with a clear link between poor air quality and human health. There is sound evidence documenting the impact of air pollution on health from the antenatal period throughout the life-course.⁴⁰ Further, there is global evidence which addresses the health benefits of reducing exposure to high levels of air pollution.⁴¹ The updated WHO 2020 Air Quality Guidelines ("**AQG**") are a culmination of global efforts to offer quantitative health-based recommendations for air quality management. These recommendations are expressed as long or short-term concentration limits for a number of key air pollutants, recognising that exceedances of these limits can place public health at significant risk.⁴² The AQG consider the lowest levels of exposure for which there is evidence of adverse health effects. In comparison, the Interim Targets (IT) are air pollutant levels that are higher than the AQG levels, but which authorities in highly polluted areas can use to develop pollution reduction policies that are achievable within realistic timeframes. Key pollutants considered and in respect of which there are recommended guidelines are: particulate matter (PM_{2.5} and PM₁₀), ozone (O₃), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and carbon monoxide (CO), see Table 5 below.

⁴⁰ Health Effects Institute. State of Global Air 2024. Boston, MA: Health Effects Institute; 2024

⁴¹ Schraufnagel DE, Balmes JR, De Matteis S, Hoffman B, Kim WJ, Perez-Padilla R, et al. Health Benefits of Air Pollution Reduction. Ann Am Thorac Soc. 2019;16(12):1478-87.

⁴² World Health Organization. WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide. Geneva: World Health Organization; 2021.

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The AQG also recognise the strong body of evidence that explores the negative effects of air pollution on different aspects of health. It is now evident that negative effects on the health of people can occur even at lower concentrations of air pollution than previously understood and/or accepted.

Air pollution has been established as a leading risk factor for the development of non-communicable diseases such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease, asthma and cancer. It has also been recognised that there is significant morbidity and mortality linked to exposure to air pollution on an annual basis. The morbidity rate attributable to air pollution is now estimated to be on par with other major global health risks such as unhealthy diets and smoking tobacco.

South Africa, in aligning itself with the position adopted in the AQG, promulgated, *inter alia*, the NAAQS, imposing limits on the concentration levels of certain pollutants in the receiving environment.

| Pollutant | Averaging time | | Interim t | AQG level | | |
|---------------------------|----------------------|-----|-----------|-----------|----|-----|
| | | 1 | 2 | 3 | 4 | |
| PM _{2.5} , μg/m³ | Annual | 35 | 25 | 15 | 10 | 5 |
| | 24-hour ^a | 75 | 50 | 37.5 | 25 | 15 |
| PM ₁₀ , μg/m³ | Annual | 70 | 50 | 30 | 20 | 15 |
| | 24-hour ^a | 150 | 100 | 75 | 50 | 45 |
| O ₃ , μg/m³ | Peak season⁵ | 100 | 70 | _ | _ | 60 |
| | 8-hour ^a | 160 | 120 | _ | _ | 100 |
| NO ₂ , µg/m³ | Annual | 40 | 30 | 20 | _ | 10 |
| | 24-hour ^a | 120 | 50 | _ | _ | 25 |
| SO ₂ , µg/m³ | 24-hour ^a | 125 | 50 | _ | - | 40 |
| CO, mg/m ³ | 24-hour ^a | 7 | _ | _ | _ | 4 |

^a 99th percentile (i.e. 3–4 exceedance days per year).

^b Average of daily maximum 8-hour mean O_3 concentration in the six consecutive months with the highest six-month running-average O_3 concentration.

Table 5: WHO Air Quality Guidelines and Interim Targets

7.6.3.1. Ambient air quality standards

In terms of section 9 of the NEMAQA, the NAAQS were promulgated to regulate concentration limits for PM, SO₂, NO₂, CO, O₃ and Benzene, see Table 6 below. In other words, the NAAQS define targets for air quality management and establish the permissible amount or concentration of a particular substance based on what a particular receiving environment can tolerate without significant deterioration.⁴³

| Pollutant | Averaging time | Concentration | Frequency of exceedance per year | Compliance date |
|---|------------------------------|-------------------------------------|--|--------------------|
| Sulphur dioxide (SO ₂) | 10 minutes | 500 µg/m ³⁻ (191 ppb) | 526 | Immediate |
| | 1 hour | 300 µg/m³ (134 ppb) | 88 | Immediate |
| | 24 hours | 125 μg/m³ (48 ppb) | 4 | Immediate |
| | 1 year | 50 μg/m³ (19 ppb) | 0 | Immediate |
| Nitrogen dioxide (NO ₂) | 1 hour | 200 µg/m³ (106 ppb) | 88 | Immediate |
| | 1 year | 40 μg/m³ (21 ppb) | 0 | Immediate |
| Ozone (O ₃) | 8-hour running avg. | 120 µg/m³ (60 ppb) | 11 | Immediate |
| Carbon monoxide (CO) | 1 hour | 30 mg/m ³ (26 ppm) | 88 | Immediate |
| | 8-hour (calc on hourly avg.) | 10 mg/m ³ (8.7 ppm) | 11 | Immediate |
| Lead (Pb) | 1 year | 0.5 μg/m³ (19 ppb) | 0 | Immediate |
| Benzene (C ₆ H ₆) | 1 year | 10 μg/m³ (3.2 ppb) | 0 | Immediate |
| | | 5 μg/m³ (1.6 ppb) | | 1 Jan 2015 |

⁴³ NECA Forum Report, ps. 303-304/531

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| Particulate | 24 hours | 120 µg/m³ | 4 | Immediate |
|-----------------------------|--------------------|-----------------------------------|---|------------|
| matter (PM ₁₀) | | 75¹ μg/m³ | 4 | 1 Jan 2015 |
| | 1 year | 10 µg/m³ | 0 | Immediate |
| | | 5 ¹ μg/m ³ | 0 | 1 Jan 2015 |
| Particulate | 24 hours 1 year | 65 μg/m³ | 4 | Immediate |
| matter (PM _{2.5}) | | 40 ² µg/m ³ | 4 | 1 Jan 2016 |
| | | 25 ³ µg/m ³ | 4 | 1 Jan 2030 |
| | | 25 µg/m³ | 0 | Immediate |
| | | 20² µg/m³ | 0 | 1 Jan 2016 |
| | | 15 ³ µg/m ³ | 0 | 1 Jan 2030 |

Table 6: Ambient Air Quality Standards

7.6.3.2. National Air Quality Framework

The DFFE has also published guidelines which speak to the fact that health concerns may occur at lower levels than those set out in the MES, see Table 7 below. This framework classifies air quality in bands which correspond with the severity of the health impacts which can be expected.

| Colours | AQ Level | Levels of Health Concerns | Bands | NO ₂ (μg/m ³) | 0 ₃ (µg/m ³) | 502(µg/m ⁸) | CO(µg/m ³) | PM _{2.5} (μg/m ³) | PM ₁₀ (µg/m ³) |
|-----------|------------------------|---------------------------------|-------|--------------------------------------|-------------------------------------|-------------------------|------------------------|---|---------------------------------------|
| | | | 1 | 0-66 | 0-26 | 0-115 | 0-1000 | 0-22 | 0-40 |
| Green | Low | Good | 2 | 67 - 133 | 27-53 | 116-231 | 1 001-20 000 | 23-43 | 41-80 |
| | | | 3 | 133 -200 | 54-80 | 232-350 | 20 001 30 000 | 44-65 | 81-120 |
| | Yellow Moderate Modera | | 4 | 201-267 | 81-107 | 351-400 | 30 001 -35 000 | 66-75 | 121-130 |
| Yellow | | Moderate | 5 | 268-334 | 108-134 | 401-450 | 35 00140 000 | 76-85 | 131-140 |
| | | | 6 | 335 -400 | 135-160 | 451-500 | 40 001 -45 000 | 86-95 | 141-150 |
| Orange | Unhealthy | Unhealthy | 7 | 401 467 | 161 - 187 | 551-550 | 45 00150 000 | 96-105 | 151-160 |
| | Very Very | Very | | 468 -534 | 188-213 | 551-600 | 50 001 -55 000 | 106-115 | 161-170 |
| Red | Unhealthy | unhealthy | 9 | 535-601 | 214 - 240 | 601-650 | 55 00060 000 | 116-125 | 171-180 |
| Hazardous | Harantous | Harandous | 10 | >607 | >741 | 2651 | > 60 000 | >126 | >181 |

Table 7: Severity of the health impacts

7.6.3.3. Coal power stations, ambient air pollution and health

Recent data, including satellite obtained data, recognises hotspots in Africa as a major source of ambient air pollution, with emission hotspots aligning with thermal power plants, cement plants, metal smelters, industrial zones or urban areas. Six of the world's ten largest NO₂ emission hotspots identified were found in Africa, and all of thermal power plants are located in South Africa. Two of the world's ten

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largest SO₂ emission hotspots are in South Africa, particularly from power plant sources.⁴⁴ Despite the contribution of other sources, such as household air pollution, coal power stations remain a major source and contributor to ambient air pollution.⁴⁵

Exposure to air pollution is the second leading risk factor for death in Africa, and if the targets contained in the AQG were realised, significant gains in life expectancy can be achieved.

7.6.3.4. Vulnerable Populations

Assessing the vulnerability of the population is also critical when assessing health impacts. Population factors to consider include age (younger than 15 and older than 65), the use of chronic medication, overcrowding in communities and the various types of alternate fuels used for household activities. Further, the long-term impact of exposure to air pollution must be considered alongside exposures of pregnant women, which have life-long consequences on their health.⁴⁶ Air pollution exposure in pregnancy is linked to premature birth, low birth weight and poor respiratory and neuro-developmental outcomes. There is also an increased risk of developing early-life and childhood illnesses such as lower respiratory tract infections and asthma, leading to lower lung function. These are important risk factors in developing conditions such as chronic obstructive pulmonary diseases (COPD), other chronic respiratory conditions, cardiovascular complications, strokes and cancer in adulthood. Non-compliance with the MES, therefore, has far-reaching consequences both in the development and exacerbation of a range of health conditions including asthma, COPD, hypertension and cardiovascular events.

7.6.3.5. Health Costs

Assigning a cost to health and mortality, as a result of the adverse impact of ambient air pollution, is complicated. However, a number of recent studies (including the recent CSIR report/UK Partnering for Accelerated Climate Transitions Country Programme Final Report – Energy Sector Decarbonisation Pathways to Meet a National Net Zero Emission Target by 2050) conducted a rand analysis and have confirmed that reducing concentrations of SO₂, PM_{2.5} and NO₂ will reduce the risk of premature

⁴⁴ International G. Major air polluters in Africa unmasked 2024 [cited 2024 19-09-2024]. Available from: <u>https://drive.google.com/file/d/1HZ4JAbS06x6vMV3V2VSNaU2JVoR0b0OB/view</u>.

⁴⁵ Adesina JA, Piketh SJ, Burger RP, Mkhatshwa G. Assessment of criteria pollutants contributions from coal-fired plants and domestic solid fuel combustion at the South African industrial highveld. Cleaner Engineering and Technology. 2022;6:100358.

⁴⁶ Sly PD, Bush A. From the Cradle to the Grave: The Early-Life Origins of Chronic Obstructive Pulmonary Disease. American Journal of Respiratory and Critical Care Medicine. 2015;193(1):1-2.

mortality. This reduction in premature mortality was also translated into monetary savings using a Value of Statistical Life metric. In this study, the total monetary savings, due to reduction in all-cause premature mortality across all ages brought about by the emission reductions, is up to \$33bn, indicating not only health but also an economic benefit.

7.6.3.6. Previous Health Studies Conducted

The health impacts of emissions from Eskom's power stations, particularly in the Mpumalanga Highveld Priority Area in South Africa, have been extensively studied and documented by various experts and organisations. It has been found that emissions from large stationary sources, such as coal-fired power plants, contribute to a range of health issues, posing a significant concern for public wellbeing. The outcomes of some of these studies are summarised below.

7.6.3.6.1. DFFE 2019: Highveld Health Report

This report by the DFFE presents a comprehensive assessment of the health impacts, including environmental conditions and human activities, associated with emissions from power stations in the Highveld region. The three main components of this study are:

- i) Household Survey includes demographics, living conditions and lifestyle factors data collected from residents living in the Highveld Area that could impact health.
- Health Risk Assessment evaluates potential risks to the residents' wellbeing, based on environmental and lifestyle factors, including exposure to pollutants, dietary habits and other elements contributing to health risks.
- iii) Health Impacts which examines the actual health impacts of the identified risks. This could involve analysing health outcomes, prevalence of disease, and other health-related indicators within the studied population.

This study integrated the above components to provide a holistic understanding of the health situation in the Highveld region. This study was key in evaluating the health impacts associated with emissions, at a plant level, for the Highveld Eskom Power Plants.

7.6.3.6.2. Dr Andrew Gray: Impacts due to Large Stationary Source Emissions in and around South Africa's Mpumalanga Highveld Priority Area

Dr. Andrew Gray's report provides insight into the specific impacts of emissions from 14 large stationary sources, emphasising the challenges faced in the Mpumalanga Highveld Priority Area. The key finding is that ambient PM_{2.5} pollution from the 14 facilities caused between 305 and 650 early deaths in the

area in 2016. If the 14 facilities were required to comply with the 2020 MES, this would reduce early deaths by 60%, preventing between 182 and 388 early deaths in and around the HPA annually.

7.6.3.6.3. Dr Mike Holland: Health impacts of coal-fired power plants in South Africa

This report delves into the health impacts specifically associated with coal-fired power plants in South Africa, shedding light on the gravity of the situation. This independent study estimated that Eskom's coal-fired power stations cause around 2,200 deaths annually as well as various health issues like asthma and bronchitis, which result in hospital admissions. It should be noted that Eskom, responsible for most of the air pollution, initially planned to de-commission several coal-fired plants by 2030. However, a 2022 Emissions Reduction Plan ("**Eskom's 2022 ERP**") altered these timelines, meaning the plants will continue to operate and, therefore, contribute to the public health impacts.

7.6.3.6.4. SO₂ Expert Panel Report

The report clearly highlights the recognised health impacts of SO₂ emissions and notes the harmful health impacts thereof, even at levels below the NAAQS, especially on vulnerable populations (including children). In this regard, the report states that there is "local evidence that even when SO2 levels meet NAAQS, adverse respiratory health impacts related to SO2 exposure occur, especially among children". Further, the report also notes that morbidity associated with air pollution exposure data is lacking and so is intersectoral and Department of Health data. The report states that "no local concentration response functions and little local health data are available that can be used to comprehensively calculate impacts on morbidity. Morbidity impacts are likely to be orders of magnitude greater than any of the likely underestimated mortality impacts calculated to date for SO2 in South Africa."

7.6.3.6.5. Health impacts of delaying coal power plant decommissioning in South Africa by Lauri Myllyvirta and Jamie Kelly

In October 2023, the Centre for Research on Energy and Clean Air (CREA) published a study which identifies South Africa as the 7th largest coal producer globally, with its coal-fired power stations contributing to climate change and air pollution. It found that air pollution, mainly from coal combustion, is associated with severe health impacts, including diseases such as heart disease, pulmonary issues and cancer. Further, it ascertained that air pollution is the second leading cause of premature mortality in Africa, with specific hotspots, including the Mpumalanga Highveld and Vaal Triangle.

7.6.3.6.6. Eskom's Cost Benefit Analysis (CBA)

As part of Eskom's section 59 exemption application, a CBA was conducted. This CBA had limitations when assessing health impacts, as noted on reading and as analysed by CREA. The analysis conducted by Eskom underestimates health benefits by omitting morbidity data, stating that this is unavailable. The CBA also underestimates premature mortality. It utilises outdated population data (2011 Census) and improper risk modelling with a linear approach, thereby simplifying the complex relationship between air pollution and health, and misinterpreting health costs.

While there may be limited South African data, there are a number of studies available on the impact of air pollution on health that are well-recognised. Further, the impact on vulnerable populations (e.g. pregnant women, children, elderly and those with chronic health conditions) should also be considered and a well-conducted health risk assessment should be the starting point. Lastly, while we utilise the South African air quality standards, the WHO air quality standards, against which health risks are assessed, are much lower and this potentially underestimates the health risks.

7.6.3.6.7. South African Medical Research Council (SAMRC) study on Coal-Fired Power Stations and Health.

The SAMRC have recently presented findings of a study looking specifically at the impact of coal power stations on human health in South Africa and found that 98% of South Africans are exposed to dangerous particle pollution. However, living in proximity of a coal power station increases the risk of mortality by 6 % and there is a higher risk of babies being born with congenital defects, such as cleft palate. Children living near coal-fired power stations are most vulnerable to the health effects. The study recommends decommissioning of coal-fired power stations, implementation of stricter air quality standards, a scale up of air quality management in ambient air pollution priority areas, further research on the health and environmental impact and tracking of health data from coal-fired priority areas.

7.6.3.7. Conclusion

The complex interplay between air pollution exposures and health is recognised. However, the evidence supporting the risk of non-compliance with global air quality standards and the impact on health is irrefutable. Key to ensuring an environment that is not harmful to people is ensuring that air pollution exposure is minimised.

7.6.4. Socio-economic considerations

7.6.4.1. Plant level assessments

Below is an analysis of the socio-economic conditions of communities situated in close proximity to Eskom's power plants. The data has been predominantly derived from the Census 2011 and 2021, as well as community-based surveys. Table 8 provides an overview of the districts and municipalities where Eskom's power stations are located.

| Power Station | Province | District Municipality (DM) | Local Municipality (LM) |
|---------------|------------|----------------------------|-------------------------|
| Lethabo | Free State | Fezile Dabi | Metsimaholo |
| Duvha | Mpumalanga | Nkangala | Emalahleni |
| Matla | Mpumalanga | Nkangala | Emalahleni |
| Kendal | Mpumalanga | Nkangala | Emalahleni |
| Tutuka | Mpumalanga | Gert Sibande | Lekwa |
| Majuba | Mpumalanga | Gert Sibande | Dr Pixley Ka Isaka Seme |
| Matimba | Limpopo | Waterberg | Lephalale |
| Medupi | Limpopo | Waterberg | Lephalale |

Table 8: Background information of the location of Eskom's power stations

7.6.4.1.1. Duvha, Matla and Kendal power stations

Eskom's Duvha, Matla and Kendal power stations are located in the Emalahleni Local Municipality ("**Emalahleni LM**") in the Nkangala District Municipality ("**Nkangala DM**"), Mpumalanga.

7.6.4.1.1.1. Population and living conditions

Between 2011 and 2021, the Nkangala DM experienced a significant increase in poverty levels and population growth. In 2011, approximately 33.3% of the population lived below the lower-bound poverty line (LBPL), and this figure had risen to 45% by 2021. During the same period, the population grew by over 21.4%.

In the Emalahleni LM, the percentage of the population living below the LBPL was 22% in 2011 and increased to 28% in 2016.

Over the past 11 years, there has also been an increase in the number of households without access to refuse disposal services. In the Nkangala DM, the percentage of households without such access increased from 6.3% in 2011 to 6.4% in 2022, marking a 0.1% rise. In the Emalahleni LM, this percentage grew from 6.8% to 9.7%, indicating a 2.9% increase.

The relatively minor increase in the Nkangala DM contrasts with the more substantial rise in the Emalahleni LM. This disparity aligns with the Auditor-General's findings regarding the correlation between clean audits and service delivery.

Lack of access to services like refuse disposal can lead to air pollution-related issues. Communities without proper waste management may resort to illegal dumping, leading to the emission of GHGs such as methane and CO₂ from decomposing waste. In addition, burning waste to create space or for energy purposes releases further pollutants, adversely affecting AAQ. It is crucial for relevant authorities to address this issue.

7.6.4.1.1.2. Unemployment rate and employment levels in the municipality

In 2021, the Nkangala DM recorded the highest unemployment rate in the Mpumalanga province at 37.5%. Within this district, the Emalahleni LM saw its unemployment rate rise from 27.3% in 2011 to 28.2% in 2021, a 0.9% increase over 11 years. Notably, youth unemployment (ages 15-34) in the Emalahleni LM escalated from 36% in 2011 to 41% in 2021.

While Eskom is not the largest employer in the Nkangala DM or Emalahleni LM, its operations significantly influence both formal and informal local economies. For instance, local mines supply coal to Eskom and other industries, providing substantial employment opportunities for residents in the area. Informal traders benefit from the presence of Eskom and mining activities by selling goods to workers and residents, and local businesses offer services to both Eskom and the mines.

The Emalahleni LM contributes 45.9% to the economy of the Nkangala DM and 18% to Mpumalanga's provincial Gross Domestic Product as of 2018. The municipality's economy was estimated at R66 billion in 2018, with mining accounting for nearly 55% of this figure. The trade, community services and finance sectors also play significant roles in the local economy.

The intertwined relationship between Eskom's operations, local mining activities and the broader economy underscores the importance of these industries in sustaining employment and economic growth in the region.

7.6.4.1.1.3. Source of energy

Between 2011 and 2016, electricity usage increased, and while there was a decline in 2022, it was not significant. Data from the Nkangala DM indicates a notable shift towards gas as an energy source for cooking, with usage rising from 1.9% in 2011 to 23.5% in 2022.

In 2011, the majority of households (63%) in the Emalahleni LM relied on electricity for heating. Meanwhile, 13.3% used coal, 4.8% used paraffin and, 4.3% relied on wood,

By 2022, a vast majority of households (91.7%) depended on electricity for lighting. Approximately 5.6% of households used candles, 1.5% relied on solar energy, 0.7% used paraffin, 0.3% used gas and 0.1% utilised other sources. Around 0.1% of households lacked access to any form of lighting.

These figures suggest a growing preference for electricity as a primary source of lighting homes over other fuel. Given that this transition coincides with population growth, it can be inferred that access to electricity is expanding in the Nkangala DM.

7.6.4.1.2. Tutuka

The Tutuka power station is located in the Lekwa Local Municipality ("Lekwa LM") in the Gert Sibande District Municipality ("Gert Sibande DM"), Mpumalanga.

7.6.4.1.2.1. Population and living conditions

Between 2011 and 2021, both the Gert Sibande DM and the Lekwa LM experienced notable changes in poverty levels and access to refuse disposal services.

In 2011, 37.5% of the population in the Gert Sibande DM lived below the LBPL. By 2019, this figure had risen to 49.5%, indicating a significant increase over the period. Similarly, in the Lekwa LM, 31.7% of the population lived below the LBPL. This percentage increased to 44.5% by 2021, reflecting a substantial rise in poverty levels.

In 2011, 8% of households lacked access to refuse disposal services in the Gert Sibande DM. This percentage decreased to 4.9% by 2022, suggesting improvements in waste management infrastructure. Conversely, in 2011, 3.9% of households in the Lekwa DM did not have a refuse disposal system. By 2022, this figure had increased to 6.2%, indicating a decline in service provision in this area.

These statistics highlight contrasting trends within the two municipalities: while the Gert Sibande DM saw improvements in refuse disposal services, the Lekwa LM experienced a deterioration. Both municipalities, however, faced significant increases in poverty rates during the respective periods.

7.6.4.1.2.2. Unemployment rate and employment levels in the municipality

Between 2011 and 2021, both the Gert Sibande DM and the Lekwa LM experienced declines in unemployment rates. In the Gert Sibande DM, the unemployment rate decreased to 30% in 2021, while in the Lekwa LM, it dropped to 22.1% during the same period.

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Although Eskom is not the largest employer in these areas, its operations significantly influence both formal and informal local economies. Local mines supply coal to Eskom and other industries, providing substantial employment opportunities for residents. Additionally, informal traders and local businesses benefit from the presence of Eskom and mining activities by selling goods and services to workers and residents in the area.

7.6.4.1.2.3. Source of energy

There was a slight decrease in households using electricity in the Gert Sibande DM, from 62.9% in 2011 to 61.4% in 2022. The data also indicates a significant migration towards cooking with gas, showing a decrease in electricity usage from 2% in 2011 to 19.8% in 2022. There was also a sharp decrease in the use of coal for cooking, from 10.8% in 2011 to 4.1% in 2022. A similar observation could be made in respect of the Lekwa LM.

The data clearly illustrates a progressive shift in respect of cooking fuel, with more households opting for gas over coal and wood. Specifically, gas usage rose from 1.1% in 2011 to 17.5% in 2022, while coal and wood usage declined by 61.84% and 46.3%.

In 2011, the majority of households in the Gert Sibanda DM (60.5%) used electricity for heating purposes.

In 2011, the majority of households in the Gert Sibanda DM (83.4%%) and Lekwa LM (88.6%) used electricity to illuminate their homes. In 2022, 91.3% of households reported using electricity to illuminate their homes, which marked an increase in electricity usage.

These figures suggest that electricity remains the preferred source of energy. The increasing number of households using electricity also signifies improved access to electricity in both the Gert Sibande DM and Lekwa LM.

7.6.4.1.3. Lethabo

The Lethabo power station is located in the Metsimaholo Local Municipality ("**Metsimaholo LM**") in the Fezile Dabi District Municipality ("**Fezile Dabi DM**"), Free State Province.

The Metsimaholo LM is a local municipality located in the northern part of the Fezile Dabi DM.

7.6.4.1.3.1. Population and living conditions

In its 2011 Census report, Stats SA reported that there were 488 036 people living in the Fezile Dabi DM and 149 108 people living in the Metsimaholo LM. In 2022, the population in the Fezile Dabi DM and the Metsimaholo LM increased to 509 912 and 158 391 respectively.

In 1996, over half of the population (51.5%) of the Fezile Dabi DM was living below the LBPL. The situation improved in 2005 and improved further in 2014. In 2005, the percentage of the population living below the LBPL dropped to 45.4% and further decreased to 33.4% in 2014.

There appears to have been a marginal improvement in access to refuse disposal systems in the Fezile Dabi DM and an equally marginal regression in the Metsimaholo LM. Access to refuse disposal is an issue of service delivery. Municipalities bear a responsibility to provide these basic and other services to communities.

7.6.4.1.3.2. Unemployment rate and employment levels in the municipality

According to the 2011 Census, the unemployment rate in the Metsimaholo LM was 32.1% and the youth unemployment rate was 41.6%.

7.6.4.1.3.3. Source of energy

According to the 2011 Census, 85.3% of the households in the Fezile Dabi DM used electricity for cooking purposes, and this declined to 74.5% in 2022. A similar decline was evident in the Metsimaholo LM. The percentage of households that used gas grew to 30.6%.

The increase in the use of gas and the decrease in the use of electricity reflects a shift in consumer preferences.

According to the 2011 Census, 67.7% of the households in the Metsimaholo LM used electricity for heating purposes.

In 2022, there was a notable increase in the percentage of households that relied on electricity to illuminate their homes in the Fezile Dabi DM and Metsimaholo LM. The observed shift towards electricity for lighting and the corresponding decrease in candle usage in the Gert Sibande DM and Lekwa LM likely reflect increased access to electricity and improved household incomes. This transition may also be influenced by heightened awareness of the health risks associated with burning candles and paraffin, which can negatively impact indoor air quality.

7.6.4.1.4. Majuba

The Majuba power station is located in the Dr Pixley ka Isaka Seme Local Municipality ("Dr Pixley ka Isaka Seme LM") in the Gert Sibande DM, Mpumalanga

7.6.4.1.4.1. Population and living conditions

In 2011, the percentage of people living below the LBPL in the Gert Sibande DM and the Dr Pixley ka Isaka Seme LM was approximately 37.5% and 46.6% respectively. This number increased in the Dr Pixley ka Isaka Seme LM to 51.3% in 2016 and to 49.5% in the Gert Sibande DM in 2021.

Of the total households in the Gert Sibande DM, 8% did not have access to refuse disposal services, but this figure dropped to 4.9% in 2022. In the Dr Pixley ka Isaka Seme LM, 10.2% of the households did not have access to refuse disposal systems in 2011, which decreased to 5.2% in 2022.

These statistics indicate that while poverty levels have risen in both municipalities, access to essential services like refuse disposal has improved over the same period.

7.6.4.1.4.2. Unemployment rate and employment levels in the municipality

In 2011, at least 249 638 people were employed and 109 659 were unemployed (43.9%) in the Gert Sibande DM.

7.6.4.1.4.3. Source of energy

As per the 2022 Census, 61.4% of households in the Gert Sibande DM relied on electricity as the main source for cooking. There was a slight decrease from 62.9% in 2011 to 61.4% in 2022. The data also indicates a significant migration towards cooking with gas, from 2% in 2011 to 19.8% in 2022. There was also a sharp decrease in the use of coal for cooking, from 10.8% in 2011 to 4.1% in 2022.

The percentage of households in the Gert Sibande DM that used fuel other than electricity and gas, in 2022, was 18.8%. In the Dr Pixley ka Isaka Seme LM, that figure was 21%.

In 2011, 39.2% of the households in the Dr Pixley ka Isaka Seme LM used electricity for heating purposes, 37.8% used coal, 11.4% used wood, 3.9% used animal dung, 1.6% used gas, 0.9% used paraffin and 0.1% used solar. 5% of the households did not have any means to heat their homes.

In 2011, a majority of households (83.4%) used electricity in the Gert Sibanda DM to illuminate their homes and 85.2% in the Dr Pixley ka Isaka Seme LM. The percentage increased in 2022 to 91.8% in both the Gert Sibande DM and the Dr Pixley ka Isaka Seme LM.

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7.6.4.1.5. Matimba and Medupi

The Matimba and Medupi power stations are located in the Lephalale Local Municipality ("Lephalale LM") in the Waterberg District Municipality ("Waterberg DM"), Limpopo.

7.6.4.1.5.1. Population and living conditions

According to the 2011 and 2022 Census, the Waterberg DM had a population of 679 336 in 2011, while the Lephalale LM's population was 118 864. By 2022, the Waterberg DM's population had increased to 762 862, while that of the Lephalale LM had grown to 125 198. The poverty rate in the Waterberg DM saw a moderate increase between 2011 and 2020, rising from 6.5% to 9%.

There has been some improvement in service delivery regarding access to refuse disposal systems. However, this improvement has been relatively marginal. In cases where communities burn waste — whether to create more space for additional waste or to generate energy for cooking and heating — the resultant emissions contribute to air pollution, negatively affecting the AAQ in these areas. It is therefore crucial for the relevant authorities to address this issue.

7.6.4.1.5.2. Unemployment rate and employment levels in the municipality

In 2011, the Waterberg DM had an unemployment rate of 21.8%. By 2021, this rate had increased to 28.3%. However, as of 2021, the Waterberg DM still had the lowest unemployment rate amongst the five districts in Limpopo. In the Lephalale LM, the unemployment rate was 22.2% in 2011, rising slightly to 23.5% in 2021.

7.6.4.1.5.3. Source of energy

Between 2011 and 2022, there was a decline in the use of electricity for cooking, with a decrease of 13.4% in the Waterberg DM and 16.9% in the Lephalale LM. According to the 2011 Census, 65.5% of households in the Waterberg DM used electricity from the mains for cooking, but this figure dropped to 51.2% in 2022.

In 2011, the majority of households in the Lephalale LM (60.4%) used electricity for heating.

Meanwhile, electricity usage for lighting increased in the Waterberg DM. In 2011, 86.7% of households used electricity to light their homes, rising to 92.9% in 2022.

7.6.4.2. Fleet level socio-economic assessment

7.6.4.2.1. Health

Health is a key component of the socio-economic wellbeing of communities. PM emissions pose more severe health impacts than NO_X or SO_X . In particular, $PM_{2.5}$ is dangerous because it is small enough to penetrate deep into the lungs and bloodstream, causing widespread inflammation, organ damage and chronic diseases. A detailed analysis on the health issues affecting communities and the implications thereof are dealt with under Health considerations, section 9.4 below.

7.6.4.2.2. Employment

The employment situation of each Local Municipality and District Municipality for each power station has been discussed above. Below, we examine the provincial employment conditions.

Mpumalanga's economy is heavily dependent on coal. In 2024, 52 million tons of coal mined in Mpumalanga were exported, while Eskom consumed 165 million tons — accounting for more than 75% of the coal mined. If immediate MES compliance was required, the entire Mpumalanga economy would be severely impacted. The province's already high unemployment rate — 34.9%, which exceeds the national average of 32.1% — would likely rise even further.

Similarly, the Limpopo province has a high rate of unemployment, being 31.9%. However, unlike Mpumalanga, Limpopo's economy is less reliant on coal. The Medupi and Matimba power stations, located outside the town of Lephalale, play a crucial role in the local economy. The closure of these power stations, along with the Grootgeluk coal mine that supplies them, would have severe socio-economic consequences for communities in and around Lephalale.

As stipulated in its section 59 applications, Eskom has a substantial permanent cumulative workforce of approximately 5 450 employees across all its power stations. However, the indirect and induced employment created by its power stations is significantly greater. In Mpumalanga alone, there are approximately 90 000 coal miners, with more than 75% of the mined coal supplied to Eskom's power stations.

7.6.4.2.3. Environment

PM emissions from coal-fired power plants have widespread and long-lasting effects on air quality, the climate, water, soil and ecosystems. Reducing PM emissions is critical due to the detrimental effects on the environment. The severity of the impact depends on the size, composition and chemical reactivity of the particles. PM_{2.5} scatters sunlight, reducing visibility and contributing to haze in cities and rural

areas. PM can act as cloud condensation nuclei, altering cloud properties and this affects the patterns of precipitation. Further changes in cloud cover may impact regional climates and cause unexpected weather variations. PMs can also cause acid rain, acidify the soil and rivers, and damage plants and ecosystems. NO_X and SO_X pollutants react in the atmosphere to form fine nitrate and sulphate particles (PM_{2.5}) that contribute to industrial smog and regional haze. The pollutants also reduce visibility in urban, natural and rural areas adversely affecting tourism and quality of life. SO_X reacts with water vapour in the atmosphere, forming sulfuric acid which results in acid rain. The acid rain acidifies the soil and leaches essential elements.

GHG effects of SO_X and NO_X are complex. Neither NO_X nor SO_X are classified as GHGs, but they can impact the climate because they can have the effect of countervailing forces that cool and heat the atmosphere. NO_X plays a role in the formation of tropospheric ozone, and it also leads to the destruction of methane, these are powerful GHGs. SO_X contribute to sulphate aerosol formation which reflect sunlight and cool the atmosphere.

7.6.4.3. Air quality offsets

According to the Air Quality Offsets Guideline:

"In the air quality context, an offset is an intervention, or interventions, specifically implemented to counterbalance the adverse and residual environmental impact of atmospheric emissions in order to deliver a net ambient air quality benefit within, but not limited to, the affected airshed where ambient air quality standards are being or have the potential to be exceeded and whereby opportunities and need for offsetting exist".⁴⁷

While Eskom continues its efforts to improve AAQ through reducing emissions from its existing coalfired fleet by retrofitting abatement technology and diversifying the energy fleet, these measures are extremely costly. Their implementation will have significant financial implications for South Africa and require a long period of time to complete. Air quality offsets (AQOs) however present an opportunity to directly address emission sources within vulnerable communities as the implementation of these measures may improve the AAQ. AQOs are more cost-effective and can lead to meaningful air quality improvements within a shorter timeframe.

⁴⁷ Republic of South Africa, National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), Air Quality Offsets Guideline, 2016.

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Eskom launched its first AQO programme in 2016, following the NAQO's directive that each power station must develop and implement an offset programme aimed at reducing particulate matter (PM_{10} and $PM_{2.5}$) concentrations in the ambient environment. Eskom's initial AQO Plans — covering the Nkangala DM, Gert Sibande DM and Lethabo Power Station — were approved by the NAQO and the relevant AEL authorities in September 2016. These plans were subsequently updated and resubmitted in April 2021. Eskom provides the relevant licensing authority with annual progress reports on its implementation of the AQO Plans.

7.6.4.3.1. Eskom's offset programme

As part of its efforts to improve the air quality in the areas around its power stations, Eskom introduced an offset programme which seeks to reduce emissions from domestic solid fuel burning. The programme is aimed at assisting households to move to cleaner sources of energy by replacing coal stoves with electric/gas stoves and providing gas heaters and Liquified Petroleum Gas cylinders, as well as by reducing the need for heating by installing ceilings to insulate houses, where possible.

Eskom began its first AQO initiative in 2011, with a pre-feasibility study to identify potential strategies to meet the offset requirements contained in its AELs. Several trials were undertaken in Kwazamokuhle (a township near Hendrina Power Station, Mpumalanga) from 2013 to 2017, before Eskom's 2016/2017 Offset Implementation Plan was formulated. The interventions aim to target domestic fuel burning for heating and cooking in the Highveld region, particularly in Kwazamokuhle and Ezamokuhle, whilst interventions target both domestic fuel burning and domestic waste burning in the Vaal. Presently, the AQO Plans are being executed in stages across various communities in close proximity to Eskom coal-fired power stations in both the Highveld and Vaal regions.

Eskom identified at least seven areas in the Gert Sibande DM, where it intends to roll out its offset programme. Of the seven, only three are proximate to the Majuba power station, namely Ezamokuhle, Daggakraal and Sinqobile. Furthermore, there appears to be potential for Eskom's programme to be implemented in the Gert Sibande DM and the Dr Pixley ka Isaka Seme LM.

In the districts of Nkangala and Gert Sibande, where domestic coal burning is a key contributor to poor AAQ, Eskom's offset intervention is two-pronged and entails the following:

- 1. "The provision of a basic plus retrofit consisting of "insulation entailing installation of a SPF ceiling system and draft proofing; electrical rewiring and issuance of a Certificate of Competence (CoC)"; and
- 2. The replacement of household coal stoves which entails the "provision of electricity- based energy source with LPG [liquefied petroleum gas] backup [including] a hybrid gas electric

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stove, LPG heater plus 2x9 kg LPG cylinders and Compact fluorescent lamp (CFL) for energy efficient lighting."

Conversely, in the districts of Fezile Dabi and Sedibeng, where the burning of waste has adversely affected air quality, Eskom's offset intervention entails clearing illegal waste dumps by moving waste to lawful waste disposal sites and implementing cleaning projects.

7.6.4.4. Eskom's proposed offsets at each of the power stations

This section provides a summary of the offset programme as presented by Eskom in its section 59 applications.

7.6.4.4.1. Matla

Eskom's AQO Plan for the Nkangala DM aims to improve air quality in communities around seven power stations, including Matla. Over the past three years, Kriel village (near Matla) has recorded non-compliance with PM₁₀ and PM_{2.5} NAAQS, with key contributors being industry, wind-blown dust and domestic fuel burning (7% and 15% for PM₁₀ and PM_{2.5} respectively)⁴⁸. Studies show PM is primarily generated within low-income settlements due to the use of fuel indoors for cooking and heating.⁴⁹

Research into household fuel usage found that 44% to 68% of households around Matla use coal. Eskom estimates 8 770 households will participate in its offset intervention, assuming that 90% of the households in the area that use coal, participate. A further 1 550 households have been identified for potential inclusion, with the overall AQO programme potentially expanding from 36 000 to 96 000 households, subject to Eskom's financial capacity and updated data from Stats SA.

⁴⁸ HPA AQMP published in Government Gazette No. 50985 of July 2024.

⁴⁹ Adesina, J. A. et al, 2022

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| | | | NUMBER OF HOUSEHOLDS AFFECTED BY AQO INTERVENTIONS | | |
|--------------------------|-------------------------|--|---|---|---|
| AREA | IMPLEMENTATION PHASE | TIMEFRAME ((ESKOM, AIR QUALITY OFFSET PROJECT, 2024) | ESKOM 2016/2017 OIP | POTENTIAL EXPANSION OF ESKOM'S AQO PROGRAMME | OPPORTUNITY FOR OFFSET INTERVENTION |
| Emzimnoni | Phase 2 | Ву 2030 | 6,065 | 85 | Domestic Fuel Burning |
| Chris Hani | Phase 2 | твс | 274 | No data | Domestic Fuel Burning |
| Milan Park Extensions | Phase 2 | твс | 1,035 | 1,433 | Domestic Fuel Burning |
| | | | | | |
| Kananna Extension 6 | Phase 2 | твс | 551 | 32 | Domestic Fuel Burning |
| Thambo | Phase 2 | твс | 845 | Not Applicable | Domestic Fuel Burning |
| Neighbouring farms | Phase 3 | ТВС | ТВС | No data | Domestic Fuel Burning |

Table 9: Matla - Selected Areas and associated Air Quality Offset Interventions (Source: Eskom)

7.6.4.4.2. Kendal

Eskom's AQO Plan targets communities around its Kendal power station, with recent monitoring showing PM_{10} non-compliance. The HPA AQMP identifies industry, wind-blown dust and domestic fuel burning (7% and 15% for PM_{10} and $PM_{2.5}$, respectively) as major contributors.

Table 10 estimates the number of households for offset interventions and assumes that 75% of households in Phola and surrounding areas use coal or wood. A further 1 952 households in Phola and Rietspruit have been identified for potential AQO interventions, supporting programme expansion to 96 000 households.

| Area | Opportunity for Offset Intervention | Proposed Number of Households for Offsets | Potential households for expansion (ARM 2024) | Implementation Phase | Timeline (Eskom 2024, Arm 2024) |
|-------------------------|---|--|---|-------------------------|------------------------------------|
| Phola | Domestic Fuel Burning | 6,016 | 592 | Phase 2 | By 2030 [,] |
| Eskom Triangle | Domestic Fuel Burning | 9 | No data | Phase 3 | ТВС |
| Khayalethu community | Domestic Fuel Burning | 10 | No data | Phase 3 | ТВС |
| Olympic Community | Domestic Fuel Burning | 47 | No data | Phase 3 | ТВС |
| Makhosi Community | Domestic Fuel Burning | 152 | No data | Phase 3 | ТВС |
| Arbor | Domestic Fuel Burning | ТВС | No data | Phase 3 | ТВС |
| Neighbouring Farms | Domestic Fuel Burning | ТВС | No data | Phase 3 | TBC |
| Rietspruit | Domestic Fuel Burning | 1,069 | 1,360 | ТВС | TBC |

Table 10: Kendal - Selected Areas and associated Air Quality Offset Interventions (Source: Eskom)

7.6.4.4.3. Duvha

Table 11 estimates that 3 108 households (90%) in Masakhane and eMalahleni will participate in the offset interventions, assuming 75% of these households use coal or wood. A review identified an additional 21 321 households for inclusion, potentially expanding the AQO programme from 36 000 to 96 000 households. Actual targets depend on Eskom's financial circumstances and updated data from Stats SA.

| AREA | OPPORTUNITY FOR OFFSET INTERVENTION | ESKOM 2017 OIP NUMBER OF HOUSEHOLDS | POTENTIAL HOUSEHOLDS FOR EXPANSION (ARM 2024) | IMPLEMENTATION PHASE | TIMELINE(ESKOM 2024) |
|------------|---|--|---|-------------------------|----------------------|
| Masakhane | Domestic Fuel Burning | 1,108 | 110 | Phase 2 | By 2030 |
| eMalahleni | Domestic Fuel Burning | 2,000 | 21,211 | Phase 3 | Ву 2030 |

Table 11: Duvha - Selected areas and associated Air Quality Offset interventions (Source: Eskom)

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7.6.4.4.4. Tutuka

Eskom's AQO plan for the Gert Sibande DM targets communities around Tutuka, where PM_{10} noncompliance has been recorded. Industry, wind-blown dust, and domestic fuel burning (7% and 15% for PM_{10} and $PM_{2.5}$) are primary sources.

Table 12 proposes that 1 560 households will participate in the offset interventions, assuming 75% in Sivukile and Thuthukani use coal or wood. A further 16 241 households have been identified for potential AQO interventions, with the programme potentially expanding to 96 000 households.

| Area | Opportunity for Offset Intervention | Proposed Number of Households for Offsets | Potential households for expansion (ARM 2024) | Implementation Phase | Timeline (Eskom, Air Quality Offset Project, 2024) |
|-----------------------|--|--|---|-------------------------|--|
| Sivukile | Domestic Fuel Burning | 1,160 | NA | Phase 2 | April 2024 – December 2025 |
| Thuthukani | Domestic Fuel Burning | 400 | 199 | Phase 3 | ТВС |
| Neighbouring farms | Domestic Fuel Burning | TBC | No data | Phase 3 | ТВС |
| Standerton | Domestic Fuel Burning | No data | 8,004 | ТВС | ТВС |
| Sakhile | Domestic Fuel Burning | No data | 8,038 | ТВС | ТВС |

Table 12: Tutuka - Selected areas and associated Air Quality Offset Interventions (Source: Eskom)

7.6.4.4.5. Lethabo

Eskom's offset interventions have primarily targeted the Mpumalanga Highveld, but domestic coal burning in the Vaal has declined, with approximately 35% of the households in low-income areas using coal. Waste burning is a significant emission source, prompting AQO initiatives to address domestic fuel and waste burning.

Phase 1 targeted illegal waste dumps and cleanup campaigns in Sharpeville. Phase 2 focuses on Tshepiso and Boipatong, while Phase 3 includes Refengkotso, where both domestic fuel and waste burning will be addressed. An estimated 9 035m³ of additional waste removal is possible under the expanded AQO programme.

| Area | Implementation Phase | Timescales | Eskom 2016/2017 OIP | Potential Expansion of Eskom's AQO Programme |
|-------------|-------------------------|--|---|---|
| Sharpeville | Phase 1 & Phase 2 | April 2022 – September 2024 & January 2023 – March 2028 | Six cleanup campaigns completed | 9,035m ³ of waste to be removed |
| Tshepiso | Phase 2 | January 2023 – March 2028 | Proposed cleanup campaigns | 9,035m ³ of waste to be removed |
| Boipatong | Phase 2 | January 2023 – March 2028 | Proposed cleanup campaigns | 9,035m ³ of waste to be removed |
| Refengkotso | Phase 2 & Phase 3 | By 2030 | Proposed cleanup campaigns and household interventions | 9,035m ³ of waste to be removed |

Table 13: Lethabo - Lethabo's AQO Programme - phased approach to rolling out initiatives in settlements

7.6.4.4.6. Majuba

Eskom's AQO Plan for the Gert Sibande DM targets Majuba, where PM_{10} and $PM_{2.5}$ non-compliance has been recorded. Industry, wind-blown dust and domestic fuel burning (7% and 15% for PM_{10} and $PM_{2.5}$ respectively) are key contributors.

Table 14 estimates the number of households for offset interventions in Phase 2, based on Eskom's assumption that 90% of households using coal will participate in the programme. A further 1 702 households have been identified for potential inclusion, with the AQO programme potentially expanding to 96 000 households.

| AREA | OPPORTUNITY FOR OFFSET INTERVENTION | PROPOSED NUMBER OF HOUSEHOLDS FOR OFFSETS | POTENTIAL HOUSEHOLDS FOR EXPANSION (ARM 2024) | IMPLEMENTATION PHASE | TIMELINE (ESKOM, AIR QUALITY OFFSET PROJECT, 2024) |
|---------------------------|---|--|--|-------------------------|---|
| Ezamokuhle | Domestic Fuel Burning | 1,850 | 823 | Phase 1 | By 2024 |
| Daggakraal & Sinqobile | Domestic Fuel Burning | 2,940 | 879 | Phase 2 | ТВС |
| Neighbouring Farms | Domestic Fuel Burning | ТВС | ТВС | Phase 3 | ТВС |

Table 14: Majuba - Selected Areas and associated Air Quality Offset Interventions (Source: Eskom)

7.6.4.4.7. Matimba and Medupi

Marapong and Lephalale townships fall within the WBPA, with PM_{10} and $PM_{2.5}$ non-compliance observed at Marapong and Medupi monitoring stations. Mining contributes over 70% of total PM_{10} emissions, while industry accounts for 99.9% of SO₂ emissions. Matimba and Medupi are the main emitters of SO₂ in the area, though ambient SO₂ levels remain low.

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Eskom commissioned an investigation with the North-West University to better understand the need and opportunities for AQO projects targeting local sources of SO₂ and PM emissions in Marapong. North-West University research identified key AQO interventions, including:

- Clean Household Energy Program: Promoting LPG or electric cookers to replace coal and biomass.
- Waste Burning Management: Introducing waste collection services and public education.
- Reforestation and Greening: Planting trees as windbreakers to reduce dust transport.
- Surfacing of Bare Public Grounds: Paving high-traffic areas to minimise dust.

A pre-feasibility study confirmed that AQO interventions in Marapong could significantly reduce emissions, warranting further investigation into feasibility, effectiveness and cost-effectiveness.

7.6.4.5. Eskom's timeframe for implementing its offset programme

As part of its reporting requirement, Eskom produces reports that outline the status of its offset programme. These reports were considered and reviewed by the NECA Forum during its tenure, and of significance is that HNM has noticed that Eskom keeps pushing back the completion dates for the various projects.

Below is a summary of Eskom's progress on the implementation of its offset programme as at January 2024:

| Settlement | No of Househ olds | Start | End | Comments |
|------------|-------------------------|-------------------|------------------|---|
| Sivukile | 1160 | June 2023 | December 2024 | Currently in the procurement stage, where the tender for the execution was issued to the market in December 2022, however all tenderers were disqualified due to technical issues with their tender. Therefore, a re-issue to the market will be initiated. A delay of +/- three months will be experienced due to the non-award |
| Phola | 6073 | September 2023 | October 2026 | Procurement process estimated to be completed by end June 2023 |

| Settlement | No of Househ olds | Start | End | Comments |
|-----------------------------------|-------------------------|-----------------|---------------|---|
| | | | | Execution planned start is 01 July 2023 |
| Emzimnoni | 4300 | March 2024 | April 2027 | Budget approval outstanding |
| Masakhane | 1108 | May 2024 | Dec 2025 | Budget approval outstanding |
| Thubelihle | 2987 | October 2024 | March 2027 | Budget approval outstanding |
| Silobela | 2504 | January 2025 | July 2027 | Budget approval outstanding |
| New Emerlo | 935 | April 2025 | July 2026 | Budget approval outstanding |
| Grootvlei village/Ntorwa ne | 2000 | June 2025 | Sept 2027 | Budget approval outstanding |
| Nederland | 1660 | June 2025 | July 2027 | Budget approval outstanding |
| eMalahleni | 2000 | August 2025 | Nov 2027 | Budget approval outstanding |

Table 15: Status of Phase 2 Eskom's offset program (Source: NECA forum report p. 380)

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| PHASE | POWER STATION | SETTLEMENT | NO OF HOUSES | START | END | COMMENTS |
|----------|------------------|-------------------------------|-----------------|------------|----------|---|
| Phase 1 | Hendrina | Kwazamokuhle | 3700 | 2021 | 2024 | Completed |
| | Majuba | Ezamokuhle | 2100 | 2021 | 2024 | Completed |
| | Lethabo | Sharpeville | | 2021 | 2024 | Completed |
| Phase 2a | Tutuka | Sivukile | 1160 | April 2024 | Dec 2025 | Contract terminated. Tender to be reissued |
| | Kendal | Phola | 66073 | Nov 2024 | Oct 2029 | In the procurement phase – Contract being negotiated. |
| Phase 2b | Matla | Emzimnoni | 3440 | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| | Duvha | Masakhane | 886 | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| | Kriel | Thubelihle | 2390 | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| | Arnot | Silobela | 2003 | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| | Lethabo | Refengkotso | 500 | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| | Lethabo | Boitshepiville | N/A | April 2025 | Mar 2030 | Budget secured. In the procurement phase. |
| Phase 2c | Camden | New Ermelo | 935 | Sept 2025 | Aug 2030 | Budget approval outstanding |
| | Grootvlei | Grootvlei village/Ntorwane | 2000 | Sept 2025 | Aug 2030 | Budget approval outstanding |
| | Camden | Nederland | 1660 | Sept 2025 | Aug 2030 | Budget approval outstanding |
| | Duvha | eMalahleni | 2000 | Sept 2025 | Aug 2030 | Budget approval outstanding |

Below is a table provided in Eskom's current applications before the Minister:

Table 16: Eskom's Implemented and planned AQO Interventions (Source: Eskom s59 Exemption application)

It is evident from Table 15 above that all offset projects ought to have been completed in 2027. However, based on the information provided in its section 59 plant level applications, see Table 16, it appears Eskom will only complete the implementation of this programme in 2030. This is dealt with in more detail below:

- There have been significant delays with every Phase 2a, Phase 2b and Phase 2c offset project. Eskom has provided little justification for these delays.
- Both Phase 2a projects were previously scheduled to start in 2023, but in Eskom's section 59 application, the start date moved out to April/November 2024. Eskom indicated that these projects are still in the procurement phase, so it is unclear how the projects have started when they are still in a procurement phase.
- Four Phase 2b projects were scheduled to start between March 2024 and January 2025. All these projects have been delayed and are now scheduled to start in April 2025.

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• The four Phase 2c projects were all scheduled to start between January 2025 and August 2025, but these have been delayed by a few months to September 2025.

It appears that Eskom discharges its duty to implement offset interventions in the ambient environment by aiming to reduce domestic fuel burning, through the replacement of household coal stoves and installation of ceilings, as well as the reduction of the burning of waste by clearing illegal waste dumps. It is evident that Eskom invested resources, financial and otherwise, in implementing the offsets, as evidenced by its budget expenditure for the Phase 1 projects (Kwazamokuhle, Ezamokuhle, Sharpeville and Emzimnoni) that have been completed. Unfortunately, there have been slippages with the implementation of Phase 2 of the offset programme.

7.6.4.6. Air quality impact assessment of Eskom's offsets

The effectiveness of Eskom's AQO plans depends on how well the interventions are planned, monitored and verified. Three key indicators must be monitored before, during and after offset implementation, namely the state of ambient air, emissions and quality of life. Over every monitoring period, the AQO project scenario (as it took place) should be compared to a credible baseline scenario (i.e., the situation that would have been the case if the project were not implemented). The principal indicator of success of the intervention should be related to a change in exposure to air pollution and nett emissions avoided because of Eskom AQO interventions.

Eskom established a Planning, Monitoring and Verification (PMV) contractor, to provide PMV services for Phase 1 of Eskom's AQO Plan at Kwazamokuhle, Ezamokuhle and Sharpeville. Various project effectiveness surveys have been completed in Ezamokuhle and Kwazamokuhle to assess the impact of Eskom's AQO interventions.

According to Eskom's contractor, the necessary data in Table 17 demonstrates that there was a notable reduction in PM_{10} (132 tons) and $PM_{2.5}$ (123 tons) annually, as well as in CO, SO₂, NO₂, VOCs and methane emissions into the air.



Table 17: Total net reduction in emissions per annum attributable to Eskom's Phase 1 AQO Project (tons) for Ezamokuhle and Kwazamokuhle (Source: Eskom)

Indoor air quality monitoring in participating households in Ezamokuhle revealed a significant decrease in PM_{10} and $PM_{2.5}$ concentrations following the implementation of Eskom's AQO interventions. Furthermore, household surveys conducted in Kwazamokuhle and Ezamokuhle indicated high satisfaction levels, with 84% and 85% of respondents, respectively, reporting that the intervention improved their quality of life, as assessed by the PMV contractor.

Post-intervention monitoring and surveys are planned for Sharpeville in 2025. However, Eskom has already quantified the air quality benefits of AQO waste interventions in Sharpeville by calculating the net emissions avoided and developing an air dispersion model. The first three clean-up campaigns demonstrated the highest potential reductions in PM_{10} (16.01 tons) and $PM_{2.5}$ (15.96 tons), along with notable reductions in NO₂ (3.32 tons) and SO₂ (0.33 tons) emissions.

Dispersion modelling commissioned by Eskom further illustrates the potential air quality improvements resulting from emission reductions, with predicted short-term maximum AAQ improvements across the first three campaigns (see Table 18 for details).

| Model Pollutant Maximum Concentration (µg/m ³) | | | | | | | |
|--|--------|---------|-------------------|---------|-----------------|---------|-----------------|
| Pollutant | PM10 | | PM _{2.5} | | SO ₂ | | NO ₂ |
| Averaging Period | 1-hour | 24-hour | 1-hour | 24-hour | 1-hour | 24-hour | 1-hour |
| Campaign 1 | 19.1 | 2.4 | 19.1 | 2.3 | 0.4 | 0.1 | 2.1 |
| Campaign 2 | 33.9 | 4.4 | 33.8 | 4.4 | 0.6 | 0.1 | 3.5 |
| Campaign 3 | 278.0 | 28.9 | 277.5 | 28.8 | 5.6 | 0.6 | 28.6 |

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 99 of 100 Table 18: Potential improvement in AAQ due to Eskom's Sharpeville AQO Project (Source: Eskom)

7.6.4.7. Conclusion

Coal is integral to the economy of Mpumalanga. There is little non-coal related manufacturing in the province.

The rejection of Eskom's section 59 applications, leading to closure of its coal-fired power stations, would have widespread economic repercussions across nearly all sectors in Mpumalanga. This includes a direct impact on Eskom's 5 450 employees, as well as workers in the coal sector (coal supply, subcontractors and service providers to the power stations) and local businesses, such as supermarkets, which may be forced to downscale or shut down due to the loss of their customer base. To mitigate these effects, the upskilling of unemployed individuals in other active sectors of Mpumalanga's economy will be crucial.

7.6.5. Achieving local emission reductions (Abatement)

7.6.5.1. Abatement retrofit options to reduce emissions

Power station retrofits that are required to comply with the MES are challenging because the majority of power stations were not originally designed to include this additional abatement equipment to treat the flue gases. Each power station has a unique layout and set of unit operations and uses a specific quality of coal, so each retrofit needs to be bespoke.

We point out that the power stations are integrated, and no space was allowed for additional abatement equipment on power stations' footprints (e.g., only the Medupi power station was designed to be "*FGD ready*" and has sufficient space in its plot plan; except for Kusile, none of the other power stations are "*FGD ready*"). Unfortunately, as highlighted in the NECA Forum's 2024 Report, time and funding constraints did not permit the appointment of experts for a detailed review of Eskom's recommended abatement solutions. As such, the NECA Forum considered and evaluated the available retrofit technologies per pollutant at a more general level. HNM is in the same position and only a high-level analysis could be done.

Many of Eskom's coal-fired power stations are from the 1970s and 1980s and were designed to comply with the emission standards at that time. The layout of the power stations was optimised so it was compact and there was the best use of space. Air emission standards have since tightened and, in order for those power stations to meet the current MES, they need abatement retrofits. Unfortunately, there

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are space and process flow constraints, so the retrofits can be costly and negatively impact the power station's performance.

Some of the unintended impacts include:

- Reduced capacity (MW).
- Reduced performance, such as operating stability and ramp-up rates.
- Operating units upstream and downstream of the retrofit will be impacted and may run suboptimally (and may also require modifications).
- Reduced power station or EAF availability due to a higher number of unplanned outages and longer GOs.
- Increased maintenance costs (from the abatement equipment itself and the retrofit's impact on the upstream/downstream units).
- Increased coal use (some unburnt coal remains in the ash).
- Reduced thermal efficiency, which results in an increase in the power station's CO₂ emissions. This also increases the coal consumption.
- Negative impacts (e.g. water & limestone requirements, and gypsum landfilling).

A challenge that some of Eskom's power stations face is that they do not only need to abate one pollutant, but two or three of them. Many of the challenges are intertwined as they impact one another, and the complexities increase exponentially.

By way of example. if only a power station's SO_X emissions need to be abated, an FGD would need to be installed. However, an FGD's operation requires PM levels that are significantly lower than MES, so the SO_X retrofit could also require a PM retrofit. These unintended consequences introduce complexities and each MES retrofit, therefore, needs to be a bespoke design.

Policy makers, regulators, emitters, appellants, engineers and legal experts need to be prudent not to underplay the unintended consequences and complexities of these challenges of abatement retrofits.

7.6.5.2. Abatement retrofits proposed by Eskom

In its Exemption application Eskom considered three Emission Reduction Plans (ERP), namely ERP2024 A, ERP2024 B and ERP2024 C. In all three scenarios, the PM and NO_x abatement projects are identical, and the only difference is on which power stations SO_x abatement retrofits are done. Details of each ERP scenario is summarised in Table 19.

The PM and NO_X abatement projects that Eskom plans to implement are consistent with the recommendations of the NECA Forum, but the delayed timing of the PM retrofits is regrettable, as highlighted in Table 19.

In March 2024, the NECA Forum recommended that "*Eskom must achieve the* $[SO_X]$ *concentration limit they state they can achieve in their applications*", but it did not recommend that Eskom's other power stations must meet the new plant MES limits for SO_X.

Further, in its recommendations, the NECA Forum stated that:

"The Forum finds that it does not yet have sufficient information to support making the installation of FGD at Medupi a condition of the plant's exemption from complying with the SOX MES limits from 2025" and

"Eskom must undertake an updated CBA to determine the value of FGD at Medupi".

Eskom's preferred scenario is ERP2024 A, which provides for the implementation of SO_X retrofits at Medupi and Kusile only. The other power stations were not designed to be "*FGD ready*" so they have no plot space or possible pipe-routings for SO_X abatement, and it is questionable how feasible or practical it would be to retrofit those plants.

| | ERP 2024 A | ERP 2024 B | ERP 2024 C | | | |
|---|--|--|---|--|--|--|
| PM Reduction Projects | Kendal, Matimba, Lethabo, Tutuka, Duvha, Matla PM Abatement Projects Air Quality Offset Projects: expansion above 35,000 households (possible total 90,000) | | | | | |
| NOx Reduction Projects | Ма | juba, Lethabo, Tutuka (+ benefits of I | Despatch Prioritisation) | | | |
| SO ₂ Reduction Projects | Kusile, Medupi | Kusile, Medupi, Kendal; Majuba | Kusile, Matimba, Medupi, Tutuka, Lethabo; Majuba; Kendal | | | |
| 2 · · | | Despatch Prioritisation; efficiency im | provement projects | | | |
| Capex (nominal) | R77 billion | R134 billion | R257 billion | | | |
| Annual Opex (real) | R2.1 billion | R4.2 billion | R 6.3 billion | | | |
| | | PARTICULATE MATTER | | | | |
| Modelling – PM ₁₀ Annual | Compliant (24hr non- compliant) | Compliant | Compliant | | | |
| Modelling – PM _{2.5} Annual | Non-Compliant | Compliant | Compliant | | | |
| | | OXIDES OF NITROGEN | | | | |
| Modelling – NO ₂ Annual | Compliant | Compliant | Compliant | | | |
| | SULPHUR DIOXIDE | | | | | |
| Modelling – SO ₂ Annual | Compliant | Compliant | Compliant | | | |
| CO ₂ Emissions | 10.4Mt (453kt pa) | 18Mt (889kt pa) | 25.5Mt (1.5Mt pa) | | | |
| Waste | 2.7Mt | 4.6Mt | 7.1Mt | | | |
| Water | 9.7M m ³ | 15.5M m ³ | 31.4M m ³ | | | |
| Health Benefits (central) | 1.74 | 0.55 | 0.33 | | | |

Table 19: Eskom's proposed retrofit scenarios. Eskom's preferred approach is ERP2024

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7.6.5.3. Retrofits to abate PM

PM abatement can be achieved through the use of one of two technologies: FFB or ESP.

At power stations that have FFB, the abatement would be enhanced by upgrading the bag houses with bags filters with a finer weave, improved pulsing and flue gas flows and/or filter- bag surface areas. At the power stations that have ESP units, ESP can be improved by SO₃ dosing, HFPS and/or installing DHP.

Eskom's proposed solutions appear appropriate because it is quicker (and cheaper) to upgrade existing units than to scrap them and replace them with another technology.

In January 2024, Eskom provided the NECA Forum with a schedule of dates by which each power station, by unit, would comply with the MES for PM emissions. There has unfortunately been a slippage in the schedule and almost all power stations will only have their PM abatement retrofits complete by a later date.

The delays in the implementation schedules are significant, as illustrated in Table 20. For instance:

- 1) There appears to be a delay of 1 108 days for the PM compliance of Tutuka Unit 5,
- Some units that previously complied now require retrofits which will only be complete in 2025/26 (Kendal, Matla and Tutuka),
- 3) No PM retrofit will be complete earlier than Eskom had previously communicated, and
- 4) Across the fleet, there is on average more than a year's delay for the PM retrofits.

In Table 20 below, Eskom sets out its comments in respect of each of the delays:

| | Schedule provided to Forum for the NECA report (Jan 2024) | Latest schedule in §59 application (Nov 2024) | Difference in timeline (days) | Eskom comments |
|------------------------|---|--|----------------------------------|--|
| Duhva U1 | complies | complies | | General point on plant optimisation. Given experience Eskom decided to ensure there was sufficent time after completion of an emission reduction project for units to optimise, stabalise and for teams to become suitably trained to manage the upgraded units in line with new requirements. In addition to this a contingency time allocation was made post our optimistic delivery schedule to ensure time overruns did not result in compliance issues. This combined contingency time post official project completion is in the order of 6 months - 180 days. |
| Duhva U2 | complies | complies | | - |
| Duhva U4 | 19-Apr-25 | 01-0ct-26 | 530 | The procurment process was unsucessful and new process is underway. A sole source approach is being adopted to try and fast track the projects. Compliance time period includes optimisation. |
| Duhva U5 | complies | complies | | - |
| Duhva U6 | 19-lan-25 | 01-Oct-26 | 620 | The procurment process was unsucessful and new process is underway. A sole source approach is being adopted to try and fast track the projects. Compliance time period includes optimisation. |
| Kendal U1 | 20-Feb-25 | 01-Apr-26 | 405 | The outage for unit 1 was moved due to commercial and systems issues and will now commence August 2025. Compliance time period includes optimisation as discussed. |
| Kendal U2 | 06-Aug-25 | 01-Apr-26 | 238 | The outage for unit 2 has commenced and will be completed during 2025. Compliance time period includes optimisation as discussed. Kendal also has ongoing compliance challenges (related in part to common plant) which also need to be adressed to ensure sustainable compliance. Compliance time period includes optimisation. |
| Kendal U3 | complies | 01-0ct-25 | Now not in compliance ? | The commited emission upgrades have been completed on the unit. The unit is however not able to consistently comply with PM=50 (issues are often common plant/ash handling plant related). Work to implement the necessary recovery plant to address this is underway and as such time for this is included in the compliance time period. |
| Kendal U4 | complies | 01-0ct-25 | Now not in compliance ? | The commited emission upgrades have been completed on the unit. The unit is however not able to consistently comply with PM=50 (issues are often common plant/ash handling plant related). Work to implement the necessary recovery plant to address this is underway and as such time for this is included in the compliance time period. |
| Kendal US | complies | 01-Apr-26 | Now not in compliance ? | The commited emission upgrades have been completed on the unit. The unit is however not able to consistently comply with PM=50 (issues are often common plant/ash handling plant related). Work to implement the necessary recovery plant to address this is underway and as such time for this is included in the compliance time period. |
| Kendal U6 | complies | 01-0ct-25 | Now not in compliance ? | The commited emission upgrades have been completed on the unit. The unit is however not able to consistently comply with PM=50 (issues are often common plant/ash handling plant related). Work to implement the necessary recovery plant to address this is underway and as such time for this is included in the compliance time period. |
| Lethabo U1 | 07-Dec-25 | 01-0ct-27 | 663 | Lethabo completion date given in Jan 24 was 7 Dec 26 (typo in this sheet). Compliance time period beyond project completion includes an optimisation period. |
| Lethabo U2 | 26-May-25 | 01-Apr-26 | 310 | Outage moved due to commercial and procurment and outage schedule challenges. Full compliance is sustainable once all upgrades High Frequenct Transformer, ESP upgrades and SO3 plant upgrades are completed on all units due to SO3 common plant elements. Compliance time period beyond project completion includes an optimisation period. |
| Lethabo U3 | 04- J an-25 | 01-Apr-26 | 452 | Full compliance is sustainable once all upgrades Fligh Frequenct Transformer, ESP upgrades and SO3 plant upgrades are completed on all units due to SO3 common plant elements. Compliance time period beyond project completion includes an optimisation period. |
| Lethabo U4 | 11- M ay-26 | 01-Apr-27 | 325 | Full compliance is sustainable once all upgrades High Frequenct Transformer, ESP upgrades and SO3 plant upgrades are completed on all units due to SO3 common plant elements. Compliance time period beyond project completion includes an optimisation period. |
| Lethabo US | 08-Dec-25 | 01-Oct-26 | 297 | Full compliance is sustainable once all upgrades High Frequenct Transformer, ESP upgrades and SO3 plant upgrades are completed on all units due to SO3 common plant elements. Compliance time period beyond project completion includes an optimisation period. |
| Lethabo U6 | 12-May-24 | 01-Apr-25 | 324 | Emission retrofit upgrades complete save final SO3 plant optimisation with all common plant elements. Station has experienced challenges with ash handling but is working to resolve these. Time to allow the station to adress issues provided. Note this commitment is optimistic given some final SO3 common plant elements are yet to be tied in. |
| Matia Ul | 14-Jui-24 | 01-Apr-25 | 261 | |
| Matia U2 | complies | 01-Apr-25 | Now not in compliance ? | |
| Matia U3 | 31-Mar-25 | 01-Apr-25 | 1 | The commited emission upgrades have been completed on the units. The units are however not able to consistently comply with PM=50 (issues are often common plant/ash handling plant |
| Matia U4 | complies | 01-Apr-26 | Now not in compliance ? | related). Work to implement the necessary recovery plan to address this is underway and as such time for this is included in the compliance time period. Station also impacted by coal quality issues and work to improve coal quality is ongoing. |
| Matia US | 31-Mar-25 | 01-Apr-26 | 366 | |
| Matla U6 | complies | 01-Apr-26 | Now not in compliance ? | |
| Tutuka U1 | 01-Jan-25 | 01-Apr-27 | 820 | |
| Tutuka U2 | WIP - no date provided | 01-Apr-27 | | |
| Tutuka U3 | 06-Sep-25 | 01-Apr-27 | 572 | Full compliance is sustainable once all upgrades High Frequenct Transformer, ESP upgrades, Dust Handling Plant upgrades and SO3/conditioning plant deployment are completed on all units. |
| Tutuka U4 | WIP - no date provided | 01-Apr-27 | | Compliance time period beyond project completion includes an optimisation period. Project elements have been delayed due to commercial and procurment issues and outage availability. |
| Tutuka US Tutuka U6 | 19-Mar-24 complies | 01-Apr-27 01-Apr-27 | 1108 Now not in | Compliance time line also includes periods for plant optimisation. |
| | n of Did projects | | 368 | |

Table 20: Comparison of Eskom's PM retrofit schedules provided to the NECA Forum in January 2024, and contained in Eskom's s59 applications, and Eskom's clarifications for the delays (Source: Status of accelerated PM projects Eskom Response 26 February 25)

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Eskom estimates the total nominal capex to complete the PM abatement projects, such that all of Eskom's coal fleet that retire post 2030 are compliant, to be R11.2 billion, see Table 21 below.

| | ERP 2024 A | ERP 2024 B | ERP 2024 C | | | |
|--------------|--|--------------|------------|--|--|--|
| PM Reduction | Kendal, Matimba, Lethabo, Tutuka, Duvha, Matla PM Abatement Projects | | | | | |
| Projects | Air Quality Offset Projects: expansion above 35,000 households (possible total 90,000) | | | | | |
| PM Capex | | | | | | |
| (nominal) | | RTL2 Dillion | | | | |

Table 21: Cost of PM reduction projects - abatement retrofits and offsets

The PM abatement projects and retrofit technologies that will be used are set out in Table 22.

| Station | Complete | Planned | LEGEND |
|---------|--|--|----------------------|
| Duvha | HFPS x1 | HFPS x2 | Compliant with Limit |
| Matla | All ESPs, HFPS x4 | HFPS x2 | |
| Lethabo | ESP x1, HFPS x6, SO $_3$ x3 | ESP x5, SO ₃ x3 | |
| Tutuka | ESP x2, HFPS x2 | ESP x4, DHP x4, HFPS x4, SO ₃ x3 | |
| Kendal | HFPS x6, ESP x4, SO ₃ x6, DHP x5 | ESP x1, DHP x1 | |
| Majuba | Not Required | Not Required | |
| Kusile | Not Required | Not Required | |
| Matimba | Not Required | Not Required (HFPSx6) | |
| Medupi | Not Required | Not Required | |

Table 22: PM abatement projects – complete and planned

Table 23 summarises Eskom's exemption requests. Eskom highlights that:

- Although ambient PM is non-compliant, Eskom stations are not the sole contributors thereto.
- Eskom's Fleet shows substantial PM reductions by 2028.
- Eskom's AQOs are improving air quality in communities.
- Majuba, Kusile, Matimba, Medupi, Duvha (U1, U2, U5), Matla (U1, U2, U3) and Lethabo (U1) will comply with PM new plant MES by 1 April 2025.
- All stations will comply with PM new plant MES from 1 October 2027.

| | | Requested Limit | New Plant Compliance | LEGEND |
|---------|------------|------------------------|----------------------|---------------------------|
| | U6 | N/A | 1 Apr'25 | Compliant with Limit by 1 |
| | U2, U3 | 100 mg/Nm ³ | 1 Apr'26 | April 2025 |
| Lethabo | U5 | 100 mg/Nm ³ | 1 Oct'26 | |
| | U4 | 100 mg/Nm ³ | 1 Apr'27 | |
| | U1 | 100 mg/Nm ³ | 1 Oct'27 | |
| Dunche | U1, U2, U5 | N/A | 1 Apr'25 | |
| Duvna | U4, U6 | 100 mg/Nm ³ | 1 Oct'26 | |
| Matia | U1, U2, U3 | N/A | 1 Apr'25 | |
| ivialia | U4, U5, U6 | 100 mg/Nm ³ | 1 Apr'26 | |
| Kandal | U3, U4, U6 | 100 mg/Nm ³ | 1 Oct'25 | |
| Kenuar | U1, U2, U5 | 100 mg/Nm ³ | 1 Apr'26 | |
| Tutuka | All Units | 100 mg/Nm ³ | 1 Apr'27 | |
| Majuba | All Units | N/A | 1 Apr'25 | |
| Medupi | All Units | N/A | 1 Apr'25 | |
| Matimba | All Units | N/A | 1 Apr'25 | |

Table 23: Eskom's s59 PM exemption requests

7.6.5.4. Retrofits to abate NO_X

NO_X emissions can be reduced by retrofitting the power station boilers with LNBs and/or Over-Fired Air ("**OFA**") systems.

 NO_X abatement, unfortunately, results in greater amounts of unburnt coal in the ash, and this reduces a power station's efficiency in coal use and increases coal consumption in the order of 1%.

Eskom estimates that the total nominal capex to install LNB at Lethabo, Tutuka and Majuba is R7.1 billion.

| | ERP 2024 A | ERP 2024 B | ERP 2024 C | | | |
|-----------|-----------------|--------------------|----------------------|--|--|--|
| NOx | Maiuba Let | thaho. Tutuka (+) | henefits of Despatch | | | |
| Reduction | Prioritisation) | | | | | |
| Projects | | | | | | |
| NOx Capex | D7.1 hillion | | | | | |
| (nominal) | | R7.1 billion | | | | |

Table 24: Cost of NO_X emission reduction projects

Table 24 sets out Eskom's NO_X compliance status and planned abatement retrofit projects.

Eskom highlights the following key aspects in their S59 application:

- All stations comply with current MES.
- Kendal, Kusile, Matimba and Medupi will comply with new plant MES by 1 April 2025.

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- Once NO_X reduction projects are complete at Lethabo, Majuba and Tutuka, all stations operating post 2035 will comply.
- NO_X abatement is not planned for Duvha and Matla due to costs and the stations retiring in the early 2030s.

| | NOx | | LEGEND |
|-------------|------------------------|------------------|--|
| Current MES | New MES (1 April 2025) | Planned projects | Generally compliant, exceedances occur |
| Duvha | Duvha | - | and/or some generating units compliant |
| Matla | Matla | - | Non-compliant with limit |
| Lethabo | Lethabo | LNB | Compliant with Limit |
| Tutuka | Tutuka | LNB | |
| Majuba | Majuba | LNB | |
| Kendal | Kendal | Not Required | |
| Kusile | Kusile | Not Required | |
| Matimba | Matimba | Not Required | |
| Medupi | Medupi | Not Required | |

Table 25: NO_X compliance status and planned projects

Table 26 summarises Eskom's s59 exemption requests in respect of NO_X and Eskom highlights the following considerations:

- Ambient NO_X concentrations are currently compliant with the NAAQS.
- Modelling predicts low NO_X concentrations (cumulatively) due to Eskom stack emissions.
- Eskom's fleet shows substantial NO_X reductions in coming years.
- No retrofits are planned for Matla and Duvha as they have a short remaining operational life and will retire in the early 2030s.
- All stations operating post 2035 will comply with new plant MES.

| | Requested Limit | New Plant Compliance | LEGEND |
|----------|--------------------------|----------------------|---------------------------------|
| Duvha | 1,100 mg/Nm ³ | _ | Compliant with Limit by 1 April |
| Matla | 1,100 mg/Nm ³ | - | 2023 |
| l athaba | 1,100 mg/Nm ³ | - | |
| Lethabo | 750 mg/Nm ³ | 1 Apr'31 | |
| Tutulca | 1,100 mg/Nm ³ | - | |
| Тицика | 750 mg/Nm ³ | 1 Apr'29 | |
| Maiuha | 1,100 mg/Nm ³ | - | |
| Majuba | 750 mg/Nm ³ | 1 Apr'30 | |
| Kendal | 750 mg/Nm ³ | 1 Apr'25 | |
| Medupi | 750 mg/Nm ³ | 1 Apr'25 | |
| Matimba | 750 mg/Nm ³ | 1 Apr'25 | |

Table 26: Eskom's NO_X exemption requests

7.6.5.5. Retrofits to abate SO_X

 SO_X abatement can be achieved with the installation of Wet FGD units or semi-dry technologies, such as an SDA or DSI. These technologies were discussed in more detail in the SO_X panel report. Wet FGD has a higher capital expenditure and lower operational expenditure so it is preferred for power stations that have a long remaining life, while semi-dry and DSI technologies have a lower capital expenditure but higher operational expenditure, which makes them more appropriate for power stations that have a shorter remaining life.

Relative to PM and NO_x abatement, SO_x abatement is a more difficult technology to run because it requires the handling of slurries that cake, and/or the solid handling of fine materials. Other challenges with FGD technologies include the fact that some require large amounts of water (Wet FGD) and sorbents (lime, limestone and trona), which would need to be transported from the Northern Cape or even imported. Further, it is challenging and potentially not even feasible to retrofit SO_x abatement technology at power stations which were not initially designed to be '*FGD ready*'. This is because of space constraints and the potential impacts of the FGD on the down (and up) stream equipment. HNM is not in agreement with the SO_x panel report which states that SO_x abatement retrofits are feasible or practical at Eskom's power stations.

In the case of FGD, there is a parasitic load, so the power stations' net output would reduce by 1-2%. This increases the power stations' CO₂ intensity and increases the amount of CO₂ emissions which would work against South Africa's NDC commitments.

The cost of the SO_x abatement retrofits for each of Eskom's ERP scenarios is set out in Table 27 below. The PM and NO_x abatement retrofit costs are R11.4 billion and R7.4 billion (Table 24), respectively, and SO_x abatement cost are R238.7 billion for 7 of the 13 Mpumalanga/Waterberg power stations. It is clear that the cost of SO_x abatement is an order of magnitude greater than that of PM and NO_x abatement, see Table 19.

Further, PM and NO_X abatement technologies have limited operational costs relative to SO_X abatement, which requires sorbent, water and waste disposal which are estimated to cost R6.3 billion per year. These annual SO_X abatement technology operating costs are not too different to the total capital cost of the PM and NO_X projects.

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| | ERP 2024 A | ERP 2024 B | ERP 2024 C | | | | | |
|------------------------------------|--|-----------------------------------|--|--|--|--|--|--|
| SO ₂ Reduction | Kusile, Medupi | Kusile, Medupi, Kendal; Majuba | Kusile, Matimba, Medupi, Tutuka, Lethabo; Majuba; Kendal | | | | | |
| 1 10,000 | Despatch Prioritisation; efficiency improvement projects | | | | | | | |
| SO ₂ Capex (nominal) | R58.7 billion | R115.7 billion | R238.7 billion | | | | | |
| Annual Opex (real) | R2.1 billion | R4.2 billion | R 6.3 billion | | | | | |

Table 27: SO_X abatements for each ERP scenario

The compliance of power stations' SO_X emissions with the MES is summarised in Table 28. Eskom's s59 application highlights that:

- Currently, all stations comply with existing plant MES.
- Only Kusile will comply with new plant MES by 1 April 2025.
- Eskom's remaining power stations cannot comply with new plant MES without abatement retrofits.

| | SO ₂ | LEGEND |
|-------------|------------------------|--------------------------|
| Current MES | New MES (1 April 2025) | Non-compliant with limit |
| Duvha | Duvha | Compliant with Limit |
| Matla | Matla | |
| Lethabo | Lethabo | |
| Tutuka | Tutuka | |
| Majuba | Majuba | |
| Kendal | Kendal | |
| Kusile | Kusile | |
| Matimba | Matimba | |
| Medupi | Medupi | |

Table 28: SO_X indulgences required because many power stations will not be compliant before abatement retrofits have been installed

Table 29 sets out the technologies that would be used for each of the ERP2024 scenarios. Wet FGD technology is suitable for Medupi and Kusile because it was allowed for when the power stations were initially designed, and the power stations have a long remaining life. Semi-dry and DSI FGD were selected for Eskom's other power stations given their shorter remaining lives and they are the preferred technologies to retrofit at power stations which were not designed to be "*FGD ready*".

| Station | Current Abatement | ERP A | ERP B | ERP C | | | |
|---------|-------------------|---------|--------------|--------------|--|--|--|
| Duvha | - | - | - | - | | | |
| Matla | - | - | - | - | | | |
| Lethabo | - | - | - | Semi-Dry FGD | | | |
| Tutuka | - | - | - | Semi-Dry FGD | | | |
| Majuba | - | - | DSI FGD | - | | | |
| Kendal | - | - | Semi-Dry FGD | - | | | |
| Kusile | Wet FGD | - | - | - | | | |
| Matimba | - | - | - | Semi-Dry FGD | | | |
| Medupi | - | Wet FGD | - | - | | | |

Table 29: SOX technologies proposed for each ERP scenario

Eskom highlights that:

- Medupi will comply with new plant MES once SO_X abatement retrofits are completed in 2032.
- Abatement was not considered for Duvha and Matla due to the costs, time to install and their short remaining life. Their shut-downs start in the early 2030s.
- SO_X abatement at Majuba and Kendal (ERP 2024 B), Lethabo, Tutuka and Matimba (ERP 2024 C) were considered, however the following should be noted:
 - High installation costs and financial implications.
 - Cross media implications water, waste, CO₂ impacts and the limited level to which the AAQ improves.
 - Long lead times to start the installation of the retrofits estimated at approximately 2031 (if they are shown to be technically feasible).
 - The abatement retrofits could be commissioned in ± 2035 while the permanent shutdowns of the power plants are: Tutuka (2036), Lethabo (2037), Matimba (2039) and Kendal (2040).
- SO_X emission reduction project at Majuba could start construction in 2029 and be completed by 2033. Although DSI FGD technology is the most suitable for a power station that was not designed to be '*FGD ready*', the technology is not able to achieve MES compliance.

Abatement of SO_X creates cross-media challenges because the abatement technologies increase the quantum of CO_2 emissions because they consume parasitic power, require water and produce solid waste. A summary of the unintended cross-media impacts are summarised in Table 30, Table 31, Table 32 and Table 33. The solid waste is produced from the use of lime, trona or carbonates (depending on which abatement technology is used) and this waste will need to be landfilled. Further the sorbent would

need to be sourced from the Northern Cape or imported and trucked/railed to the power station – this has its own CO_2 and cost implications.

| | ERP 2024 A | ERP 2024 B | ERP 2024 C | | |
|-----------------------------------|---------------------|----------------------|----------------------|--|--|
| Greenhouse Gas (CO ₂) | 10.4Mt (453kt pa) | 18Mt (889kt pa) | 25.5Mt (1.5Mt pa) | | |
| Waste | 2.7Mt | 4.6Mt | 7.1Mt | | |
| Water | 9.7M m ³ | 15.5M m ³ | 31.4M m ³ | | |
| Health Benefits (central) | 1.74 | 0.55 | 0.33 | | |

Table 30: Cross-media impacts of SO_X abatement for each of the ERP2024 scenarios

| | ERP Alternative | Technology | Water Increase (m³/a) | Water Increase (%) | Water Catchment | | |
|--------------------------------|-------------------|---------------------|--------------------------|--------------------|-----------------|--|--|
| Medupi | ERP 2024 A | Wet FGD | 9.7 million | 146% | Mokolo River | | |
| Kendal | ERP 2024 B | Semi-Dry FGD | 5.8 million | 67% | Upper Olifants | | |
| Majuba | ea ERP 2024 B | | negligible | 0% | Upper Vaal | | |
| Lethabo | ERP 2024 C | Semi-Dry FGD | 5.2 million | 13% | Upper Vaal | | |
| | | | | | | | |
| Tutuka | ERP 2024 C | Semi-Dry FGD | 5.1 million | 23% | Upper Vaal | | |
| Matimba | ERP 2024 C | Semi-Dry FGD | 5.6 million | 180% | Mokolo River | | |
| ¹ DSI technology is | a dry FGD process | , and therefore neg | ligible increase in wate | er is anticipated. | | | |

Table 31: Increase in water use due to SO_X abatement

| | ERP Alternative | Technology | Average Increase (t/a) ¹ | Waste Increase (%) | | | | | | | |
|--|-------------------------|--------------|-------------------------------------|--------------------|--|--|--|--|--|--|--|
| Medupi | ERP 2024 A | Wet FGD | 2.7 million | 54% | | | | | | | |
| Kendal | ERP 2024 B Semi-Dry FGD | | 932kt | 31% | | | | | | | |
| Majuba | ERP 2024 B | DSI FGD | 931kt | 22% | | | | | | | |
| Lethabo | ERP 2024 C | Semi-Dry FGD | 840kt | 11% | | | | | | | |
| Tutuka | ERP 2024 C | Semi-Dry FGD | 827kt | 24% | | | | | | | |
| Matimba ERP 2024 C | | Semi-Dry FGD | 904kt | 18% | | | | | | | |
| ¹ Once installation are complete on all generating units. | | | | | | | | | | | |

Table 32: Increase in waste production due to SO_x abatement

| | ERP Alternative | Technology | Total Increase (t) | Average Increase (t/a) ¹ | Contribution to Eskom 2031 target (pa) ² | | |
|----------------------|-----------------|--------------|--------------------|--|---|--|--|
| Medupi | ERP 2024 A | Wet FGD | 10.4 million | 453kt | 0.32% | | |
| Kendal | ERP 2024 B | Semi-Dry FGD | 3.8 million | 263kt | 0.19% | | |
| Majuba | ERP 2024 B | DSI FGD | 3.8 million | 173kt | 0.12% | | |
| Lethabo | ERP 2024 C | Semi-Dry FGD | 2.3 million | 2.3 million 211kt | | | |
| Tutuka | ERP 2024 C | Semi-Dry FGD | 1.9 million | 193kt | 0.14% | | |
| Matimba ERP 2024 C S | | Semi-Dry FGD | 3.3 million | 251kt | 0.18% | | |
| | | TOTAL | 25.5 million | 1.5 million | 1.1% | | |

¹Once installation are complete on all generating units.

 2 Contribution to the 2031 target for Eskom based on South Africa's commitment to limit fossil fuel generation to 125 – 140Mt CO₂ per annum.

Table 33: Increase in CO₂ production due to SO_X abatement

As highlighted in Eskom's s59 application:

- In the worst case, CO₂ emissions increase by 1.5 million tons per year, which would render it more difficult for Eskom to meet its NDC CO₂ targets and assist the country to meet its NDC commitments.
- New solid waste disposal facilities will be required at all facilities with SO_X abatement technologies.
- Although the water requirement can be met based on the current requirements of the power stations, South Africa is a water scarce country, and water security remains a risk:
 - <u>Waterberg</u>: the Mokolo pipeline can only meet Medupi's (and/or Matimba) future water requirements in 2028 when the water pipeline project has been completed. Based on the 2023/2024 DWS AOA, conducted for the Mokolo River System, a deficit in the water supply in the Mokolo catchment is expected in 2025, with water security predicted to be low between 2025 and 2028.
 - <u>Mpumalanga</u>: Additional supply is not necessarily available over the short-term, with limited water supply development potential existing in the IVRS, and with water security remaining at risk. The water security risk from IVRS will be alleviated with the LHWP-Phase 2, expected to be online post 2030.

Eskom does not have control over the timing of the construction of these pipelines because they are being developed by another entity, and SO_X abatement cannot be done on its power stations without this water supply.

7.6.5.6. Reducing the amount of coal burnt

Reducing coal burnt can be achieved by either closing the coal-fired power stations down earlier than anticipated or operating the plant more flexibly. There are many potential benefits associated with keeping a coal plant running at lower levels rather than shutting it down, namely:

- 1) They remain available to the system to operate at higher utilisation levels;
- 2) The socio-economic impacts of shutting a plant down are negated; and
- 3) The capital expenditure on new flexible forms of generation can be avoided.

7.6.5.7. Flexible running of coal-fired power stations

Coal technologies typically have less flexibility to ramp-up/down because it takes time to heat the boilers and heat exchanges before the plant can run. A coal plant is also more complex as it has several unit operations. However, globally, coal-fired power stations are transitioning to a more flexible mode of operation whereby they can run at part-loads and cycle up/down daily depending on the electricity supply/demand balance. This is in response to the higher penetration of variable renewable energy generation. This is evident in China, where, every year, they are adding numerous new coal-fired power stations to their fleet and increasing capacity, however these power plants are increasingly being operated flexibly at part-loads. As a result, the amount of electricity generated from coal is growing at a slower pace than the growth in coal generation capacity.

With the increasing penetration of variable renewable energy and the imminent retirement of Camden and Grootvlei, South Africa's electricity sector needs more flexible energy generation and it is desirable that more of Eskom's power stations are equipped to fulfil that purpose. This will also reduce both local and GHG emissions because less coal will be burnt.

Retrofits are normally not required to operate a coal-fired power station at part-loads of $\pm 55\%$ of capacity other than a modification to operational procedures and the tuning of control systems. Physical changes to the plant may be necessary to allow the power station to have the flexibility to run at high ramp rates, low-load operations and frequent start–stop actions.

The challenge with the cycling of the power stations relates predominantly to regular changes in temperature resulting in thermal stresses and the condensation of water, which can cause corrosion. Every time a power plant is turned on and off, the boiler, steam lines, turbine and auxiliary components go through unavoidably large thermal and pressure stresses. Baseload facilities are not designed for these frequent variations because they are operated at stable conditions and only experience these variations when they are shut down for a general overhaul (GO) every few years.

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Decisions on whether and when to replace parts or modify components are normally made on a caseby-case basis and can often only be made once the cycling operations have commenced and some existing equipment needs to be replaced. The changes that are required are unit specific and focus on actions that improve drainage and thermal resilience and reduce opportunities for corrosion. Retrofits such as automated drains, dampers, additional instrumentation and/or systems to bypass steam to the condenser could be considered.

It should be noted that it is typically more challenging to retrofit a super-critical power station like Medupi or Kusile to operate in an on/off cycling mode, than to retrofit one of the other power stations in Eskom's fleet because they are sub-critical, less efficient and operate at lower temperatures.

The plant's operations will differ when the power station is operated in a flexible manner. It is therefore important that adequate operator training takes place and standard operating procedures be updated. This training will reduce the wear-and-tear on the plant and make the power stations more responsive to generate the residual electricity demand required by the grid. The training would need to be done prior to beginning to run the plant in a flexible manner.

Whilst there are benefits to enabling a coal-fired plant to run more flexibly, there are also disadvantages. The operation and maintenance costs will rise because of the increased wear-and-tear from the thermal stresses and operating the plant outside its initial design of baseload operation.

While cycling-related increases in failure rates may not be noted immediately, critical components will eventually start to fail. Shorter component life expectancies will result in higher UCLF rates and/or higher capital and maintenance costs to replace components at or near the end of their service lives. The increased wear and tear also reduces the power station's economic life and heightens the risk that generating plants will be unavailable when they are needed most, reducing grid reliability.

The fuel costs will also be higher because more fuel oil will be required for the frequent start/stops and the power station will also be operating at lower efficiencies because it is not run consistently at the optimal baseload design conditions.

The resulting cost of electricity (R/MWh) generated by the power station will increase because less electricity will be generated (MWh), and the operation, maintenance and fuel costs will increase. This increased cost of electricity will need to be recovered by Eskom. Whether this results in higher electricity costs at the system level depends on the cost of building and running alternative mid-merit capacity (most likely gas turbines), together with other systemic effects.

The emissions concentrations released by the plant, as a result of cycling, increases because of increased fuel use during start-ups, reduced plant efficiencies at less than full loads and the reduced effectiveness of pollution-control equipment at start-up and ramp-up/down. The impacts are:

7.6.5.7.1. Impact on PM emissions

When a coal-fired power plant is run at partial load, the quantity of PM emissions typically decreases, influenced by various factors such as:

- Decreased coal consumption (reduces PM);
- Inefficient combustion (e.g., more unburnt carbon or soot) at partial loads (increases PM);
- Reduced efficiency of pollution control systems (such as ESPs or baghouse filters) pollution control systems are usually optimized for full-load operation, and their performance can be less efficient at partial loads (increases PM).

At partial loads, the concentration of PM emissions may increase due to incomplete combustion and the reduced efficiency of pollution control devices, but since the total coal burned is lower, the overall load of PM emitted decreases.

7.6.5.7.2. Impact on NO_X emissions

 NO_X emissions emanating from a coal-fired power plant can vary significantly when operating at partial loads. The key factors that influence NO_X emissions at reduced loads include combustion temperatures, air-to-fuel ratios and the LNB configurations.

If a coal-fired power station is run at partial loads, typically the total NO_X emission load decreases, however the NO_X concentration in the flue gas may increase because the plant would not be running optimally at less than its designed capacity.

7.6.5.7.3. *Impact on SO_X emissions*

 SO_X emissions result from the oxidation of the pyritic sulphur, organic sulphur and sulphates in the coal. Therefore, the quantity of SO_X produced is directly proportional to the amount of coal that is burnt.

While the total quantity of SO_X emissions decreases at partial load due to lower coal consumption, the SO_X concentration in flue gases may increase due to inefficient combustion.

7.6.5.8. Emission Intensity and current regulations

Power stations are designed to operate at full load and under these loads, power stations run at their optimal point and at their highest thermal efficiencies. Under partial loads, a power station runs sub-optimally. Emissions released in the flue gases can be measured in various metrics – total tons of emissions, emission concentration in the flue gas or emissions per unit of electricity generated. The qualitative emissions released at part loads under these metrics are summarised in Table 34 below.

The MES regulates only the concentration of PM, NO_x and SO_x emissions in the flue gases and does not take into account either the total quantity of emissions (i.e. tons) or the intensity of emissions released (e.g., tons/MWh). This is a shortcoming of the current MES regulations because it considers only one of the possible lenses to improve AAQ. The adverse health impacts of emissions are also dependent on the absolute quantity of emissions, particularly when the flue gases are released at the top of the stack, which is typically more than 200 meters above ground level. There, emissions disperse before they can reach ground level and impact communities. Dispersion modelling will be an important tool to determine the AAQs and health impacts.

| | РМ | NO _X | SO _X |
|---|--------|-----------------|-----------------|
| Load of emissions (tons per year) | Lower | Lower | Lower |
| Concentration of emissions in flue gases (mg/Nm ³) | Higher | Higher | Higher |
| Emissions intensity: Emissions per unit electricity generated (tons/MWh) | Higher | Higher | Higher |

Table 34: Impact of partial loads on emission loads, flue gas concentration and emission intensity

Despite the fact that emission rates during cycling can be higher than rates during stable operation, studies such as Lew⁵⁰ et al. (2013) show that the avoided emissions from the use of wind and solar generation outweigh secondary emission impacts induced by cycling. These increases in emission

⁵⁰ Lew, D.; Brinkman, G.; Ibanez, E.; Florita, A.; Heaney, M.; Hodge, B.-M.; Hummon, M.; Stark, G.; King, J.; Lefton, S.A.; Kumar, N.; Agan, D.; Jordan, G.; Venkataraman, S. (2013). The Western Wind and Solar Integration Study Phase 2. NREL/TP-5500-55588. Golden, CO: National Renewable Energy Laboratory. Accessed October 7, 2013: <u>http://www.nrel.gov/docs/fy13osti/55588.pdf</u>.

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concentrations at the coal power stations will need to be permitted in terms of MES regulations, and regulatory reform may be required to allow for this. On a tonnage basis, emissions will decrease due to the reduction in coal burnt.

Unfortunately, current regulations likely create a hurdle for Eskom to operate their power stations at partial loads.

7.6.6. Security of electricity supply

A secure electricity supply in South Africa is of vital importance for economic development and social stability. Inadequate power supply and loadshedding disruptions have wide-ranging socio-economic consequences, including hindering economic growth, causing job losses, disrupting essential services (healthcare, education and water provision) and compromising public safety. Security of electricity supply is therefore a critical factor in considering the sustainability of Eskom's coal-fired power plant MES compliance.

At the time of writing the NECA Forum 2024 Report, the South African electricity system faced an acute crisis, as electricity demand surpassed supply regularly, resulting in frequent and disruptive loadshedding. Shortly after the publication of the report, the acute loadshedding crisis resolved and the performance of the electricity system has been markedly improved.



Source: Eskom 2024 | Eskom se Push 2024 | NERSA 2023. Notes: Q3: quarter 3.

Figure 1: Loadshedding stage hours in 2024. Centre for Renewable and Sustainable Energy Studies, Stellenbosch University, October 2024.

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Government has attributed this improved performance to the implementation of the NECOM Energy Action Plan. The Action Plan combines immediate solutions to the energy gap with longer-term strategies like accelerating the building of generation and storage capacity, expanding and improving infrastructure, improving Eskom's performance and restructuring the power sector, including attracting private investment.

The most significant driver of improved electricity security is the marked improvement in Eskom's coal fleet. A metric that is widely used to describe how well a power plant is likely to perform is its EAF, which measures the electricity that is available to be generated by the plant at a particular point in time. At the time the NECA Forum 2024 Report was drafted, the average EAF of Eskom's generating plants had been steadily declining over the past fourteen years, as demonstrated in the draft IRP 2023 graph replicated in Figure 2.



Figure 2: Actual EAF trend from 2010 (Source, DMRE draft IRP 2023, Figure 1).

This decline abruptly reversed from February 2024, as Eskom's Generation Operational Recovery Plan, initiated in 2023, started to bear fruit.



Source: Eskom & Minerals Council

Additional factors contributing to the increased security of supply include financial support to Eskom from National Treasury, the appointment of a Minister for Electricity, the rapid expansion of rooftop solar together with a reduced demand for electricity due to loss of investor confidence and energy efficiency measures. There has also been a slowdown in South African GDP growth since the global financial crisis in 2008, due to structural constraints which have been exacerbated by loadshedding in the past two years⁵¹.

A 2023 analysis aligning with the DMRE's draft 2023 IRP suggested that loadshedding could potentially be resolved between 2024 and 2029 (Meridian Economics, 2023). The role of the performance of the coal fleet in reducing and maintaining security of supply was highlighted. Fortuitously, the power system improved in line with the most optimistic of the future scenarios considered. However, the recent return to Stage 6 loadshedding (February 2025) was a stark reminder that the pressures on the system remain, likely until 2029, and the coal fleet is aging and subject to challenges.⁵²

Table 35: Eskom Energy Availability Factor, average per month. Source: Minerals Council South Africa, Eskom Update April to May 2024.

⁵¹ South African Reserve Bank Occasional bulletin of Economic Notes OBEN/23/01. Van Rensburg and Morema, Reflections on Load-shedding and potential GDP.

⁵² Yelland, C. March 2025. Eskom's load shedding crisis: Confusion, contradictions and uncertainty in EE Business Intelligence new and announcements, Issue 146, March 2025.

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Whilst the power system remains insecure, additional local air emissions mitigation will increase the risk of loadshedding as the coal plants either need to be taken offline for retrofits or utilised less to reduce coal burn. There is a direct trade-off between loadshedding and air quality whilst there is inadequate power on the system. This does not mean that energy security is sacrosanct – whilst there is insufficient clean electricity generation capacity, there will be a trade-off between full energy security and air pollution, but this trade-off is one of degrees, it is not binary. It may be that some increased degree of loadshedding risk can be tolerated to improve local air quality. The margin by which adequacy is restored is also relevant; it will take time to provide a sufficient margin of electricity supply to either start reducing coal burnt by the coal plants and / or to enable all necessary local air pollutant retrofits to be undertaken without putting energy security in jeopardy.

Over the longer term, once the current loadshedding crisis has subsided (most likely between 2027 and 2029, as per existing projections), there is no reason why the South African power system should battle with ongoing electricity security issues, assuming adequate power sector forward planning and the efficient operation of the wholesale power market as provided for in the Energy Regulation Amendment Act of 2024.

7.6.7. Electricity cost to customer

Because of the systemic nature of power provision, the cost of electricity supply is determined at a power system level - a reflection of the many interacting factors that contribute to producing a consistent, balanced power supply. Cost components include the capital costs of building power system capacity (generation, transmission and distribution), together with the operating costs of maintaining the infrastructure and fuel. Timeframes are also important. The cost of building a new power plant today may be different from building a plant in five years' time, given trends in technology costs. In addition, some generation plants have ongoing fuel costs to consider, others, such as renewable energy generation plants, do not. Generation plants differ in the roles they play in the system and therefore cannot be considered in isolation when determining the cost of electricity supply.

Whilst individual consumers may choose off-grid power supply solutions, historically these have been less able to take advantage of the economies of scale and security of supply offered by grid scale solutions. This is changing but will remain true for most consumers well into the future. The cost of supplying the country with grid power is therefore of greatest relevance to the issue of Eskom's compliance with local air quality regulations.

Electricity is essential for the running of a modern society and economy, and becomes increasingly so as the world decarbonises. Electricity is an input across the economy, and a clean and safe source of

energy for citizens, when compared to, for example, the use of wood, gas and paraffin. Affordable electricity is therefore a base determinant of economic activity and social well-being at a national level, which is embedded in social and economic development policies such as South Africa's Energy Policy White Paper (1998) and the National Development Plan (2013). Maintaining an affordable electricity supply is therefore key to South Africa's future socio-economic development.

Currently the majority of South Africa's wholesale electricity prices are determined by NERSA through an ongoing regulatory tariff-setting process, the Multi Year Price Determination (MYPD). In Eskom's recent MYPD process application to NERSA (MYPD 6), Eskom requested tariff increases of 36.15% for FY2026, 11.81% for FY2027, and 9.10% for FY2028. NERSA finally approved significantly lower tariffs (12.7%, 5.36% and 6.19%). Even so, the 2025 tariff is four times that of the inflation rate.



Figure 3: Eskom tariff increases compared to consumer price inflation since 2010. Source Mahlaka, 2025, Daily Maverick⁵³

⁵³ https://www.dailymaverick.co.za/article/2025-02-03-eskom-accepts-new-reality-of-low-electricity-tariffs-in-future/

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What Eskom cannot recover will impact its financial viability, which impacts the cost of its current financing structures together with the cost at which the utility can access finance going forward. In recent times, Eskom has not been allowed a full cost recovery in its tariffs, which has been a contributing factor to the State stepping in with a bail-out regime to address the utility's ballooning debt. The MYPD 6 tariffs will result in a R250 billion loss in revenue over the three-year period,⁵⁴ which ultimately will have to be recovered from the fiscus (i.e. taxpayer) given that Eskom is a regulated State-Owned Entity. When the fiscus bails Eskom out in this manner, it diverts government expenditure from social and welfare budget items, and affects the government's own credit rating, making its current debt holdings and ability to access debt going forward more expensive.

Environmental costs such as the Electricity Generation Levy on non-renewable power and local air quality expenditure are included as 'allowable expenditure' by NERSA, and are considered in the determination of tariffs. However, it becomes very difficult to increase tariffs for any reason in the current environment of escalating baseline operational costs. The Treasury has indicated that its carbon tax will remain price-neutral in its Second Phase (2026-2030). This means that it cannot be passed through to the consumer in the tariffs. NERSA has a duty to balance the impact on the customer with the impact on Eskom, meaning ultimately it is the taxpayer or electricity consumer who will foot the bill.

The implications of emissions abatement for electricity costs depends on both the type of mitigation as well as the state of the power system and the cost of generation options alternative to coal. The generation of electricity causes local air pollution to the extent that electricity is produced by unabated fossil fuel power plants. Reducing local air pollution associated with the generation of electricity can therefore be achieved by either installing abatement technologies at emitting plants, or by reducing the contribution of these plants to the power supply. These options, or a combination thereof, at the individual plant level, will have different implications for the total cost of electricity generation to the country, depending on how they interact with the other cost drivers implicit in the power system over the longer term — the long-term perspective is particularly important given the long lifetimes of South Africa's power infrastructure. The costs of retrofitting different types of local air pollutant abatement technologies do not translate linearly to an increase in electricity costs. Similarly, it is not possible to associate a cost (or possible saving, particularly in the long-term) to the replacement of coal-fired power with clean alternatives, as this is systemically determined.

⁵⁴ https://www.esi-africa.com/finance-and-policy/eskom-tariff-dwarfs-inflation-rate/

For example, extending GOs in order to retrofit emission abatement technologies may result in additional loadshedding or require temporary additional use of peaking plants, which are typically significantly more expensive to run than coal plants. This, together with the abatement technology costs, will produce an upward pressure on electricity costs. The magnitude of this could be compared against the cost of building clean generation capacity (nuclear or renewables plus storage) to replace the coal plants before the end of their anticipated life, reducing emissions in the longer term.

Whilst coal-fired power still currently represents the cheapest source of power on the South African grid at the margin, this situation is changing rapidly as renewable energy and storage technology costs continue to decline, and the externality costs of GHG emissions are increasingly internalised both on the demand side (consumers don't want emissions intensive power), and on the supply side through carbon taxation. The National Treasury will implement a price neutral carbon tax on electricity in the second phase of the tax which commences in 2026, but the full details of this proposal remain unclear⁵⁵.

Emissions abatement costs therefore impact the whole of South Africa's economy and society, and not just Eskom. The exception to this is if international funding can be sourced for forms of emissions abatement technology retrofits or a reduction in coal burnt. A very real possibility exists for this under the JETP between South Africa and a group of developed country partners, as part of the global climate change response.

The transition from a centralised structure to a market-based structure in the electricity supply industry has significant electricity price implications. Economic signals under monopolistic structures are typically weak, meaning that there is not a strong link between the various costs of providing electricity and the price the customer pays. Given the lack of competition, it is up to the regulator to have a significant amount of information in order to determine whether claimed costs are valid. Under a market system, the market mechanism itself does this work, as participants are incentivised to keep their costs to a minimum in order to compete.

The transition to a full market system will take at least five years. For this period, Eskom's coal plants will be protected from full exposure to the market via two primary mechanisms. First, the coal plants cost bids into the spot wholesale market will be regulated by NERSA. Secondly, each plant will establish a Vesting Contract for Differences with the Central Purchasing Agency (a transitional entity) to manage their transition to full market exposure. These Vesting Contracts will include payments for

⁵⁵ National Treasury (2024) Phase Two Carbon Tax Discussion Paper; Meridian Economics (2024). Comment on the National Treasury's Phase Two Carbon Tax Discussion Paper.

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availability, energy hedging and ancillary services, and the cost of these will be socialised across the power system as a whole (i.e. power consumers will pay for them).

Eskom's exemption applications indicate that its Dispatch Prioritisation Strategy will be a key factor in reducing its coal burn (and therefore emissions). Given the mechanics of price determination in a transitioning power sector, described above, the details of this Strategy (none are provided in the exemption application) become critical for understanding how the Dispatch Strategy might be used to reduce local air emissions.

7.6.8. **GHG Commitments**

7.6.8.1. International GHG commitments

South Africa is a signatory to the Paris Agreement and, in an effort to achieve the objectives of the Agreement, signatories are required to submit **NDCs** outlining actions they will take to reduce their GHG emissions. South Africa's NDC (last updated in 2021 and due for update this year to cover the period 2030-35) outlines a target national emissions range of between 398 and 510 Mt CO2e by 2025 and between 350 and 420 Mt CO2e by 2030. Importantly, the Paris Agreement stipulates that NDC's must be updated every five years, with each successive iteration representing a progression that reflects each country's highest ambition. The stringency of South Africa's mitigation targets is therefore expected to increase over time, requiring more ambitious mitigation measures, including for the power sector.

In addition to NDC's, signatories to the Paris Agreement are encouraged to submit long-term low GHG development strategies that place their national climate commitments within the context of long-term planning and development priorities. South Africa's **LEDS** aspires to a goal of reaching net-zero emissions by 2050. The emissions trajectory to the net zero date matters, which is what the incrementally more ambitious NDCs are designed to address.

South Africa has secured funding against its international climate commitments, including a current total of \$12.8 bn⁵⁶ under the **JETP**. In recognising South Africa's net zero aspirations, the JETP focuses on the electricity sector, and resolves to 'accelerate the decarbonisation of South Africa's electricity system to achieve the most ambitious target possible within South Africa's NDC range'. Increasing

⁵⁶ https://www.engineeringnews.co.za/article/south-africa-confirms-us-withdrawl-of-15bn-just-energytransition-partnership-pledge-2025-03-06

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energy efficiency, deploying renewable energy and accelerating the retirement of coal-fired power stations are underlined as key actions in decarbonising the electricity system.

The JET-IP, published in 2022, has been endorsed by Cabinet and the signatories to the JETP, and sets out the scale of investments needed to enable a just energy transition that diversifies the energy mix while simultaneously addressing issues of inequality, poverty and unemployment. The decommissioning of coal and the deployment of renewable energy at scale and pace are two of the key infrastructure investment priorities outlined in the JET-IP for transitioning the electricity sector to a low-emissions trajectory. These decarbonisation measures are paired with a plan to develop green industrialisation opportunities to enable the creation of quality green jobs while increasing renewable energy generation.

7.6.8.2. Domestic GHG policy

Domestic policies and legislation give effect to South Africa's international commitments. Primary amongst these are a carbon tax (remit of National Treasury) and the Climate Change Act (remit of the DFFE).

The Climate Change Act (No. 22 of 2024) highlights the importance of policy alignment and the need for 'climate change considerations to be integrated into the making of decisions which may have a significant effect on the Republic's ability to mitigate or which exacerbate its vulnerability to climate change'. The Act makes provision for the establishment of SETs as a key mitigation measure. SETs will be determined for GHG emitting sectors including electricity, establishing emission reduction goals that are aligned with the national GHG emissions trajectory, which is currently set by the NDC. The Minister(s) responsible for each policy must then develop or amend policies and measures to ensure the achievement of the sector level SET, which must be regularly monitored and results reported. The Act also makes provision for mandatory company-level carbon budgets, with companies required to submit mitigation plans for approval. Company level budgets are enforced through the carbon tax, with any emissions above the budget receiving a significantly increased tax rate on those emissions.

The carbon tax (introduced in 2019) is based on the polluter pays principle and imposes a tax on GHG emissions to provide price signals that help shift the economy in a more sustainable direction. The tax is currently in its first phase (2019-end 2025), featuring an escalating headline rate and a suite of exemptions that are differentially applied across sectors and companies. In November 2024, Treasury released a discussion paper on Phase Two of the carbon tax ("**Discussion Paper**"), running from 2026-2030, indicating an escalating headline rate to 2030 and declining exemptions in many of the exemption categories. South Africa's headline tax rate is currently significantly lower than those recommended by

the High-Level Commission on Carbon Pricing and the International Monetary Fund⁵⁷, with the exemptions further widening this gap. However, Treasury has indicated (in the 2022 Budget Review) that the intention is to align with international carbon prices in the longer term (\$120/tCO₂e by 2050).

7.6.8.3. Implications for the power sector

South Africa has the highest carbon intensity of power generation globally. Coal power generation is the most GHG intensive form of power generation, and South Africa's coal fleet is largely old and GHG emissions intensive.



Figure 4: The relative carbon intensity of South Africa's power supply (in gCO2/KWh) (Source, Reuters, 2023)

⁵⁷ Meridian Economics (2024) Phase two for the carbon tax: National Treasury discussion paper comment by Meridian Economics, 2024. https://meridianeconomics.co.za/publications/comment-on-south-africas-carbon-tax-phase-2-discussion-paper/

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As the world's nations strive to achieve the Paris Agreement decarbonisation commitments, South Africa's carbon intensive power production will become increasingly economically disadvantageous. International market forces will tend towards the average level of effort, penalising economies that are more carbon intensive. Embedded power sector emissions are costly for South African companies, whose access to and cost of financing can be determined by carbon intensity. Further, carbon intensity is critically important for exporters, with carbon taxes on exports starting to include that of embedded electricity emissions from 2027 under the European Union's Carbon Border Tax Adjustment Mechanism. Power users will therefore increasingly demand low carbon power from the power sector, and potentially pay a premium for this.

The electricity sector has the greatest low-cost mitigation potential of all sectors in the South African economy⁵⁸ and a decarbonised power sector is also an imperative for enabling the decarbonisation of other sectors, where electrification represents the least-cost option for lowering emissions, for example switching to electric mobility in transport and moving away from coal and gas use in industry. Consequently, the power sector represents the bulk of the mitigation effort to achieve South Africa's current NDC and long-term international decarbonisation commitments. Energy system modelling underpinning the country's climate policy positions suggests that the power sector should achieve below 167 MT of emissions by 2030 in order for the South African economy to achieve its NDC effectively⁵⁹. The level of mitigation effort required by the power sector is contested – the draft IRP proposes a far higher range (to 180 MT), and the DFFE draft SET for the power sector in 2030 is 125 MT.

The carbon tax does not currently affect the price of electricity, nor does it incentivise Eskom to reduce GHG emissions. In the electricity generation sector, given the context of rising underlying prices, the tax is designed to be revenue and price neutral. It is not allowed to be passed through into the tariffs determined by NERSA, and the cost to Eskom is offset to the extent of Eskom's payment of the

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⁵⁸ Department of Environmental Affairs (2014) South Africa's greenhouse gas (GHG) mitigation potential analysis. Pretoria, Department of Environmental Affairs; Merven, B. et al. (2021) Climate mitigation in South Africa. SA-TIED. Available at: https://sa-tied.wider.unu.edu/article/climate-mitigation-southafrica. Energy Systems Research Group (2022) Exploring net zero pathways for South Africa: An initial study. University of Cape Town. Available at:https://zivahub.uct.ac.za/articles/report/Exploring_net_zero_pathways_for_South_Africa_-_An_initial_study/22189150; Meridian Economics (2023) Achieving net-zero in South Africa's power sector. Available at: https://meridianeconomics.co.za/our-publications/achieving-net-zero-in-southafricas-power-sector/.

⁵⁹ The Presidency (2022) South Africa's Just Energy Transition Investment Plan (JET IP) 2023-2027and the World Bank South Africa Country Climate Development Report, 2022

Electricity Generation Levy on non-renewables⁶⁰ and the premium Eskom pays for electricity from early Renewable Energy Independent Power Producer projects. Treasury has indicated it will retain this price and revenue neutrality into the Second Phase, but that the tax will now start to incentivise Eskom to mitigate GHG emissions. It is not clear from the Discussion Paper how this will be achieved, especially in the context of the reforming sector structure⁶¹.

In the longer term, once a competitive market is established, the implications of the longer-term effective carbon tax price trajectory described in the Phase Two Discussion Paper may likely significantly reduce the amount of power produced from coal.

7.6.8.4. Implications across Eskom's coal plants

The impact of decarbonisation policies and pricing on the cost of coal-fired power will differ between power plants depending on their CO_2 emissions intensity.

⁶⁰ Eskom currently pays an Environmental Levy of a (nominal) 35c/MWh on all its coal plant

⁶¹ Meridian Economics (2024) Phase two of the carbon tax: National Treasury discussion paper comment by Meridian Economics, 2024. https://meridianeconomics.co.za/publications/comment-on-south-africas-carbon-tax-phase-2-discussion-paper/

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| | tCO2/MWh |
|-----------|----------|
| Matla | 1,19 |
| Duvha | 1,12 |
| Kendal | 1,18 |
| Lethabo | 1,08 |
| Matimba | 0,99 |
| Majuba | 1,25 |
| Medupi | 0,92 |
| Tutuka | 1,23 |
| Arnot | 1,30 |
| Camden | 1,38 |
| Grootvlei | 1,44 |
| Hendrina | 1,38 |
| Kriel OG | 1,23 |
| Kusile | 1,00 |

Figure 5 Carbon dioxide emissions intensity of Eskom's coal plants (Eskom, IRP data, 2023)

Although GHG emissions from coal power production can be reduced by Carbon Capture Utilisation and Storage (CCUS) technologies at power plant level, the high costs associated with retrofitting emission abatement technologies excludes them from least-cost electricity systems in several modelling studies⁶². The availability of local storage and utilisation options presents another challenge for CCUS. From a GHG mitigation perspective then, reducing coal burnt represents the most economic mitigation option. Reducing coal burnt also mitigates against local air pollutants.

Due to the systemic nature of the power sector, its GHG emissions profile is determined by the particular set of technologies generating power, at any particular time, to meet demand and keep the system in

⁶² National Business Initiative (2021) Decarbonising South Africa's power system; Meridian Economics (2023) Achieving net-zero in South Africa's power sector; Presidential Climate Commission (2023) Technical report supporting the recommendations for South Africa's electricity system.

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balance. Therefore, whilst it is important to understand the contribution of individual power plants, GHG emissions of possible regulatory scenarios can only fully be determined at the power system level through a tool such as power system modelling.

7.7. DETAILED OVERVIEW OF METHOD ADOPTED BY NECA FORUM TO DEAL WITH BALANCING OF THESE DIMENSIONS

The NECA Forum 2024 Report provided recommendations to the Minister on how Eskom's coal fleet can achieve sustainable compliance with the MES.

The Forum understood 'sustainable compliance' in this context to be the ability of each coal-fired power plant to remain in compliance with its legal requirements whilst considering the additional objectives of multiple relevant dimensions identified as:

- 1. Health impacts arising from non-compliance
- 2. Ambient air quality
- 3. Security of electricity supply
- 4. Cost of compliance by Eskom (considered as both stand-alone abatement technology retrofits costs and the implications of abatement for the cost of supplying electricity)
- 5. Socio-economic considerations
- Meeting South Africa's international climate commitments, including the lower bounds of the 2021 NDC (1.5 degrees compatible).

In the case of the Eskom's coal-fired power plants, the multiple objectives that need to be balanced to achieve 'sustainable compliance' apply at different scales, which can be simplified as being plant, municipal, air quality Priority Area (PA) or power system scale, and must be considered as such.

For example, the implications of plant closures due to lack of MES compliance will have a *socio-economic* impact at a municipal and PA scale in the form of both direct and indirect job and livelihood loss. The *air quality* impact of any one plant is felt both in the plant's immediate vicinity (Municipality), but also at the PA scale given the dynamics of air dispersion *.Health* impacts from a coal-fired power plant correspondingly arise both locally in the communities within the immediate vicinity of the plant, and in populations within the region and beyond, as determined by air dispersion dynamics.

Eskom, as a company, will bear the costs relating to retrofits to abate emissions, load reductions or closure of individual power plants before the end of their economic life. Given the central role of Eskom in the power system and the extent of the appeals, these costs to Eskom will also reflect in the *cost of provision of electricity* to the country. Whilst the costs of individual plant retrofits are determined at a

plant scale, given the systemic nature of electricity supply, the cost of electricity provision is most appropriately assessed at the scale of the national power system.

Similarly, whether *electricity supply is adequate*, an acute challenge for South Africa currently, is also most accurately assessed at the power system scale. This is not least because eight of Eskom's coal-fired plants, representing the bulk of power generation in the country, are applying for exemption.

The impact of reducing air emissions at any one plant on adequacy of electricity supply depends on the dynamics of the power system as a whole. The cost and adequacy of national electricity supply also has a number of important second order effects at the national scale: Inadequate power supply hampers social services such as education, health and healthcare, and water and sewerage supplies. Economic activity and investment which supports job creation and enables social welfare expenditure through tax revenues, are associated with reliable and affordable power. Taking plants offline to retrofit, and reducing coal plant load will have an impact on the electricity system's *GHG emissions*, and from there the country's ability to meet its international climate commitments such as its Nationally Determined Contribution (NDC). Further, the carbon intensity of the power supply has a cost implication under national and international carbon pricing regimes, with important second order effects for economic activity and investment.

The Report found that the existing formulation of the MES does not allow for anything that approaches sustainable compliance across the multiple dimensions outlined above. On this basis, it was recommended that the eight plants currently applying for exemption from the MES do so, but if these exemptions are awarded, they be subject to conditions that aim to achieve an MES-equivalent impact on air quality and health, whilst considering the multiple additional dimensions which impact at different scales. The Report identified an initial set of such conditions, arrived at following a detailed multi-dimensional, multi-scalar analysis of the eight plant.

7.8. ANALYTICAL APPROACH UNDERPINNING THE RECOMMENDATION OF EXEMPTIONS PLUS CONDITIONS

The analytical approach used in the NECA Forum 2024 Report is grounded in the well-established field of Multi-Criteria Decision Analysis (MCDA), which has numerous applications to the South African energy and environmental sphere. Because the various dimensions are impacted at different scales, tools were employed that focused on these different scales: A Plant, Municipal and Priority Area (PA) Matrix focuses on the plant and PA scale, whilst power system modelling considers the power system scale. This way of thinking is high level and is designed to support and accommodate additional analyses as needed, in the form of many different types of tools. Cost Benefit Analyses (CBA), in particular, was identified given the extent to which these are relied on in the air quality regulatory space.

The interaction of the MCDA tools in the Forum's approach are depicted at a high level in the diagram below:



Figure 6: The NECA Forum 2024 multi-scale, multi-dimensional approach

Key observations guiding the analysis include:

- All abatement solutions require making plants unavailable to the power system, either temporarily, whilst abatement technologies are retrofitted, or more permanently, as units / plant operate at reduced load or are taken offline.
- Currently, PMs pose a far greater impact on health due to the exceedances of PMs in the AAQ of the Priority Areas than do NOx and SO₂.
- Reducing coal burn as an abatement option is not inherently pollutant-specific and therefore is not captured in the Figure 7 above, but is a critical abatement mechanism, addressing all air and other environmental pollutants simultaneously. Under the MES, which are concentration limits,

reducing coal burn did not assist Eskom to achieve compliance. However, in the context of exemptions, reducing coal burn becomes a significant abatement option

7.9. METHODOLOGY FOR DETERMINING EMISSIONS LIMITS AND CONDITIONS

The NECA Forum 2024 Report presented an evaluation of Eskom's non-compliance with the MES per plant per pollutant. These findings are presented below, having been updated based on new information contained in Eskom's exemption application, and the easing of the electricity supply inadequacy in the country.

PMs

PMs are the priority pollutant from a health perspective, given the extent of the AAQ exceedances and that they are the least expensive and technically challenging to address in terms of mitigation options. PM is also the pollutant for which Eskom has the most comprehensive abatement plan. Five of the midlife coal plants Duvha, Kendal, Lethabo, Matla and Tutuka are not yet operating in compliance with the new plant MES for PMs. Abatement projects are planned for each of these plants to bring them into compliance and must be implemented. Further, the NECA Forum 2024 Report reflected that fast tracking these PM projects comes at a trade-off between additional loadshedding risk and a short-term improvement in PM emissions in the HPA and VPA. In this regard, HNM notes that Eskom's fast-tracked PM abatement implementation schedule has not been met.

NOx

Duvha, Matla, Lethabo, Majuba and Tutuka remain non-compliant with the MES for NO_x . Eskom is proposing only retrofitting Lethabo, Majuba and Tutuka with low NO_x burners. Eskom does not intend to install low NO_x burners at Duvha and Matla, as these plants are identified for closure by 2034 and therefore will not recoup the capital cost of the retrofits.

The NECA Forum 2024 Report concurred with Eskom's retrofit approach because:

- In the case of Lethabo, Majuba and Tutuka, LNBs are not unduly technically challenging to install, and Tutuka's LNB project is already underway.
- There are fewer AAQ exceedances of NO_x and NO_x is less of a health concern that PMs. Given Matla and Duvha's retirement schedule, together with the tight security of supply situation, LNB should not be required at these plants. Matla and Duvha, therefore, need only comply with existing plant standards until retirement. However, whenever there is adequate supply,

Duvha and Matla should be prioritised for reduced utilisation. This can be operationalised following Eskom's Priority Dispatch Strategy contained in its exemption application.

 SO_2

As with NO_X , there are few AAQ exceedances of SO_2 , but abatement retrofits are far more capital intensive than those for PMs or NO_x . FGD retrofits are also significantly more technically complex to install at all plants where FGD has not been incorporated in the plant design, such as at Medupi and Kusile and, at most plants, there are space constraints rendering retrofitting FGD highly unlikely.

Therefore, the NECA Forum 2024 Report found that the primary abatement option for SO_x , for all plants, should be reducing coal burnt through reduced utilisation of the plant and / or early closure. FGD at Medupi represented a potential exception, which is considered further in the conditions method below.

HNM has considered the findings of the NECA Forum 2024 Report above, together with additional public information contained in Eskom's exemption application, to recommend emission limits and timeframes per plant point source and per pollutant. The rationale for each is provided together with these recommendations below.

It is necessary to note the variability and inconsistency of information provided by Eskom publicly and to the Forum with regard to retrofit timeframes, and Eskom's 2024 exemption application. The NECA Forum 2024 Report considered a number of Eskom documents, dated between 2019 and 2024, identifying feasible emission limits or planned retrofit projects, per plant, per pollutant, over particular timeframes. These included:

- December 2023 quarterly report to the DFFE;
- November 2023 quarterly report to the DFFE;
- 2018 and 2019: Individual applications to the NAQO for postponement and suspension of compliance timeframes with new plant standards (the postponement applications);
- March 2019 Applications for suspension, alternative limits and/or postponement of the MES compliance timeframes for Eskom's coal and liquid fuel fired power stations
 – Summary Document;
- Annex 1 data request costs December 2023 updated;
- Annex 10 Eskom's IRP information, dated January 2023;
- Eskom's Board Approved ERP 2022; and
- Accelerated PM Project Programme (Presentation, 2024).

Across all related documentation, HNM finds there is sufficient high-level justification for changes to retrofit schedules or emission limits by Eskom.

The NECA Forum 2024 Report relied on Annex 10 Eskom IRP information, dated January 2023, updated with Eskom's November 2023 quarterly report information, as a baseline for its analysis and assessment of feasible abatement projects at a plant level. These differ from those contained in the exemption application, with insufficient justification for the changes. In addition, the emission limits proposed in the exemption application differ from those in the 2018/19 postponement applications. To inform recommendations on emission limits and timeframes in this report, HNM relied primarily on the postponement applications, the ERP 2022 and the exemption application as well as on the findings of the NECA Forum, as contained in its report, and the views of the experts appointed to its panel.

HNM notes similar issues with the offset projects, and decommissioning schedules for Eskom's coal fleet. Throughout its tenure, the NECA Forum worked on the basis of Eskom's 'Annex 10 Eskom IRP information', dated January 2023, for anticipated plant closure and decommissioning dates. Subsequently, Eskom has indicated in its Sixth MYPD application that it will no longer shut Tutuka down in 2030, but rather run this plant for the full extent of its technical life (to 2040). Eskom has to apply to NERSA to approve its decommissioning schedule, and this has not yet occurred for either the IRP 2023 schedule or the MYPD update.

HNM has therefore continued to use the IRP 2023 schedule as a basis for its recommendations in this report. The IRP 2023 gazetted for comments on 4 January 2024 uses this schedule, and there is limited legal indication of a deviation from this. Using the same schedule as the NECA Forum supports the internal integrity of the analytical approach.

In considering the emission limits requested in Eskom's S59 Exemption Applications, HNM noted shifts in timelines with regard to abatement installation when compared to previous schedules, which were considered by the NECA Forum and assessed in its 2024 Report. As a result, revised emission limits are presented by Eskom, in its S59 Exemption Applications, with no clear discussion or justification for this deviation.

The Exemption Applications appeared to indicate that more time was required to complete both the NO_x and PM emission reduction projects, and that operational challenges, outage schedules and grid capacity may be factors in Eskom's inability to complete the projects as initially planned.

A meeting with Eskom was therefore scheduled by HNM to seek clarity on the changes in timeframe commitments to meet new plant MES, and how these relate to adverse outage schedules, grid capacities and operational conditions. HNM felt it important not to revert to timelines and limits that were no

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longer achievable given potential changes in circumstances, as this may result in Eskom soon being in breach of the limits in its AELs.

The meeting with Eskom Generation took place on 11 March 2025. During this meeting, Eskom clarified that the factors necessitating the revised timeframes were the underestimation of the difficulties in optimising PM abatement as well as the fact that Eskom lacked access to certain units for optimization because of grid capacity issues.

HNM is of the view that the clarity provided by Eskom constitutes sufficient justification for the revised timelines and limits, as requested in its S59 Applications. As such, in instances where there is a deviation in the time periods and emission limits being requested by Eskom, HNM has taken the decision, in the light of the clarity provided by Eskom, to conditionally grant Eskom's request as per its S59 Application.

On the other hand, where Eskom, in its S59 exemption application, has requested that it be granted an emissions limit or time period for compliance which aligns with that requested in its postponement application, HNM has considered the requested limit as well as the considerations, modelling and findings of the NECA Forum and has concluded that it would be appropriate for Eskom to be granted the requested limit subject to compliance with certain conditions, which are to be included in each individual AEL and which are discussed further below.

8. CRITERIA FOR DETERMINING RECOMMENDED CONDITIONS FOR EXEMPTIONS

8.1. A TYPOLOGY OF CONDITIONS

Four categories of conditions are considered as being of relevance to s59 exemptions, represented in a two-by-two matrix (shown in Table 36). The columns differentiate between conditions that address the impact of the interim non-compliance with the MES, and conditions that contribute towards compliance. Following the NECA Forum's approach to how coal plant emissions can be reduced, we further divide the latter category into conditions regarding abatement retrofits, and conditions that reduce the amount of coal burned. Conditions are then further differentiated as to whether they are plant specific, i.e. in the remit of the Plant Manager, or the remit of Eskom Holdings, and must be implemented by head office.

| Condition | ns supporting compliance |
|-----------|--------------------------|
|-----------|--------------------------|

| | Conditions responding to impacts of non-compliance | Abatement retrofits | Reduction in coal burnt |
|----------------|--|------------------------|-------------------------|
| Plant specific | | | |
| Eskom level | | | |

Table 36: Typology of recommended conditions

8.2. ESTABLISHING CRITERIA FOR THE CONDITIONS

As stated above, the NECA Forum's 2024 Report recommended that the Minister should consider an application for exemption on its merits and, to mitigate adverse effects, the Minister should impose conditions on Eskom if an application for exemption under section 59 of NEMA is granted. The Report then provided a set of "condition" recommendations at both a general and plant level, informed by the analytical process the Forum undertook in order to consider how Eskom might achieve sustainable compliance with the MES, balancing the critical factors discussed in the NECA Forum's 2024 Report.

Exemptions may be granted for any period of time, determined by the Minister, subject to ensuring that the nature and extent of the exemption is as limited as possible, which would include time limits. From the NECA Forum 2024 Report, the primary reason for considering temporary exemptions for Matla, Duvha, Majuba, Lethabo, Medupi, Matimba, Tutuka and Kendal was to ensure security of electricity supply at an affordable price. Therefore, as soon as there are options of affordable and clean electricity available, it is recommended that these exemptions should be reviewed.

To meaningfully reflect the gravity of operating under a s59 exemption, the conditions imposed on Eskom at a fleet and/or plant level must be:

• Implementable

Each condition must be implementable by either the Plant Manager, or Eskom.

• Measurable

The conditions must be set in such a way that both the DFFE and Eskom can clearly determine whether they have been met within the associated timeframes. To this end, conditions that are

quantitative in nature are preferred, acknowledging that in some instances this will not be possible.

• Timebound

Because the exemptions must be limited, the conditions will be timebound and need not necessarily match the exemption timeframe nor the validity period of an AEL. Given the fluidity in the power sector currently, driven by the five-year transition to a market system, shorter-term conditions and more regular reviews are recommended. The timeframes of each condition within the same AEL can be different.

• Enforceable

The NAQO and relevant licensing authorities have, in the past, imposed conditions which Eskom either failed to comply with, its implementation was outside the requisite time period allocated and/or was deficient. In the light of the above, conditions must be designed with a consideration of enforceability. Conditions which generate their own momentum by creating a range of stakeholders invested in the condition outcomes, beyond the DFFE, are therefore preferential. It is imperative that any conditions imposed on Eskom under the s59 exemptions be closely monitored to ensure compliance and, in the event that Eskom fails to comply and there are no exceptional circumstances to justify the non-compliance, the Minister should review Eskom's exemption and consider withdrawal thereof. Should the non-compliance result in the breach of a condition contained in an AEL, the DFFE must seriously consider applying the consequence management provisions contained in the NEMAQA. The relevant licencing authority therefore plays a critical role in monitoring compliance.

• Commensurate with Eskom's pollution impact

There are four main sources of local air pollution emissions in the Priority Areas, with domestic fuel burning, transport and mining joining Eskom's emissions as main sources of pollution in the Priority Areas. Three of the four fall outside of Eskom's scope. However, since Eskom has some of the largest operations in the Priority Areas, the NECA Forum's 2024 Report stated that more is required from Eskom to not only comply with s21 of the NEMAQA, but to implement further measures to address other sources of emissions that adversely affect the AAQ in the areas in which it operates. In addition, the National Environmental Framework requires stakeholders to adopt a holistic approach to addressing issues related to air quality. In view of the above, the Forum stated that should the Minister uphold Eskom's appeals or make any other appropriate decision in favour of Eskom, Eskom should still be held to a high standard of

accountability. However, any conditions imposed on Eskom should take into account its ability to comply, ensuring that it is not held solely responsible for service delivery issues beyond its control.

• Enable the achievement of sustainable MES-equivalent outcomes

As discussed in the NECA Forum 2024 Report, the conditions must support the Eskom coal fleet and individual plants to achieve a sustainable MES-equivalent impact on air quality and health in as short a time possible, whilst considering the multiple additional dimensions which impact at different scales.

8.3. DETERMINING CONDITIONS

The conditions contained in the NECA Forum 2024 Report represented the starting point for the analysis, as these emerged from the Forum's multi-dimensional, multi-scale analytical approach. These existing recommended conditions were then considered for their performance against the criteria established in the section above, and for their ongoing relevance. Given that eleven months have passed since the submission of that Report, the factual situation may have evolved and additional information has become available.

Ideally, the elaboration and selection of conditions should have been accompanied by extensive additional research and analysis, as was anticipated by the Forum. However, this was beyond the reach of the HNM team given that this report was compiled from start to finish within a month. Therefore, the process was undertaken based on the information at hand, relying extensively on the expertise of the appointed team.

Specifically, the following additional information sources were considered:

- Information given to the Forum, and the Forum's analytical work, as contained in its 2024 Report;
- Publicly available information relating to all of the critical conditions of relevance to the s59 applications;
- Eskom's exemption applications for its fleet and power stations;
- Information obtained from the NAQO;
- Eskom's response to the NECA Forum's 2024 Report;
- CER's response to Eskom's exemption applications; and
- Responses to questions of clarity posed to Eskom.

Additional considerations pertain to particular types of conditions, and these are outlined below.

8.3.1. Conditions relating to the impact of non-compliance with the MES

Conditions relating to the impact of non-compliance with the MES are considered in the light of specific impacts per pollutant per plant. The following was considered:

- 1. The extent of the non-compliance with the new plant MES
- 2. The timeframe of non-compliance with the new plant MES, according to the emission limit timeframes.
- 3. The health impact associated with non- compliance with the new plant MES at each plant, taking into account Priority Area AAQ, and the health risk of the pollutant within the particular locality.

The recommended emission limits and timeframes together with the Plant and Priority Area Matrix from the NECA Forum 2024 Report, shown in Table 37, form the basis for this assessment.

| | ja Ri | Plant spec | ifications | Plant coal cost | profile | Plant p | erformance | | Socio-economic impacts | | | Other Environmental Impacts | | Other Environmental Impacts 문화 | | Abatement technologies | | | Air Quality In | | | |
|---------------|--------------------|---|--------------------------|---|---|---|---|--|---|---|--|--|-------------------------------|---------------------------------------|--------------------------|------------------------|--|--|---------------------------------------|--|-------------------|-------------|
| Priority Area | Plaint Level Analy | Plant size (MW rated capacity) | Plant closure date | Coal cost Current projection coal cost over plant lifetime | Plant exposure to marginal coal source | EAF historical Average (2018-22) | EAF risk contained in Eskom's future projections. | District vulnerability (poverty & unemploymen t) | District Leadership; F financial management F | Municipal population size relative to district population | Municipality level of unemployme nt | Municipality Leadership; financial management | Municipality vulnerability | Water use by plant (`000MI/year | , CO 2 intensity) | Polluta nt Level An | Difficulty & duration of retrofit (green = compliant / committed) | Externalities (Sorbent, ter water, other) im | Cost of chnology (if plemented) | Plant emissions compared to average | PA Air quality | Health risk |
| | | | | | | | | | | | | | Pixlev ka | | | PM | | | | | | |
| | Majuba | 3804 | 2051 | | | | | | | small | | | Seme | 32 | | NOx | | | R3.4 bn | | | |
| | | | | | | | | | | | | | | | | SOx | | | R32.0 bn | | | |
| | Tutuka | 2010 | 2020 | | | | | GertSibande | | com II | | | Labua | 50 | | PM | | | R2.7 bn | | | |
| | TULUKA | 0100 | 2050 | | | | | | | SILEI | | | Lexwa | | | 90v | | | R21.5 bn | | | |
| - | | | | | | | | | | | | | | | | PM | | | R2.7 bn | | | |
| fight | Matla | 3450 | 2034 | | | | | | | | | | | 52 | | NOx | | | R4.8 bn | | | |
| đ | | | | | | | | | | Large | | | | | | SOx | | | R21.2 bn | | | |
| | | | | | | | | | | | | | Emalahleni | | | PM | | | R1.1 bn | | | |
| | Duvha | 2875 | 2034 | | | | | | | | Large | | | 50 | | NOx | | | R3.0 bn | 1 | | |
| | | | | | | | | Nkangala | | | | | | | | SOx | | | R21.2 bn | | | |
| | | | | | | | | | | | | | | | PM | | | R2.5 bn | | | | |
| | Kendal | 3840 | 2044 | | | | | | | | | | | 4 | | NOx | | | - | | | |
| | | | | | | | | | | | | | | | | SOx | | | R24.3 bn | | | |
| < | | | | | | | | | | | | | | | | PM | | | R2.8 bn | | | |
| <u>8</u> | Lethabo | 3558 | 2041 | | | | | Fezile Dabi | | Large | | | Metsimaholo | 53 | | NOx | | | R3.0 bn | | | |
| | | | | | | | | | | | | | | | | SOx | | | R21.9 bn | | | |
| | | | | | | | | | | | | | | 4 | | PM | | | KZ.4 DN | | | |
| 5 | Matimba | 3690 | 2042 | | | | | | | | | | | | | NOx | | | • | | | |
| later | | | | | | | | Waterberg | | Small | | | No data for | | | SOx | | | R23.5 bn | | | |
| beng | | | | | | | | Ŭ | | | | | Lephalale | 10 | | PM | | | • | | | |
| | Medupi | 4320 | 2071 | | | | | | | | | | | | | NOx | | | - | | | |
| | | | | | | | | | | | | | | | | SOx | | 5000M (/a | R37.4bn | | | |

Table 37: Plant and Priority Area Matrix, completed February 2024 (source NECA Forum Report, 2024)

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8.3.2. Conditions supporting compliance with the MES

For each plant and pollutant, a temporary emissions limit must be specified. How Eskom achieves this limit, whether through retrofits, reducing coal burned or closing units / the plant, should not be prescribed, but rather left to the discretion of the utility. Both the recommended emission limits as well as the conditions considered in this section are designed to work together to bring all of Eskom's plants into compliance with the MES as soon as possible, given the multi-dimensional factors involved.

8.3.3. Conditions related to reducing the amount of coal burnt

Reducing coal burn is a significant abatement option that only becomes available in the context of MES exemptions. The NECA Forum 2024 Report power system modelling suggested that earlier retirements and/or reduction in output and minimum stability operation limits may provide multi-dimensional gains, including in respect of the cost of electricity, GHG reductions, local air pollution reductions with corresponding health gains, and improvements in local socio-economics and the environment.

Eskom's coal fleet has historically been designed to run at relatively high 'stability factors', and utilisation rates. But it is possible to run the fleet differently, albeit less efficiently. In a transitioning power system, flexibility will compete with efficiency as a valuable coal plant characteristic.

As discussed in Section 8.3.3, reducing coal burn has a binary (on-off) and incremental component (reducing the number of units running per plant and reducing the utilisation rate of the units). The following points are relevant to conditions associated with reducing coal burn:

- Because flexibility has not been a valuable quality of coal plants in the historical South African power system, ways of achieving flexibility and the cost versus value ratio of various interventions to attain flexibility are not well explored.
- The impact of increased flexibility on plant operation is not well known and, in some instances, not easy to predict in advance.
- Technological upgrades can improve flexibility but are not always needed.
- Operators will require training on running a plant more flexibly.
- Medupi and Kusile will likely be more challenging to retrofit for flexibility than the older plants in Eskom's fleet.
- Operating plants outside of their intended optimal baseload conditions will be more expensive at the margin, but may reduce system costs overall.

- Emissions from the plant will increase per MWh produced, but because fewer MWh are produced overall, total emissions will likely reduce compared to running the plant in baseload conditions.
- The emission limits recommended are specified for baseload operating conditions. Alternative limits will need to be specified for plants operating at reduced utilisation. This is not the case if flexibility is obtained by shutting down individual units.
- Reducing coal burn only becomes an abatement option when there is sufficient alternative clean energy available to the power system. The rate of renewable energy production and storage build is key to enabling reduced coal burn whilst maintaining security of electricity supply and affordability.

The conditions relating to reducing the amount of coal burned are specified at an Eskom level and are aimed at supporting renewable energy uptake, and developing a mechanism for including the external cost of local air emissions in the transitioning power system. Because flexibilisation opportunities are highly plant specific and little is known about them in South Africa currently, the conditions pertaining to reducing coal burn are aimed primarily at revealing information and building the necessary incentive systems in the short term. In the medium to long term, once sufficient clean and competitive energy is available, the electricity wholesale market will work to ensure that coal is dispatched less frequently.

8.3.4. Abatement retrofit conditions

Whilst the NECA Forum 2024 Report found that reducing coal burn (through lower utilisation rates or early closure) was the primary method for Eskom's coal plants (apart from Kusile) to comply with the new plant MES for SO_x, the Report found that the situation was not entirely clear for Medupi:

- An FGD was included in Medupi's design and the installation of FGD remains a requirement of the World Bank loan associated with the plant.
- There is funding ring-fenced for Medupi's FGD.
- Eskom is planning to implement the FGD (stating an intention to go to market to procure the project in the first quarter of 2024).
- However, when considering the multiple dimensions captured by the Plant and Priority Area Matrix, together with the power system modelling, it was not clear that installing FGD at Medupi was the best course of action for South Africa. There are a number of motivators for proceeding with the FGD retrofit:
- Medupi is the second youngest, second largest plant in the fleet. Based on Eskom's EAF scenario planning, it is also expected to be one of the best performing over the rest of its life

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(along with the mid-life plants, Lethabo and Matimba). Medupi has a locked-in low priced coal long-term contract for decades to come.

• The coal in the Waterberg has a particularly high sulphur content, making SO₂ abatement for the plant particularly effective.

However, installing FGD at Medupi does not score well on a number of other dimensions:

- Power system modelling analysis suggested that closure of equivalent but older coal capacity (Kendal) had less of an effect on the cost of electricity than installing FGD at Medupi.
- Security of supply outcomes were also slightly better when closing older capacity as opposed to retrofitting Medupi. Eskom has indicated that the FGD installation will require an extension of the plant's GOs, resulting in one of the largest and best performing plants in the fleet being offline for 80 additional days per year for 6 years during the period when load shedding risk is highest.
- Power system modelling projected a 7% reduction in GHG emissions from reducing coal use by closing an older plant as opposed to installing FGD at Medupi. FGD only addresses one air pollutant, and coal plants are problematic across additional local pollutants and GHGs.
- Reducing coal use results in reductions in all three pollutants, whereas FGD only addresses SO₂.
- Whilst Medupi's SO2 emissions seem to negatively impact the AAQ which, together with the other pollutants, is associated with an increased risk of "all-cause" mortality in the surrounding communities, the effect of SO2 exposure is less of a health concern than PMs, which are directly associated with specific adverse health outcomes. In addition, the WPA is significantly less densely populated than either of the other two Priority Areas, and the power plant is situated downwind of the population, resulting in less immediate impact.
- The WBPA's AAQ is well within its compliance range.
- The operation of FGD requires a significant amount of water, which will need to be piped from the Hartbeespoort Dam, with corresponding costs (opportunity and actual).
- There are concerns over the environmental impacts of the supply, disposal and management of sorbent required for FGD.
- FGD increases GHG, NOx and primary PM pollutants from the plant by around 1% due to the parasitic power load of the FGD plant.
- Operating Medupi for its full economic lifetime may not be possible given South Africa's international climate change commitments. Hence, the costs of the FGD may not be able to be amortised over the full lifetime of the plant.
- Socio-economic conditions in the District and Municipality are relatively good compared to those in Mpumalanga. This suggests possibly less socio-economic disruption should the plant close early / reduce its output.
- Eskom has indicated that even after retrofitting Medupi with FGD, it will still require indulgences to achieve compliance with concentration limits.

These findings suggest that a condition requiring Eskom to further investigate the overall merit of installing FGD at Medupi is warranted. The outcome of such an investigation may then impact the recommended emissions limit for SO_2 for Medupi.

8.3.5. Plant and Fleet conditions and the setting of emission limits

In addition to the individual conditions conforming to the criteria developed in this section, the total set of conditions and emission limits applied at a Plant and Fleet level must similarly be implementable in sum, commensurate with Eskom's pollution impact, and enable the achievement of MES-equivalent health and air quality outcomes as soon as possible.

It is acknowledged that emission limits that require retrofits to meet those limits, impose costs on Eskom. Ultimately, society in the form of the electricity consumer or taxpayer will cover these costs. The NECA Forum 2024 Report considered the cost of providing electricity as one of the multiple dimensions in its method for evaluating options for compliance, specifically through power system modelling. Because the conditions are based on the findings of that Report, cost has therefore already been considered. However, as these conditions have been elaborated and augmented, the cost of meeting them individually and in total is accounted for in the recommendations in section 9 of this report, including in the total Plant and Fleet conditions and the setting of emission limits.

The following guide the full set of Plant and Fleet conditions and emission limits:

- All plants operating with exemptions must have emission limits and timeframes for these limits for all pollutants at all point sources.
- Because all plants operating under exemptions are, by definition, adversely impacting local air quality and therefore health, and are out of compliance with the MES, both conditions to address these impacts and conditions to support compliance should be included for each plant. Certain Eskom-level conditions which require all plants to participate are mandatory for each plant.
- The total number of conditions recommended for each plant is determined by both the extent of its non-compliance with the MES and the extent of the impact of this on local environments and communities.

- Because the air quality issue is so multi-dimensional, complex and uncertain, the conditions address the issues of non-compliance impact and supporting sustainable compliance through many different channels, as is reflected in the condition typology. There is then a degree of overlap and redundancy, which is intentional, as an appropriate strategy given the nature of the issue.
- Where emission limits set at a plant level require the retrofitting of costly abatement technologies sufficient to achieve the MES, an attempt is made not to 'double count' these abatement actions through the additional imposition of a pollutant price. Given the criteria of feasibility, it is important that the collective number of conditions at the plant-specific level are not more than the Plant Manager can implement. Similarly, the total number of Eskom level conditions placed upon any one part of Eskom (for example, the System Operator, coal procurement, planning, or environmental management) should not exceed Eskom's capacity to implement these.

9. ANALYSIS OF APPLICATIONS AND RECOMMENDATIONS

9.1. EVALUATION OF FLEET APPLICATION AND FLEET CONDITIONS

9.1.1. Summary of Fleet Application

9.1.1.1. Eskom MES Exemption – Eskom Fleet Report (November 2024) – Public

The Eskom Fleet Report provides the background information and motivation for the individual power station s59 exemption applications, in the context of the environmental and operational challenges the various power stations face. It is argued in the report that a holistic approach in the fleet level report was necessary as each station's circumstances could not be considered in isolation. Station performance, emission impacts and financial aspects of abatement need to be considered cumulatively.

The report introduces the application by indicating that Eskom supplies approximately 95% of the country's electricity, with a generation capacity exceeding 35 000 MW. Approximately 90% of this power comes from coal-fired power stations, mainly in the Mpumalanga Highveld, and with others in the Free State and Limpopo provinces.

It then presents the legal background of the postponement applications (2018-2020), the NAQO's decisions (October 2021), Eskom's appeal process (initiated in December 2021), and the Minister's decisions (May 2024), including the instruction for Eskom to submit s59 exemption applications for Duvha, Kendal, Lethabo, Majuba, Matimba, Matla, Medupi and Tutuka. As part of the Minister's

decision, Eskom was required to review the 2022 Emission Reduction Plan (ERP 2022). This was completed in 2024.

Eskom currently has abatement technologies to mitigate PM at all power stations since this is historically the pollutant of most concern in terms of health impacts, due to the number of exceedances recorded in the airsheds. Eskom is currently taking steps to further reduce PM emissions at the stations, with several abatement equipment upgrades and refurbishments completed, and currently being undertaken, focusing on projects such as ESP refurbishments, HFPS installations, sulphur trioxide (SO₃) plant upgrades, and DHP upgrades. Eskom has boilers with low NO_x design at Medupi, Kendal, Kusile and Camden, with SO₂ abatement technology, in the form of FGD, installed at Kusile.

As part of the 2024 ERP, Eskom is planning and/or evaluating the following to reduce emissions (page 7 of 75 of Eskom's Fleet Report):

- Wet FGD at Medupi (included in previous ERPs).
- SO₂ reduction projects have been identified as potential alternatives at Kendal (semi-dry FGD) and Majuba (DSI FGD).
- LNB technology at Majuba, Tutuka and Lethabo to mitigate NO_x emissions.
- Dispatch Prioritisation Strategy at specific power stations, initiated to reduce SO₂ emissions, however also positively impacting PM and NO_x emissions.
- Efficiency improvement projects under the Generation Recovery Programme to optimise the air-to-fuel ratio which should abate some SO₂ emissions and maximise combustion efficiency.
- The progressive shutdown of coal-fired stations that will reduce overall Eskom Fleet emissions.
- Although not a method of reducing emissions at source (i.e. the power stations), the cumulative impact on neighbouring communities is reduced through the air quality socio-economic intervention (addressing emission sources within the community) projects already implemented by Eskom. Eskom is looking to expand this beyond the 35 000 households originally planned.

The abatement schedules presented in the report are as follows:

| OTATION | GENERATING | E RATE* | DURATION OF | | |
|---------------|-----------------------|-------------------------|-----------------|-------------------------------|-------------------|
| STATION | UNIT | mg/Nm ³ | Average | Date To Be Achieved | EMISSIONS |
| | | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | Ub | 50 mg/Nm ³ | Daily | 1 April 2025 | Continuous |
| | | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | 02, 03 | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous |
| | 115 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| LETHABO | 05 | 50 mg/Nm ³ | Daily | 1 October 2026 | Continuous |
| | 114 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | 04 | 50 mg/Nm ³ | Daily | 1 April 2027 | Continuous |
| | 114 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | 01 | 50 mg/Nm ³ | Daily | 1 October 2027 | Continuous |
| | U1, U2, U5 | 50 mg/Nm ³ | Daily | Immediate | Continuous |
| DUVHA | U4, U6 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | | 50 mg/Nm ³ | Daily | 1 October 2026 | Continuous |
| | U1, U2, U3 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| MATLA | | 50 mg/Nm ³ | Daily | 1 April 2025 | Continuous |
| | U4, U5, U6 | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous |
| TUTUKA | All Units | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| TOTOKA | | 50 mg/Nm ³ | Daily | 1 April 2027 | Continuous |
| | | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| KENDAL | 03, 04, 00 | 50 mg/Nm ³ | Daily | 1 October 2025 | Continuous |
| RENDAL | | 100 mg/Nm ³ | Daily | Immediate | Continuous |
| | 01, 02, 05 | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous |
| MAJUBA | All Units | 50 mg/Nm ³ | Daily | Immediate | Continuous |
| MEDUPI | All Units | 50 mg/Nm ³ | Daily | Immediate | Continuous |
| MATIMBA | All Units | 50 mg/Nm ³ | Daily | Immediate | Continuous |
| *Emission lin | nits requested are fo | r normal operations, so | excludes upset, | startup, shutdown, or mainter | nance conditions. |

Table 0-1 – Particulate matter requested emission limits and timeframes

| STATION | GENERATING | MA | DURATION OF | | | |
|---------------|-----------------------|--------------------------------|-----------------|-------------------------------|-------------------|--|
| STATION | UNIT | mg/Nm ³ | Average | Date To Be Achieved | EMISSIONS | |
| DUVHA | All Units | 1,100 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | |
| MATLA | All Units | 1,100 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | |
| | All Unito | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | |
| LETHABU | All Units | 750 mg/Nm ³ | Daily | 1 April 2031 | Continuous | |
| | All Units | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | |
| TOTOKA | | 750 mg/Nm ³ | Daily | 1 April 2029 | Continuous | |
| | All Units | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | |
| WAJOBA | | 750 mg/Nm ³ | Daily | 1 April 2030 | Continuous | |
| | All Units | 1,100 mg/Nm ³ Daily | | Immediate | Continuous | |
| KENDAL | | 750 mg/Nm ³ | Daily | 1 April 2025 | Continuous | |
| MEDUPI | All Units | 750 mg/Nm ³ | Daily | Immediate | Continuous | |
| MATIMBA | All Units | 750 mg/Nm ³ | Daily | Immediate | Continuous | |
| *Emission lin | nits requested are fo | r normal operations, so | excludes upset, | startup, shutdown, or mainter | nance conditions. | |

Table 0-2 – Oxides of nitrogen requested emission limits and timeframes

| OTATION | GENERATING | МА | DURATION OF | | | | |
|--|------------|--------------------------|-------------|----------------------|------------|--|--|
| STATION | UNIT | mg/Nm ³ | Average | Date To Be Achieved | EMISSIONS | | |
| DUVHA | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| MATLA | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| LETHABO | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| Τυτυκα | All Units | 3,000 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| MATIMBA | All Units | 3,500 mg/Nm ³ | Monthly | Immediate - Shutdown | Continuous | | |
| | All Units | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | | |
| KENDAL | | 1,000 mg/Nm ³ | Daily | 1 April 2036** | Continuous | | |
| | All Units | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | | |
| WAJUBA | | 2,100 mg/Nm ³ | Daily | 1 April 2034** | Continuous | | |
| MEDUDI | | 3,500 mg/Nm ³ | Monthly | Immediate | Continuous | | |
| MEDUPI | All Units | 800 mg/Nm ³ | Monthly | 1 April 2032 | Continuous | | |
| *Emission limits requested are for normal operations, so excludes upset, startup, shutdown, or maintenance conditions. **Should semi-dry FGD be installed at Kendal, and DSI FGD at Majuba. | | | | | | | |

The report presents data from the various South African Weather Services and Eskom AAQ monitoring stations for baseline comparison with NAAQS. The report also presents various atmospheric dispersion modelling scenarios (Eskom's emissions only), including a baseline (current) Eskom scenario and three other scenarios incorporating various abatement configurations. The findings are as follows:

PM

AAQ monitoring shows PM exceedances of the NAAQS in the Highveld, Vaal Triangle and Waterberg. There are several contributors to ambient particulates in the respective airsheds in addition to the Eskom

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stack emissions. These include domestic fuel burning, traffic emissions and fugitive emissions from exposed areas and stockpiles.

Duvha Unit 1 and 2, Majuba, Medupi and Matimba currently comply with the new plant MES for PM. The remaining stations are unable to comply with the new plant MES until completion of their respective PM abatement projects, detailed in the report. The Eskom Fleet project reductions in PM stack emissions in the coming years due to various abatement projects. By FY2030, these show a 65-kilo tonne (kt) reduction from FY2025, representing a 74% decrease, due to PM abatement projects implemented in the fleet and at stations entering shutdown phase.

Non-compliances of PM_{10} and $PM_{2.5}$ NAAQS in the airsheds are predicted even under the abatement scenarios. WSP asserts that the exceedances are predominantly due to low-level fugitive sources (e.g. windblown ash from ashing facilities) rather than the stack emissions themselves. WSP also highlights model conservatism.

NO_x

For the period 2021 - 2023, measured/monitored ambient NO₂ concentrations in the Highveld and Vaal Triangle are compliant with the NAAQS. In terms of the Eskom Fleet FY2030 (compared to 2025), NO_x emissions are estimated to reduce by 292kt (40%) due to assumed shutdowns of Arnot, Kriel, Hendrina, Camden and Grootvlei. Between FY2025 and FY2050, total NO_x emissions are estimated to reduce by 78%. All WSP dispersion modelling scenarios predict NO₂ compliance with the NAAQS. This includes the current scenario, which assumed no NO_x abatement at Matla, Duvha, Tutuka and Lethabo. WSP asserts that Despatch Priortisation to address SO₂ emissions will also reduce NO_x emissions, albeit not to compliance levels.

Eskom plans the installation of LNBs for Majuba, Lethabo and Tutuka. LNB installation is not proposed for Matla and Duvha due to imminent assumed closure. This is in line with the NECA Forum 2024 Report recommendations. In this regard, it should be noted that both Matla and Duvha comply with the existing plant MES.

SO_2

For the period 2021 - 2023, measured/monitored ambient SO₂ concentrations in the Highveld and Vaal Triangle are compliant with the NAAQS. There is currently no SO₂ abatement at the eight power stations applying for s59 exemptions. Considering the cumulative Eskom Fleet SO₂ reductions under ERP 2024 A (which excludes SO₂ abatement at Lethabo, Tutuka, Matimba, Majuba and Kendal), by FY2030 a reduction of 555kt (32%) is anticipated, with a further 165kt (14%) by FY2035 due to

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completion of the wet FGD installation at Medupi, Despatch Prioritisation, efficiency improvement projects, and the assumed shutdown of Arnot, Kriel, Camden, Hendrina, Grootvlei, Duvha and Matla.

SO₂ abatement is not proposed for Matla and Duvha due to upcoming (assumed) shutdowns. This is in line with the NECA Forum 2024 Report recommendations. SO₂ abatement technologies at Majuba and Kendal were evaluated under ERP 2024 B (a scenario, that with additional guarantees and considerations, could be achieved), with semi-dry FGD identified as the most appropriate at Kendal, while DSI FGD was identified as the most appropriate for Majuba. The semi-dry FGD would bring Kendal into compliance with the new plant MES, while the Majuba DSI FGD would reduce SO₂ emissions, but not to a level of compliance with the new plant MES.

ERP 2024 C, which represents a scenario that would require substantial guarantees, with significant financial implications, SO₂ technologies were evaluated for Tutuka, Lethabo and Matimba. In previous applications, Eskom's position has been that installation of SO₂ technologies at Lethabo, Tutuka and Matimba are not economically feasible and are at high risk of not even being technically feasible for implementation. This position is maintained in the S59 applications.

WSP asserts that while extension of a station's life may increase viability of SO_2 reduction projects at certain stations, this would extend South Africa's reliance on coal generation, with implications for South Africa's GHG commitments. WSP suggests the alternative use of funds to support renewables development and grid connection of the same amounts that would have been invested in such SO_2 retrofits.

9.1.1.2. Cost Benefit Analysis

WSP presents a health CBA for the Highveld, Vaal Triangle and Waterberg regions, as conducted by Prime Africa Consult (2024). This analysis evaluated the health benefits and costs associated with ERP 2024 A, ERP 2024 B, and ERP 2024 C.

In the Highveld and Vaal, the CBA concludes that the greatest health benefits relative to costs would be realised by ERP 2024 A, with a benefit cost ratio ("**BCR**") above 1. While the BCR of ERP 2024 B approaches 1 in the most optimistic scenarios, it generally shows that the costs of abatement installations outweigh the health benefits. For ERP 2024 C, costs of installations outweigh the health benefits, with the BCR well below one. In the Waterberg CBA, the BCRs for all scenarios are well below 1, indicating that under all scenarios, the costs of installation outweigh the health benefits.

9.1.1.3. Conclusions

The Fleet report states that Eskom is mindful that any exemption application should be limited.

In respect of PM, WSP asserts that limit exemptions are requested only where it is necessary and only for the time to complete the emission reduction projects to bring the stations into new plant MES compliance. Further, the exemption requested alternate limits are no worse than the MES existing plant limits at which the stations have operated historically.

In respect of NO_x , WSP asserts that for Lethabo, Tutuka and Majuba, exemptions are requested for the time to complete the emission reduction projects to bring the stations into compliance with the new plant MES. Further, there is compliance with the NAAQS for NO_2 and the alternate limits requested are no worse than the existing plant MES at which the stations have operated historically. For Duvha and Matla, WSP asserts that the exemption request is supported by a clear motivation, there is compliance with NO_2 NAAQS, and the requested alternate limits are no worse than the existing plant MES alternate limits are no worse than the existing plant MES at which the stations have operated by a clear motivation.

WSP asserts that the SO₂ exemption requests provides clear motivation for the alternate limits requested per station, illustrating that there is compliance with SO₂ NAAQS.

WSP concludes that the exemptions applied for are appropriate and balance environmental and health impacts with national requirements for security of supply and economic growth and development. Eskom is not seeking a blanket exemption as it intends to operate at alternate SO₂ limits generally below the existing plant MES and it will obtain MES compliance for two out of the three priority pollutants at all stations operating post 2035.

9.1.2. Fleet Level Conditions

This section comprises recommended conditions that should be met by Eskom's head office due to their fleet-wide nature and the processes which are affected. In certain cases, these conditions should be referenced in the plant AELs.

In determining these conditions, consideration has been given to a set of conditions that are commensurate with the impact of Eskom's ongoing non-compliance with the new plant MES, and that provide support in achieving compliance in the short (PM), medium (NO_x) and long term (SO_2). Further, the manageability and cost of meeting the conditions, for the various Eskom divisions, has been taken into account.

Because of the urgency of responding to health impacts, conditions related to these are prioritised in terms of timeframe for implementation. Apart from technology retrofits, conditions that support reduced coal burn do not have the potential for substantial impact for the next five years given generating capacity constraints. However, after 2030, these constraints will start to ease and the longer term coal burn related conditions will start to gain relevance.

A number of the conditions are analytical in nature, requiring Eskom to commission and submit an analytical report to the Minister. It is recommended that all such reports adhere to the following independence and accountability provisions, unless otherwise specified:

- Reports must be independent.
- Completed reports must be published for stakeholder comment with a month allowed for the commenting period. Eskom must collate stakeholder comments and submit these together with the final report to the Minister.
- Eskom must submit to the NAQO detailed reports and updated project plans for each of its retrofit projects, on a quarterly basis, taking into account the actions taken to adhere to the timelines proposed by Eskom in respect of its abatement retrofit projects.

The conditions are grouped according to the typology outlined in section 8.1. A summary of the recommended conditions is presented in at the end of each plant assessment.

9.1.2.1. Conditions that respond to the impact of non-compliance

Non-compliance with the MES has impacts in a number of areas. These include:

- Socio-economic aspects of communities local to the power plants;
- The health of local communities;
- AAQ standards; and
- Local environmental impacts (water, waste).

Conditions that relate to these impacts are considered below. There is a large degree of interaction between the sub-categories, which is reflected in the conditions.

(i) Health interventions

Eskom is not a health care provider, however, it is common cause that emissions from its coal-fired power stations have a negative impact on the health of people in the surrounding communities. It is well documented that compliance with the MES significantly reduces the impact of these pollutants on negative health outcomes. Therefore, Eskom has a responsibility to ensure that it takes steps to ease the

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burden, where possible, on public health institutions and provide meaningful support to the health sector in the communities in which it operates.

Eskom's response to previous community level health recommendations is that "Eskom does not recommend that it be required to become an implementer or funder of health care interventions as such work is clearly outside its mandated area of operations." However, to mitigate the impacts of noncompliance with the MES, we strongly recommend that health-service strengthening initiatives to affected communities be upscaled and supported by Eskom, with clear timelines in place. Eskom states that stack emissions contribute a limited extent to ambient air pollution, referencing Adesina et al. 2022. Assessment of criteria pollutants contributions from coal-fired plants and domestic solid fuel combustions at the South Africa industrial highveld. Cleaner Engineering and Technology 6 (2022). However, the same source states that "SO₂ and O₃ received major contributions from the coal-fired plants" and this contribution must be acknowledged.

While it is recognised that many health interventions require inter-departmental collaborations and planning, holding Eskom accountable for their contribution to health impacts in the surrounding communities is imperative and implementing conditions that support mitigating some of these impacts must be considered, such as:

• Improving air quality monitoring and early-warning systems allowing communities to be alerted to poor air quality times so that at-risk and vulnerable populations can be alerted and take necessary precautions such as consider staying indoors or using air purifying systems where available..

This must be achieved through

- i) the deployment of additional air quality monitoring stations in the affected communities, providing real-time accessible data (see the air quality transparency and governance section below), and
- ii) the development of a data free app with alerts on air quality and changes must be made available within 8 months. When the AAQ exceeds the NAAQS, affected residents should be made aware of this so that they can take appropriate action e.g. stay indoors, limit strenuous activities. Eskom shall conduct an information campaign to make residents aware of the precautions they should take when AAQ is poor, and they have received a mobile/app warning notification of this.

- A co-ordinated environmental health programme for the communities situated in air pollution Priority Areas is required. This will best be achieved by Eskom employing an environmental health specialist to co-ordinate the implementation of programmes and interventions to mitigate some of the health impacts related to air pollution exposure. The employment of such a person should occur within 3 months of the exemption being granted.
- The Eskom Health Specialist should be responsible for oversight and implementation of the following functions and the tenure of the Health Specialist should be for a minimum period of 5 years. The said person must provide 6 monthly progress reports on each of the conditions to the Minister's Office:
 - Conduct detailed health impact assessments to quantify excess mortality/morbidity associated with Eskom's emissions based on existing health response models (e.g. BenMap Environmental Benefits Mapping and Analysis Program Community Edition (BenMAP-CE) | US EPA) at each of the Eskom power plants. Based on this data, Eskom is to demonstrate how they are mitigating these effects in a quantitative sense through direct investments in the communities most affected. This must be initiated within 6 months through a partnership with experts in the field of health impact assessments with annual report backs on progress sent to the Minister's Office.
 - ii) Extend Eskom's established employee occupational health programmes to the local communities by providing facilities and resources that can be used to conduct community screening programmes bi-annually. This can utilise the established infrastructure of the employee occupational health programmes and must be undertaken within 6 months. The screening must be a combination of:
 - a. Lung health screening to include lung function testing (spirometry).
 - b. This will develop the much-needed infrastructure to improve diagnostics of chronic lung diseases.
 - c. Cardiovascular and general health screening (blood pressure, cholesterol and blood glucose).
 - iii) Develop awareness programmes within 6 months of the exemption being granted. The programmes must make specific reference to bi-annual engagements with communities as this will empower them to better understand health screening and wellness through health education programmes on early detection and accessing health care for potential air quality associated health impacts. The programme must also cater for training health care workers who will bear the responsibility to support and educate

communities on health-related issues. The implementation of such programmes may be implemented through partnerships established with social justice or other NGO groups.

- iv) Maternal and child health are particularly vulnerable to ambient air pollution, impacting health from the time of conception. Public health campaigns and awareness programmes are key, as is liaising with local health facilities to implement such programmes and ensuring that they are achieved. This must be undertaken within 6 months.
- v) As stated on the website, (<u>https://www.eskom.co.za/about-eskom/corporate-social-investment/social-sector/</u>) the Eskom Foundation, as part of the CSI programme, provides mobile clinics:

"Eskom supports preventative healthcare around the country by providing state-ofthe-art mobile clinics which visit schools to provide dental and eye-care services, as well as general health check-ups".

When clarifying this issue with Eskom, HNM was informed that the mobile clinic project was halted several years ago, and that the information was outdated.

- vi) While this may be dated information, community mobile clinics or revamping of local facilities is key in strengthening healthcare to affected communities, particularly if the MES are not met, and will provide important pathways to care in already vulnerable populations. A commitment should be required from Eskom to support at least one mobile clinic for at least 5 years in the most affected communities. These facilities must serve the needs of the community, be accessible to the community on the weekends and clinical data from these clinics (subject to POPIA requirements) should be made available to all stakeholders. If this initiative has lapsed, Eskom should ensure that it is reinstated within 12 months.
- Improving greenspaces, particularly around established healthcare facilities and schools, is important for mitigating some of the effects of air pollution.

Eskom must commit to creating 1 greenspace per year in each community situated near a power station, starting with the worst affected community. Eskom must use some of its unused land to establish green spaces, an approach that is gaining momentum, which involves planting large scale tree farms that will improve AAQ by reducing wind-blown PMs. In areas such as Lephalale, the green spaces can also assist to minimise the heat, as they provide natural cooling of air and surfaces. Eskom can explain the benefits of this approach to get buy-in from people in the communities who can be enlisted to assist it with establishing the green spaces.

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(ii) Socio-economic intervention programmes

Existing "offset" programmes

The implementation and schedules of the Phase 2a, Phase 2b and Phase 2c socio-economic intervention programmes are illustrated in Table 15 and Table 16 of this report. It is clear, when looking at the timelines set out in these tables that there have been several delays in the implementation and execution of Eskom's "offset" programmes, which Eskom has provided no details or justification for.

It is the view of HNM that Eskom must implement its socio-economic intervention programmes within the timelines set out in Table 15 of this report by, *inter alia*:

- Expediting project implementation schedules (start dates and completion dates of each of the projects). The plant implementation timeline should be compressed.
- Expediting procurement processes for Phase 2a and Phase 2b.
- Expediting budget approvals for the Phase 2c initiatives.
- Eskom has also stated that it is its intention to increase the offset programme in households from 36 000 to 96 000. Eskom is required, within 12 months, to provide details and timelines for this expansion and for its implementation.

In addition, Eskom should provide the DFFE with detailed reports and updated project plans, on a quarterly basis, taking into account the actions taken to adhere to the NECA Forum 2024 Report Schedule, that sets out the timelines proposed by Eskom in respect of its offset programmes.

HNM suggests that Eskom must also give consideration to increasing the allocation of resources (human and financial) to the socio-economic interventions to ensure their timely realisation.

If Eskom now cannot meet the timeframes of the NECA Forum 2024 Report Schedule, it must apply to the Minister for extensions, presenting a detailed justification for why each programme is behind schedule, and how Eskom will accelerate the completion of the programmes.

Additional socio-economic conditions

• Eskom must undertake meaningful research programmes to understand socio-economic intervention programmes that are most appropriate and acceptable to specific communities. These programmes must include a focus on understanding how to improve planning, implementation, tracking criteria, monitoring and verification processes to ensure that offset projects improve the quality of air. The findings of these programmes must be made taken into account when considering the existing offset programmes..

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• Eskom should consider collaboration with local universities to support research on community perceptions of offset programs and their effectiveness at improving AAQ and community health outcomes. This support should be through the provision of research grants and access to relevant information.

Eskom should consider investing in strategies to reduce other sources of air pollution that adversely affect AAQ, particularly those that cause and/or exacerbate pulmonary and cardiovascular diseases. In this regard, HNM proposes the following conditions be imposed:

- One of Eskom's socio-economic interventions in settlements near the Lethabo power station is the collection of waste and the eradication of illegal waste dumps. The scope of this intervention should be increased to cover a minimum of 2 at-risk settlements located around Eskom's power stations, where illegal mining dumps have been established. This will result in the reduction of uncontrolled burning of refuse containing tyres/plastics which produces harmful toxins.
- Eskom must submit plans within 12 months of the issuance of the AEL that comprehensively address how it intends to deal with the ash dumps it has established in the various areas. These dumps contribute significantly to the emission of PM, particularly during windy conditions. Eskom must set out clear timelines for when it will address the issues however, these timelines must fall within the time period that the AELs are in place.

(iii) Air quality transparency and governance conditions

We recommend that a monitoring plan for each power station is compiled (or updated if already in existence) and submitted to the NAQO within six months of this report. These monitoring plans must:

- Indicate the reasoning behind the placement of the minimum two monitors around each power station (with reference to the dispersion modelling done, showing that placement is capturing predicted ambient peaks) and justification for the equipment selected.
- Present calibration schedules, backup power options, backup equipment, data quality assurance and quality control (QA/QC), etc.
- Stipulate that the monthly monitoring reports as well as annual reports (showing seasonal patterns and trends over the full/multi-year monitoring period, with comparisons with abatement schedules etc.) must be submitted to the NAQO.
- Eskom must ensure that at least two continuous air quality monitoring stations (measuring PM10, PM2.5, NO2 and SO2) per power station are operational and providing continuous datasets at all times, (these AQMS can be taken offline when stations shutdown) within twelve months of the exemptions being granted. These can be SAWS stations. AQMS can be taken

offline when stations shutdown. To satisfy this requirement, Eskom needs to commission and maintain additional AQMS around Majuba and Matla (which currently have only one AQMS each) and Tutuka (two AQMS have been installed but only one has valid data for the period of WSP's s59 exemption assessment, suggesting maintenance issues). There are no SAWS AQMS in the vicinity of these power stations.

- Lethabo has one Eskom AQMS and two SAWS AQMS in its vicinity. Duvha has one Eskom and one SAWS air quality monitoring station in its vicinity. Kendal already has two Eskom air quality monitoring stations in its vicinity.
- In the Waterberg region, there are three AQMS (two Eskom stations and one SAWS station).
 We recommend at least one additional AQMS be installed there.

Eskom's monitoring stations must comply to International Organization for Standardization (ISO) 14 001 environmental standards, but it is free to select what technology they utilise (e.g. low-cost sensors could be considered).

Key sensitive receptors should be considered in the following locations for additional monitoring due to high pollutant concentrations (read from Eskom's s59 atmospheric dispersion modelling exercise). These should be installed sufficient distance away from existing stations, within twelve months:

- Sizenzele Primary School (near Majuba)
- Gweda Primary School and Kwanala Primary School (near Matla)
- Amalumgenlo Primary School (near Tutuka)
- Ditheko Primary School, Kings College, Steenbokpan (Rehab centre), Kremetartpan (BnB), Lephalele Medical Hospital, Phegelelo Secondary School and Grootgeluk Medical Centre (Waterberg).

The ambient air quality monitoring data at a minimum of two monitoring stations per power station must be published live/in real time on the Eskom website in addition to being live fed to the DFFE so that it can be reported on the SAAQIS web portal. Additionally, for comparison, Eskom must provide live daily stack emission data for each of the pollutants on Eskom's website for full disclosure to all stakeholders and this data must be live fed to the DFFE so that it can be reported on the SAAQIS web portal with immediate effect. This will enable all stakeholders to access information relating to Eskom's compliance with its obligations, as set out in its AELs.

Eskom must send stack monitoring data (emission concentration and volumetric flow) at a 10-minute resolution to the NAQO weekly with immediate effect. This is in addition to the provision of live feed data.

Data coverage must be maintained at a minimum of 90% every month at least two monitoring stations per power station and Eskom needs to explain/justify any data gaps in their monthly reports to the NAQO. There should be penalties if the AQMS are down due to lack of maintenance/planning etc. Backup equipment should be installed if equipment is removed for repairs or calibration etc.

Any exceedances of the recommended emission limits will require a full atmospheric dispersion assessment to determine likely health incidents (with reporting that is in line with the Atmospheric Impact Report Regulations).

Eskom must record the emissions data, referred to above, in its annual Sustainability Report and in its financial results /Annual General Meeting.

Progress on abatement projects must continue to be included in Eskom's quarterly reporting to the NAQO.

9.1.2.2. Conditions that support compliance

9.1.2.2.1. Technology retrofit abatement conditions

(i) Medupi FGD CBA and power system modelling

Eskom's exemption application indicated that CBAs had been undertaken for their three ERP scenarios, the first of which included the installation of FGD at Medupi. This CBA includes abatement interventions for PM and NO_x for all eight plants, as well as the corresponding health benefits of these.

Further, HNM has the following concerns with the CBAs undertaken by Prime Africa for purposes of Eskom's exemption application:

- The issue of airshed saturation (cumulative impact) is not accounted for, and this is an important determinant of health impacts. For example, in a saturated airshed, asthmatics respond to lower emission levels more quickly and intensely than healthy, unexposed individuals.
- The use of Exposure Response Functions from other countries likely underestimates South Africa's baseline TB and HIV concerns, which impact on respiratory, cardiovascular and immunological response.
- Synergistic pollutant interactions were not incorporated, which contribute to cumulative impacts.
- The value of abating additional pollutants to PM, Nox and SOx were not included.

- Morbidity impacts were not included (cost of medical treatment, loss of employment, impacts of health risk on households, employers, the health care and insurance industries, educational impacts for sick children and childcare implications, consideration for vulnerable populations such as children, the elderly, and those with chronic health conditions).
- Environmental aspects such as infrastructure and services to provide water and waste management (sorbents) associated with the FGD were not included.

A revised and expanded plant-specific CBA is therefore to be undertaken regarding installing FGD at Medupi within 6 months of the exemption decision and submitted to the Minister.

To respond to the concerns articulated above, the following must be included in the quantitative assessment:

- Health costs (addressing all concerns cited above);
- Technology costs (construction, maintenance and operation);
- Energy efficiency penalty;
- CO₂ costs;
- Cost of sorbent supply, including infrastructure costs;
- Waste treatment; and
- Cost of water supply, including infrastructure costs.

The CBA must be limited to SO₂ health impacts, holding all other pollutants constant and consider plant closure dates of 2045, 2055 and 2071 in separate scenarios. The report must further provide commentary on construction and operational risks, timing and duration of outages required to install the FGD, finance availability, project status currently, and the plant emission levels post the retrofit. Implications for SO₂ emissions and the FGD plant of running Medupi at reduced utilisation rates must also be commented upon.

Further, the CBA must consider two scenarios:

- Compliance with new plant MES for SO_x on a daily basis (i.e. wet-FGD), and
- Scenarios with appropriate abatement retrofits that do not necessarily comply with new plant MES but significantly reduces SO_x emissions.

Eskom must further commission independent power system modelling to explore alternatives to installing FGD at Medupi. The following scenarios should be compared:

- Installing wet-FGD at Medupi;
- Scenarios with appropriate abatement retrofits that do not necessarily comply with new plant MES but significantly reduce SOx emissions; and
- Spending the Capex instead on flexibilising Mpumalanga coal units to displace a similar amount of health cost. The choice of Plant should be guided by the Forum Report's 2024 Plant Baseline Assessment to target the poorest performing plants across multiple criteria)

The modelling output that should be compared across the two scenarios includes: electricity adequacy, cost, GHG emissions, and NO_x, PM and SO_x emissions per Priority Area.

9.1.2.2.2. Reducing the amount of coal burnt

Eskom's exemption application states that:

'the existing coal fired power stations are expected to provide additional flexibility to the system through increased variability in a load following mode of operation, as well as providing backup to the variable intermittent non-dispatchable renewable technologies, as well as providing ancillary services, inertia etc. which are not provided by the inverter-based renewable technologies. This essentially results in lower running load factors for these stations as the renewable energy sources will be given priority dispatch over the fossil-fuelled stations. ⁶³

To give this effect, the exemption application describes a Dispatch Prioritisation Strategy of renewables, which will reduce SO₂ emissions in particular (but also have beneficial impacts on all other emissions, local and GHG). According to this Strategy, Eskom will not run plants at maximum loads, but rather limit loads to those required for system adequacy, resulting in reduced coal burnt. Eskom notes in its exemption application that this Strategy relies on the addition of clean generation capacity to the system, which it notes is outside its control. HNM does not think that this is entirely correct. Eskom's NTCSA's slow implementation of the Transmission Grid Plan and Eskom Distribution's slow provision of grid access to renewables projects both directly retard renewables build.

Conditions related to reducing the amount of coal burnt are therefore designed to strengthen the effectiveness of Eskom's Dispatch Prioritisation Strategy as a mechanism to reduce local air pollution,

⁶³ Eskom's Exemption Report – Medupi at pg. 25.

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in particular SO₂. It is noted that the implementation of this Strategy should not adversely impact system level outcomes such as security of electricity supply and the cost of producing electricity. By its nature, the Strategy will lead to beneficial GHG emission outcomes through the reduction of coal burnt.

(i) Dispatch Prioritisation Strategy: Analyse and propose mechanisms for including a R/kgSO₂ price on all Eskom coal generating plant

The recommended emission limits require that all plants will either retrofit the appropriate PM and NO_x abatement technologies, or close within ten years. The coal fleet will, from thereon, be compliant with the MES for PMs and NO_x . However, for most, if not all, of the coal plants, retrofits to comply with SO_2 MES are highly capital intensive and technically complex. There is no reasonable way of complying with the MES or MES-equivalent standards for SO_2 , determined by absolute emission volumes, other than by reducing coal burn and ultimately closing. The implication of this is that the coal plant will remain unconstrained in terms of SO_2 emissions until the end of their lives. This is not acceptable from an air quality regulation perspective.

Eskom notes in its exemption application that the market reform process, in conjunction with the increasing competitiveness of renewables, storage and carbon pricing, will incentivise reduced coal burn as soon as there is sufficient quantity of alternative generation and storage capacity to enable the coal burn to be turned down. However, Eskom confirmed in subsequent clarifications to HNM that dispatch does not consider emission prioritisation at this stage and that doing so may require approval from NERSA, and that there are no details yet in how its Dispatch Prioritisation Strategy will be operationalised.

The NECA Forum 2024 Report recommended pollutant pricing as a theoretically efficient mechanism for internalising externality costs of pollution. A price mechanism (compared to an absolute constraint such as the current concentration limits) is more flexible, which is valuable when optimising for multiple objectives. Flexibility can further lead to a better allocation of capital over the longer term. A flexible price mechanism is more aligned with the transitioning of the sector structure to that of a market, promoting mechanism resilience over time.

It is acknowledged that limiting SO_2 emissions is but one of many considerations in generating power, others include adequacy of supply and electricity cost concerns. It is further acknowledged that until there are significant volumes of energy generated by alternative sources available, the System Operator has to dispatch all coal power generated, and therefore a SO_2 price can only rarely influence dispatch decisions. However, as volumes of clean energy increase, a SO_2 price will be able to increasingly influence the coal merit order and can start to be escalated towards the social cost of SO_2 emissions.

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In the light of this, Eskom must therefore investigate how a SO_2 emissions price in R/kgSO₂ can meaningfully be included in its Dispatch Prioritisation Strategy. The objective of the price should be to, over time, influence dispatch decisions such that those plants whose SO_2 emissions are having the worst impact on health are more costly to dispatch. Eskom is required to develop a proposed design or alternative designs for the SO_2 emissions price, publish these for stakeholder comment, and submit the report plus all comments to the Minister within 12 months of the exemptions being granted. The Minister is recommended to consult external expertise in reviewing the report.

The following should be considered in the proposal design:

- In the context of exemptions from a concentration based regulatory regime, a pollutant price condition can only be imposed on and implemented by Eskom. This is in contrast to the conventional implementation of a price in the form of a tax or a levy, which would require the involvement of National Treasury and regulatory reform.
- Given the constraints of the current regulatory environment, together with the context of escalating electricity prices, the SO₂ price need not be a real cost to Eskom Generation, nor need be reflected as allowable revenue in the tariff decision-making process yet. However, over time the price should be able to evolve to achieve both of these aspects. If and when the price transitions to a real cost, consideration should be given to Eskom paying associated revenues into a dedicated vehicle to support grid expansion.
- Some options for implementing a price per kg SO₂ which can be explored include a R/kgSO₂ generated in the internal Eskom market bid price; requiring the System Operator to include a SO₂ cost penalty in dispatch modelling (but not necessarily dispatch according to the outcomes); including an SO₂ penalty into production plan development (influencing the MTSAO / IRP). It may be appropriate to include more than one of these mechanisms, or others yet to be identified.
- There may be regulatory considerations in designing the price that need to be taken into account, including in the regulation of the coal plant bid costs in the transitioning market, and their vesting contracts with the Central Purchasing Agency.
- Whilst the inclusion of diesel fueled peaking plants could be included in the analysis, this is not considered a current priority. The diesel peakers do produce significant local air emissions, but play a different role in the power system to the coal plant, and emit to different (coastal) airsheds.

- The current and future treatment of the CO₂ tax in Eskom planning should be taken into account in the SO₂ price design given their similarities, including the cumulative implications for coal plants.
- Whether the calibration of the SO₂ price should be plant-specific, uniform across plants, or whether different penalty levels should be applied to plants in different Priority Areas, given the differing health impacts, should be considered.
- Consideration of how a SO₂ price might work under air quality regulatory reform as described in the NECA Forum 2024 report.

At minimum, the analysis must:

- Convincingly detail how the price can influence System Operator dispatch decisions at the margin under transitional and future market structures.
- Discuss what processes are required to ensure any adaptation of the price mechanism during the transition to the market structure.
- Identify which processes within Eskom need to be exposed to the price to ensure it is fully reflected in dispatch decisions.
- Include consideration of a range of price calibrations for their impact on system level outputs such as adequacy of supply, electricity system cost and GHG emissions. Power system modelling will likely be required for this aspect of the analysis.
- Recommend an appropriate starting penalty level, design and mechanism, and comment on the potential for escalation over time.

(ii) Proposal for specifying pollutant concentration levels for operating at reduced utilizations

In section 8.3.3, it was noted that operating a coal plant at partial loads may increase emission concentrations of all three local air pollutants. However, overall, it is anticipated that absolute emissions will decrease due to the reduced coal burn.

This issue requires further investigation, and a proposal made to the DFFE for emission concentration limits associated with various partial load modes, per plant, per pollutant. Eskom must therefore submit a report to the DFFE within 12 months of the exemption decision. This report must comprise an analysis in partnership with an external service provider to provide technical evidence as to how the turn-down conditions will impact the pollutant loads and concentrations emitted. This must be provided for at least three levels of turn-down per plant, and potentially per point source (boiler). The impact must be compared with that of operation at full utilisation.

Based on the report, it is recommended that the Minister consider instructing the NAQO to add pollutant concentration limits to plant AELs for partial load operation for each plant / point source.

It is noted that closing units (boilers) temporarily or permanently will unlikely incur AAQ concentration penalties. (SO₂ penalties will ultimately incentivise this method of reducing coal burn in plant decision making).

(iii) Submission of Eskom's current coal flexibilization studies to the Minister

Eskom's response to the NECA Forum recommendations (Letter dated 11 December 2024, accompanying Eskom's exemption application), included the following:

'Eskom is investigating the changes required to enable the plants to run at lower minimum loads and respond quickly when required to ramp up and down. Three categories of changes are being investigated: Tier 1 is linked to operational procedure changes, Tier 2 is minor equipment changes, and Tier 3 is possible large equipment upgrades. These studies should be completed by September 2025. Eskom is also investigating the possibility of including "operational flexibility" operator training utilising the operator simulators at the various sites. Plasma and low-fuel igniter technologies are also being investigated to support operation at lower loads. This project's demonstration phase should be completed in 2026.'

Eskom must publish these studies for stakeholder comment and submit these studies to the Minister once they are completed. A report of the plasma and low-fuel igniter technologies demonstration phase should also be submitted to the Minister.

(iv) Progress on transmission grid expansion

A key abatement mechanism, and the only sustainable one in the case of SO₂ is to phase out coal generation and replace it with a renewables and storage dominated power system. Whilst renewables are increasingly competing with installed coal generation, one of the main barriers to rapidly accelerating renewable capacity in South Africa is the limitations of the transmission grid. The NTCSA releases annual Transmission Development Plans (TDP), which cover a rolling ten-year planning horizon. The latest version, TDP 2024, targets 14 500 new transmission lines and 210 new transformers

over the decade, which is adequate to support renewables expansion. However, the TDPs are lagging in terms of their implementation, facing significant challenges. These include the pace of grid expansion, which requires a five-fold increase over the TDP 2024 period compared to that of the previous decade, and financing given Eskom's liquidity issues and constraints on NERSA to increase electricity tariffs. Alternative funding and delivery models are therefore promoted in the TDP, including Independent Transmission Projects (ITPs) and hybrid Eskom / ITP developments.

It is therefore important for the management of local air emissions that Eskom's NTCSA implements the TDP according to the timeframes set out therein. It is therefore recommended that Eskom send the Minister the annual TDP for consideration when reviewing its exemptions and progress against conditions.

| R | ECOMMENDED CONDITIONS | TIMEFRAME | Plant specific | | | | | |
|---|---|---------------------------|----------------|--|--|--|--|--|
| | | | implications? | | | | | |
| A | A Conditions responding to the impact of non-compliance with the MES | | | | | | | |
| Н | ealth interventions | | | | | | | |
| | Development and roll-out of a data free air quality alert app | 8 months | | | | | | |
| | Appointment of an environmental health specialist | 3 months | | | | | | |
| | Plant level health risk assessments | Annually | Yes | | | | | |
| | Extend employee occupational health screening programmes to comunities for biannual screening | 6 months | | | | | | |
| | Develop community air quality health awareness programmes. | 6 months | | | | | | |
| | Maternal and child health campaigns | 6 months | | | | | | |
| | Reinstate mobile clinic programme. | 12 months | | | | | | |
| | Improve green spaces around healthcare facilities and schools | | Yes | | | | | |
| S | ocio-economic interventions | | | | | | | |
| | Implementation of offset programme as per March 2024 timeframes. | As per s59 application | | | | | | |
| | Progress on offset projects must be included in quarterly reports to DFFE | Quarterly | | | | | | |
| | Establish research programmes on intervention progammes, in collaboration with universities. | | | | | | | |
| | Waste collection interventions associated with illegal mining dumps. | 12 months | Yes | | | | | |
| | Plans to deal with ash dumps at each plant | 12 months | Yes | | | | | |
| A | r quality transparency and governance | | | | | | | |
| | Monitoring plan per plant | 6 months | Yes | | | | | |
| | Install and maintain air quality monitoring stations and monitors | 12 months | Yes | | | | | |
| | Additional key sensitive receptor monitoring stations. | 12 months | Yes | | | | | |
| | Data reporting improvements: real time on DFFE SAAQIS, weeekly stack data | Immediate | Yes | | | | | |
| | Atmospheric dispersion assessment for exceedences of AEL limits | As required | Yes | | | | | |
| | Emissions performance included in Eskom's Sustainability report and raised at AGM. | Annual | | | | | | |
| | Continue quarterly reporting on abatement projects | Immediate | Yes | | | | | |
| В | Conditions that support compliance with the MES | | ù | | | | | |
| | Conduct expansive plant-specific Cost Benefit Analyis for FGD at Medupi | 6 months | Yes | | | | | |
| | Analyse and propose mechanisms for the inclusion of a SO2 price in the Dispatch Prioritisation Strategy | 12 months | | | | | | |
| ┢ | Proposal for pollutant concentration levels | 12 months | | | | | | |
| ┢ | Submission of current flexibilisation studies to the Minister | Sept 2025 | Yes | | | | | |
| F | Submission of TDP to the Minister | Annual | | | | | | |

Table 38: Summary of recommended conditions

9.2. ESKOM'S DUVHA POWER PLANT ("DUVHA")

9.2.1. Summary of Application

9.2.1.1. Background: Postponement Application (2019)

On page 7 of Eskom's motivation, which accompanied its postponement application, Eskom states as follows:

"In summary, the suspension and alternative limits and postponement requested for Duvha is:

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1) Postponement of the new plant PM limit between 1 April 2020 and 31 March 2025

and an alternative daily limit of 80mg/Nm3 for units 4,5 & 6 until decommissioning (2030-2034).

2) An alternative daily limit for SO₂ of 2600 mg/Nm3 from 1 April 2020 until decommissioning (2030-2034).

3) An alternative daily limit of 1100 mg/Nm3 NOx between 1 April 2020 and decommissioning (2030-2034)

Based on the remaining life of the Duvha power station, the techno-economics and cost benefits assessment any additional measures other than what was committed to above is not financially viable. It is requested that the proposed limits only apply during normal working conditions, and not during start-up and shut-down, upset conditions and maintenance periods."

Eskom's request is also set out in table 1 on page 6 of Eskom's motivation for its application, which shows the applicable limits contained in Duvha's AEL and the requested emission limits:

| | Current Limit (from AEL) | | | Requested Emission Limits* | | |
|-----------------------|-----------------------------|---------------------|---------------------------------|----------------------------|---------------------|---------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| Particulate Matter | 100 | | Immediately | 50 | | 1 April 2020 |
| Unit 1-3 | 50 | Daily | 1 April 2020 | | Daily | |
| Particulate | 100 | Daily | Immediately | | Daily | |
| Matter Unit 4-6 | 50 | | 1 April 2020 | 80 | | |
| Culabur | 3500 | | Immediately | 2600 | | 1 April 2020 |
| Sulphur | 2200 | | 1 April 2020 - 31 | | Daily | |
| Unit 1.3 | 2300 | | March 2025 | | | |
| Offic 1-5 | 500 | Daily | 1 April 2025 | | | |
| Culphur | 3500 | Dally | Immediately | | | |
| diovide | 2200 | | 1 April 2020 - 31 | | | |
| Unit 4.6 | 2500 | | March 2025 | | | |
| Unit 4-0 | 500 | | 1 April 2025 | | | |
| Nitrogen | 1100 | | Immediately | | | |
| oxides Unit 1-3 | 1100 | Daily | 1 April 2020 – 31 March 2025 | 1100 | Daily | |

| | Current Limit (from AEL) | | | Requested Emission Limits* | | |
|--------------------|-----------------------------|---------------------|---------------------------------|----------------------------|---------------------|---------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| | 750 | | 1 April 2025 | | | 1 April 2020 |
| Nitrogen | 1100 | | Immediately | | | |
| oxides Unit 4-6 | 1100 | | 1 April 2020 – 31 March 2025 | | | |
| | 750 | | 1 April 2025 | | | |

*The requested emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O2.

In paragraph 5 of Eskom's motivation, it sets out the reasons for applying for a postponement. In this regard, it is stated that, "[s]uch reasons are set out below and include the fact that emissions from Duvha will not result in non-compliance with National Ambient Air Quality Standards (NAAQS), together with a suite of undesired environmental consequences of compliance with the MES including associated water demands, transport impacts and increases in waste and carbon dioxide (CO2) production. These undesired consequences together with the financial costs of compliance (such as an increase in the electricity tariff) must be weighed up against the benefits that will accrue as a result of compliance with the MES. It is Eskom's view that the benefit of compliance does not justify the non-financial and financial costs of compliance (see section 5.5. below for the details of the cost implication of MES compliance)."

Eskom's reasons for the application are grouped together as follows:

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Remaining life of the power station – Duvha is currently scheduled to be decommissioned between 2030 and 2034. It is Eskom's submission that it is not financially viable to retrofit Duvha with FGD abatement technology given its current operating life.

Water availability – It is Eskom's assertion that the water demands of FGD are significant and FGD is not a judicious use of water in an extremely water scarce country such as South Africa.

Environmental implications of FGD – There are environmental consequences of FGD relating to the use of limestone and the requirement to transport it as well as relating to the production of gypsum as a by-product.

Impact on AAQ – In this regard, it is stated that "Duvha Power Station is located in the Mpumalanga Province, 15 km southeast of eMalahleni. The surrounding land use includes coal mining, brick manufacturing, agriculture and residential areas, Duvha therefore operates in an area of elevated ambient SO₂ as a result of multiple other sources. This elevated loading is reflected in the ambient air quality measurements where non-compliance with the National Ambient Air Quality Standards (NAAQS) is evident in Witbank (2015 and 2016) and Komati (2016) for daily and annual average concentrations. For actual SO₂ emissions at Duvha Power Station the predicted annual average SO₂ concentration is significantly less than the national ambient SO₂ standard of 50 µg/m3 [and] does not exceed the national ambient air quality standards of 125 µg/m3. The impact of Duvha's emissions on ambient air quality has been comprehensively assessed in the accompanying independently compiled Atmospheric Impact Report (Annexure A)."

Cost implications of compliance with the MES – Eskom's financial implications of compliance with the MES, most especially the financial implications of compelling existing plants to comply with 'new plant' standards, is presented in Eskom's motivation in more detail. According to Eskom, there are direct financial costs and electricity tariff implications of compliance.

9.2.1.2. The NAQO's decision in respect of Eskom's application for Duvha

Below is a summary of what Eskom applied for in 2019 and the NAQO's decision taken in respect thereof:

| S 21 Category | S 21 Category Appliance Postponemen Sought | | ry Appliance Postponement Emission St Sought | Standards | | |
|--|---|--|---|-------------------------------|------|--|
| | | | Minimum Standards | Minimum Emission Standards | | Decision |
| | | | Pollutant | 2015 | 2020 | |
| Subcategory 1.1: Solid Fuel Combustion Installation | Units 4-6 | 80mg/Nm ³ from 1 April 2020 until 2025 80 mg/Nm ³ decommissioning (2030-2034) | PM | 100 | 50 | Alternative limit request until decommissioning is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a), (b) and 12A(c)(i)). Postponement until 31 March 2025 is declined because the facility did not demonstrate the intention to comply with the new plant standard of 50mg/Nm ³ |

| 6 Units | 2600 mg/Nm ³ from 1 April 2020 until decommissioning (2030-2034) | SO ₂ | 3500 | 1000 | Alternative limit request until decommissioning is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a), (b) and (c)(i). |
|---------|---|-----------------|------|------|---|
| | | | | | The requirement to comply with the minimum emission standards for new plant as stated in the 2015 postponement decision with a limit of 2300mg/Nm ³ from 1 April 2020 to 31 March 2025 thus remains in place. |
| 6 Units | 1100 mg/Nm ³ from 1 April 2020 until decommissioning (2030-2034) | NOx | 1100 | 750 | AlternativelimitrequestuntildecommissioningisdeclinedbecauseasthefacilitydoesnotcomplycomplyormeettherequirementofGN1207 of1207 of2018 (12A)(a)and(12A)(b).Therequirementtocomplywiththeminimumemissionstandardsfornewplantplantasstatedinthe2015postponementdecisionwithalimitof |
| | | | | | 1100mg/Nm ³ from 1 |
| | | | | | April 2020 to 31 March 2025 thus remains in place. |

The NAQO, in its decision, imposed on Eskom the following further conditions, set out in the decision dated 30 October 2021:

- "This decision will have to be reflected in your Atmospheric Emission Licence (AEL) to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.
- In addition, you are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Duvha Power Station.
- You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.
- Eskom Duvha Power Station's requirement to implement an offset programme to reduce PM pollution in the ambient/receiving environment as your facility is located in the Highveld Priority Area remains in place."

Eskom approached the Minister to appeal the decision of the NAQO.

9.2.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review their 2022 ERP to address emission reductions in the Eskom Fleet.

9.2.2. Section 59 Exemption Application

9.2.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Duvha Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)

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- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld Priority Area)
- Appendix D: Station Specific Atmospheric Impact Report Duvha Station

9.2.2.2. Eskom's application with regards to the Duvha Station

- Eskom is requesting an exemption from the new plant MES for PM at Duvha (U4 and U6) until completion of the abatement projects.
- Eskom is requesting an exemption from the new plant MES for NO_x at Duvha until its assumed shutdown.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Duvha until its assumed shutdown. In this regard, a limit of 2600 mg/Nm³ is proposed until shutdown.

| POINT | | M | DURATION OF | | | | |
|--|-----------------|--------------------------|----------------|----------------------|------------|--|--|
| SOURCE CODE | POLLUTANT | mg/Nm ³ | Average Period | Date To Be Achieved | EMISSIONS | | |
| U1, U2, U4, | SO ₂ | 2,600 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | |
| Ú5, Ú6 | NOx | 1,100 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | |
| U1, U2, U5 | PM | 50 mg/Nm ³ | Daily | Immediate | Continuous | | |
| | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | |
| 04, 06 | PIVI | 50 mg/Nm ³ | Daily | 1 October 2026 | Continuous | | |
| *Emission limits requested are for normal operations, so exclude upset, startup, shutdown, or maintenance conditions | | | | | | | |

Table 7-1 – Emission limits requested for Duvha

Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.2.2.3. What is Eskom intending to do at Duvha to meet the standards for which it is applying?

Duvha is planned for shutdown from 2031 to 2036.

Particulate Matter

Table 4-1 – Status of particulate matter abatement projects

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion |
|---------------------|--------------------|--------------|----------------|---------------------------------|
| Duvha U1, U2 | | Not required | None | N/A |
| Duvha U4, U5, U6 | | U5 HFPS | U4 and U6 HFPS | 1 April 2026 (U4, U6) |

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- The ESP and Fabric Filter Plants (FFP) at Duvha control PM emissions. To further improve PM performance, the station has installed HFPSs on Unit 5 and will complete installation on the ESP Unit 4 and Unit 6 by March 2026.
- Duvha U1 and U2 have no PM projects planned as these stations have PJFF and comply with the new plant MES.
- Regarding Duvha U4, U5 and U6, compliance with the new plant MES can only be achieved once the abatement projects are complete.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- In the Highveld and Vaal Triangle, key interventions include the distribution of hybrid stoves, ceilings, electrical rewiring and LPG heaters to households, as well as cleanup campaigns to remove illegally dumped waste. Preliminary results show significant reductions in PM₁₀ and PM_{2.5} concentrations and improvements in indoor air quality in participating households.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.

NO_X and SO₂

- Neither NO_x nor SO₂ emissions are controlled directly at the power station.
- Given the assumed shutdown phases of Duvha, NO_x abatement technologies at this station are not planned as the station would be shutting down at the same time as the NO_x upgrades were underway.
- SO₂ emissions are not controlled directly at the power station. SO₂ abatement was not evaluated as part of Eskom's application.
- Exemption from the new plant MES for SO₂ is requested until shutdown.

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion | | | |
|--|-------------------------|--------------|---------|------------------------------|--|--|--|
| Duvha | | None | None | N/A | | | |
| Matla | | None | None | N/A | | | |
| Kendal | | Not Required | None | N/A | | | |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 | | | |
| Majuba | ERP 2024 B; | None | LNB | 1 April 2030 | | | |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 | | | |
| Kusile | | LNB | None | N/A | | | |
| Matimba | | Not Required | None | N/A | | | |
| Medupi | | LNB | None | N/A | | | |
| *Includes required optimisation periods of new equipment | | | | | | | |

Table 4-2 – Status of NOx abatement projects

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| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion | |
|--|-----------------|----------|---------|---------------------------|-----------------------------------|---------------------------------|--|
| Duvha | - | - | - | - | - | N/A | |
| Matla | - | - | - | - | - | N/A | |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A | |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 | |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 | |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 | |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | |
| Considered an alternative and is being evaluated as part of this application | | | | | | | |

Table 4-3 – Status of SO₂ abatement projects

¹Considered an alternative and is being evaluated as part of this application ²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

9.2.3. HNM's View on Whether or not the Exemption Application Meets the Legal Criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Duvha Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Duvha. The requirement that the applications must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application, for all of the stations applied for, including Duvha, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Duvha's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Duvha and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Duvha. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Duvha, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

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In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its application for Duvha, notification of the exemption applications, as well as an opportunity to comment on the application process, was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| Table 8-3 - Placement of Adverts | | | | |
|-----------------------------------|---------------------------|--|--|--|
| NEWSPAPER NAME | DATE OF PUBLICATION | | | |
| City Press (Regional Newspaper) | Sunday 3 November 2024 | | | |
| Sunday Times (National Newspaper) | Sunday 3 November 2024 | | | |
| Beeld (National Newspaper) | Sunday 3 November 2024 | | | |
| Star (National Newspaper) | Sunday 3 November 2024 | | | |
| Mpumalanga News | Wednesday 6 November 2024 | | | |
| Standerton Advertiser | Thursday 1 November 2024 | | | |
| Mpumalanga Lowvelder | Thursday 1 November 2024 | | | |
| Ridge Times | Thursday 1 November 2024 | | | |
| Witbank News | Thursday 1 November 2024 | | | |
| Middelburg Observer | Thursday 1 November 2024 | | | |

In view of the above, it is HNM's view that Eskom's exemption application for Duvha meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Duvha and the potential conditions that may apply.

9.2.4. **Recommendation**

In respect of its Duvha Power Station, Eskom is to be granted exemptions, as per the table below, until the recommended shut down date of **21 February 2034** (as per Eskom's Annex 10 Eskom IRP information, dated January 2023). The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES Recommendation mg/Nm ³ mg/Nm ³ | | Recommended Averaging Period | Recommended Date to Be Achieved |
|-------------------------------------|--|------|---------------------------------|---------------------------------------|
| SO ₂ (U1, U2, U4- U6) | 1000 | 2600 | Daily | Immediate |
| NO _x (U1, U2, U4- U6) | 750 | 1100 | Daily | Immediate |
| PM (U4, U6) | 50 | 100 | Daily | Immediate |
| PM (U4, U6) | 50 | 50 | Daily | 01-Oct-26 |

9.3. ESKOM'S KENDAL POWER PLANT ("KENDAL")

9.3.1. Summary of Application

9.3.1.1. Background: Postponement Application (2019)

On page 6 of Eskom's motivation, which accompanied its postponement application, Eskom summarises its application as follows:

- "Postponement of the new plant MES for PM and an alternative daily limit of 100 mg/Nm³ between 1 April 2020 to 31 March 2025 and an alternative daily limit of 85 mg/Nm³ for PM from 1 April 2025 until decommissioning (2039 - 2044);
- Postponement of the new plant MES for SO₂ and an alternative daily limit for SO₂ of 3000 mg/Nm³ from 1 April 2025 until decommissioning (2039 - 2044);
- A postponement of the new plant MES for NO_x and an alternate limit daily limit of 1100 mg/Nm³. from 1 April 2025 Eskom requests a monthly limit of 750 mg/Nm³ until decommissioning (2039-2044).

It is requested that the proposed limits only apply during normal working conditions, and not during start-up or shut-down, upset conditions and maintenance periods. ^{"64}

| | Current Limit (from AEL) | | | Requested Emission Limits*** | | |
|--------------------|-----------------------------|---------------------|---------------------------|------------------------------|---------------------|---------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| Particulate matter | 100 | 24 hours | 1 April 2015 | 100 | Daily | 1 April 2020 |
| | 50 | | 1 April 2020 | 85 | Daily | 1 April 2025 |
| Sulphur Dioxide | 3500 | 24 hours | 1 April 2015 | 3500 | Daily | 1 April 2020 |
| | 2600 | | 1 April 2020 - |] | | |
| | | | 31 March | 3000 | Monthly | 1 April 2025 |
| | | | 2025 | | | |
| | 500 | | 1 April 2025 | | | |
| Nitrogen Oxide | 1100 | 24 hours | 1 April 2015 | 1100 | Daily | 1 April 2020 |
| | 750 | | 1 April 2020 | 1 | | |
| | | | | 750 | Monthly | 1 April 2025 |

***The requested interim emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O2.

In paragraph 5 of its motivation, Eskom sets out its reasons for applying for a postponement in respect of its Kendal Power Station. In this regard, it is stated that:

"As mentioned above, the application for postponement and alternate limits must be accompanied by reasons. Such reasons are set out below and include the fact that emissions from Kendal will generally not result in non-compliance with National Ambient Air Quality Standards (NAAQS), the decommissioning of Kendal will occur between 2039 and 2044 (according to the 50-year life plan); together with a suite of undesired environmental consequences of compliance with the MES including associated water demands, transport impacts and increases in waste and carbon dioxide (CO2) production. These undesired consequences together with the financial costs of compliance (such as an increase in the electricity tariff) must be weighed up against the benefits that will accrue as a result of compliance with the MES. It is Eskom's view that the benefit of compliance does not justify the non-financial and financial costs of compliance. (see section below for the details of the cost-benefit analysis completed). None of these reasons should be seen as exclusive (i.e. it is not one reason alone that prevents compliance) but rather all in combination. Before presenting these various reasons, the reader is referred to Annexure A the AIR, Annexure B the Summary Atmospheric Impact Report and Annexure C the CBA."

⁶⁴ "Current limit" refers to current as at the time of the postponement application.
The motivation then addresses several aspects of the above, in more detail, under the following headings:

- a) Remaining Power Station Life and Project Development timelines
- b) Water Availability
- c) Environmental Implications of FGD
- d) Impact on Ambient Air Quality
- e) Cost Implications of Compliance with the MES
- f) Project Delays

9.3.1.2. The NAQO's decision in respect of Eskom's application for its Kendal Power Plant

Below is a summary of what Eskom applied for in 2019 and the NAQO's decision in respect thereof:

| S 21 Category | Appliance | Postponement Sought | Emission Standards | | | | |
|--|-----------|--|----------------------|-------------------------------|------|---|--|
| | | | Minimum Standards | Minimum Emission Standards | | Decision | |
| | | | Pollutant | 2015 | 2020 | | |
| Subcategory 1.1: Solid Fuel Combustion Installation | 6 Units | 100mg/Nm ³ from 1 April 2020 until 31 March 2025 85 mg/Nm ³ from 1 April 2025 till decommissioning (2039-2044) | PM | 100 | 50 | Alternative limit request until decommissioning is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A(a) and 12A(c)(i)). Postponement until 31 March 2025 is declined because the facility did not demonstrate the intention to comply with the new plant | |

| | | | | | standard of |
|--|-------------------------|-----------------|------|------|-----------------------------|
| | | | | 1000 | 50mg/Nm ³ |
| | 3000 mg/Nm ³ | SO ₂ | 3500 | 1000 | Alternative limit |
| | from 1 April 2025 | | | | request until |
| | UNTII | | | | decommissioning |
| | | | | | facility doos not |
| | (2039-2044) | | | | comply or meet the |
| | | | | | requirement of GN |
| | | | | | 1207 of 2018. |
| | | | | | (12A)(a), (12A) |
| | | | | | (c)(i). |
| | | | | | |
| | | | | | Postponement of |
| | | | | | compliance |
| | | | | | timeframe of 3000 |
| | | | | | mg/Nm ³ |
| | | | | | (monthly) is |
| | | | | | declined as the |
| | | | | | comply or meet the |
| | | | | | requirement of GN |
| | | | | | 1207 of 2018. |
| | | | | | (11A) and |
| | | | | | (12A)(b). The |
| | | | | | requirement to |
| | | | | | comply with the |
| | | | | | minimum emission |
| | | | | | standards for new |
| | | | | | plant as stated in |
| | | | | | the 2015 |
| | | | | | postponement |
| | | | | | limit of |
| | | | | | 2600mg/Nm ³ from |
| | | | | | 1 April 2020 to 31 |
| | | | | | March 2025 thus |
| | | | | | remains in place. |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | 1100 mg/Nm ³ | NOx | 1100 | 750 | Alternative limit |
| | alternative day | | | | request until |
| | limit | | | | aecommissioning |

| 750 mg/Nm ³ (monthly) from 1 April 2025 till decommissioning (2039-2044) | is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a). Postponement of compliance with the minimum emission standards for new plant is granted with a limit of |
|--|---|
| | plant is granted with a limit of 1100mg/Nm ³ from 1 April 2020 to 31 March 2025. |

The NAQO's decision, summarised above, was subject to the following further conditions, set out in its decision dated 30 October 2021:

- a) "This decision will have to be reflected in your AEL to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.
- b) You are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Eskom Kendal Power Station.
- c) You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.
- d) Eskom Kendal Power Station's requirement to implement an offset programme to reduce Particulate Matter (PM) pollution in the ambient/receiving environment as your facility is located in the Highveld Priority Area remains in place.
- *e)* The decision may be reviewed by the NAQO with the concurrence of AELA should ambient air quality conditions in the affected area of the plant not conform to ambient air quality standards."

Eskom approached the Minister to appeal the decision of the NAQO.

9.3.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.3.2. Section 59 Exemption Application

9.3.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Kendal Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld Priority Area)
- Appendix D: Station Specific Atmospheric Impact Report Kendal Station

9.3.2.2. Eskom's application with regards to the Kendal Station

- Eskom is requesting an exemption from the new plant MES for PM at Kendal until completion of the abatement projects, after which this station will comply with the new plant MES.
- Kendal is currently compliant with the new plant MES for NO_x.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Kendal until its assumed shutdown.
- Semi-dry FGD is evaluated in the exemption application. This would allow for compliance with the SO₂ MES by 1 April 2036.

| POINT | | M | DURATION OF | | | |
|----------------|----------------------|--------------------------|--------------------|-------------------------------|----------------|--|
| SOURCE CODE | POLLUTANT | mg/Nm³ | Average Period | Date To Be Achieved | EMISSIONS | |
| | 80. | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | |
| U1, U2, U3, | 502 | 1,000 mg/Nm ³ | Daily | 1 April 2036** | Continuous | |
| U4, U5, U6 | NOx | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | |
| | | 750 mg/Nm ³ | Daily | 1 April 2025 | Continuous | |
| 112 114 116 | РМ | 100 mg/Nm ³ | Daily | Immediate | Continuous | |
| 03, 04, 08 | | 50 mg/Nm ³ | Daily | 1 October 2025 | Continuous | |
| 114 112 115 | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | |
| 01, 02, 05 | PIVI | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous | |
| *Emission limi | ts requested are for | normal operations, so | exclude upset, sta | artup, shutdown, or maintenar | nce conditions | |

Table 7-6 - Emission limits requested for Kendal

**Should semi-dry FGD be installed

9.3.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Kendal Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Kendal. The requirement that the application must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Kendal, is comprised of a fleet-wide application and station-specific applications which together run to over 500 pages with annexures. Eskom's fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Kendal's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Kendal and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES as applied for. In HNM's view, these two documents read together contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Kendal. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Kendal, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Kendal, notification of the exemption applications as well as an opportunity to comment on the application process was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| LOCATION | DATE OF PUBLICATION |
|-----------------------|---------------------|
| Mpumalanga News | 6 November 2024 |
| Standerton Advertiser | 1 November 2024 |
| Mpumalanga Lowvelder | 1 November 2024 |
| Ridge Times | 1 November 2024 |
| Witbank News | 1 November 2024 |
| Middelburg Observer | 1 November 2024 |
| City Press | 3 November 2024 |
| The Star | 3 November 2024 |
| Die Beeld | 3 November 2024 |
| Sunday Times | 3 November 2024 |
| Daily Sun | 6 November 2024 |

Table 8-3 - Placement of Adverts

In view of the above, it is HNM's view that Eskom's exemption application for Kendal meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Kendal and the potential conditions that may apply.

9.3.4. **Recommendation**

In respect of its Kendal Power Station, it should be noted that given the uncertainty of the power sector transition, it is recommended that no exemption is granted for a period longer than ten years. As such, it is recommended that the exemption granted to Kendal expires on 1 April 2035.

The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm ³ | Recommendation mg/Nm ³ | Recommended Averaging Period | Recommended Date to Be Achieved | | |
|-----------------------------------|-------------------------------------|-----------------------------------|------------------------------------|---------------------------------------|--|--|
| SO ₂ (U1-U6) | 1000 | 3000 | Daily | Immediate | | |
| PM (U3, U4, U6) | 50 | 100 | Daily | Immediate | | |
| PM (U3, U4, U6) | 50 | 50 | Daily | 01-Oct-25 | | |
| PM (U1, U2, U5) | 50 | 100 | Daily | Immediate | | |
| PM (U1, U2, U5) | 50 | 50 | Daily | 01-Apr-26 | | |

9.4. ESKOM'S LETHABO POWER PLANT ("LETHABO")

9.4.1. Summary of Application

9.4.1.1. Background: Postponement Application (2019)

On page 4 of Eskom's motivation, which accompanied its postponement application, Eskom states as follows:

"Lethabo already achieves the 'existing plant' MES of 100 mg/Nm3 Particulate Matter (PM), 1100 mg/Nm3 for Nitrogen oxides (NO_x) and 3500 mg/Nm3 for Sulphur dioxide (SOx) emissions. However, the Power Station will not be able to comply with the "new plant" MES of 50 mg/Nm3 until the planned SO₃ plant upgrade and High Frequency Power Supply (HFPS) installation is completed by 2025 and as such a postponement of the new plant standard until 2025 is requested. The technology choice for Lethabo does however not guarantee compliance to the new plant limit and as such an alternate limit of 80 mg/Nm3 until station decommissioning is requested. The station cannot comply with the new plant limit of NO_x limit of 750 mg/Nm3 and an alternative limit of 1100 mg/Nm3 is being requested. Similarly, the station is unable to comply with the new plant limit of 1000 mg/Nm3 for SO₂ and an alternate limit of 2600 mg/Nm3 is being requested."

A summary of the indulgence sought by Eskom is recorded on page 6 of its motivation as follows:

"In summary the postponement requested for Lethabo is: A postponement of the PM new plant MES until 2025 (when the planned retrofits are complete) with an alternative daily limit of 100 mg/Nm3 until then and thereafter an alternate daily limit of 80 mg/Nm3. For SO₂ a postponement of the new plant standard is requested until 2025 with an alternative limit of 3500 mg/Nm3 and thereafter an alternate daily limit of 2600 mg/Nm3 is requested until decommissioning in 2040. For NO_x postponement of the new plant standard until 2025 is requested and thereafter an alternative daily limit of 1100 mg/Nm3 is requested until station decommissioning.

Based on the remaining life of the Lethabo power station, the techno-economics and cost benefit assessment any additional measures other than what was committed to above and the emission limits requested is not considered a socio-economic benefit and will not result in increased health impact. It is requested that the proposed alternative emission limits only apply during normal working conditions, and not start-up or shut-down, upset conditions and maintenance periods." (sic)

Eskom's request is also set out in table 1 on page 6 of its motivation, which shows the applicable limits contained in the Lethabo Power Plant's AEL, as well as the requested emission limits⁶⁵:

| | Current Limit (from AEL) | | | Requested Emission Limits*** | | | |
|--------------------|-----------------------------|---------------------|---------------------------|------------------------------|---------------------|------------------------------|--|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by | |
| Particulate | 100 | Monthly | 1 April 2015 | 100 | Daily | 1 April 2020 | |
| Matter | 100 | Daily | 1 January 2016 | 00 | Deile | 1 April 2025 | |
| | 50 | Daily | 1 April 2020 | 80 | Daily | T April 2025 | |
| Sulphur dioxide | 3500 | Daily | 1 April 2015 | 3500 2600 | Daily Daily | 1 April 2020 1 April 2025 | |
| | 2500 | | 1 April 2020 | | | | |
| Nitrogen oxides | 1100 | Daily | 1 April 2015 | 1100 1100 | Daily Daily | 1 April 2020 1 April 2025 | |
| | 1100 | Daily | 1 April 2020 | | | | |

The requested interim emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O2.

⁶⁵ "Current limit" refers to current as at the time of postponement application

In paragraph 5 of Eskom's motivation, it sets out its reasons for applying for a postponement.

The following reasons are listed, and each is then elaborated on in its motivation:

(i) Remaining Power Station Life

- (ii) Water Availability
- (iii) Environmental Implications of FGD
- (iv) Impact on Ambient Air Quality
- (v) Cost implications of compliance with MES
- (vi) Project Delays

9.4.1.2. The NAQO's decision in respect of Eskom's application for its Lethabo Power Plant

Below is a summary of what Eskom applied for in 2020 and the NAQO's decision in respect thereof:

| S21 Category | Applia nce | Postponement period sought | Emission Standards | | | |
|--|---------------|---|---|------|----------|--|
| | | | Minimum Emission Standards (mg/Nm ³) | | Decision | |
| | | | Pollut- ant | 2015 | 2020 | |
| Subcategory 1.1: Solid Fuel Combustion Installations | 6 Units | 100mg/Nm ³ (monthly) from 1 April 2020 80mg/Nm ³ (monthly) from 1 April 2025 | РМ | 100 | 50 | Alternative limit request until decommissioning is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, |

| | 3500mg/Nm ³ | SO ₂ | 3500 | 1000 | (12A)(c)(i). Postponement from 1 April 2020 to 31 March 2025 declined because the facility did not demonstrate the intention to comply with the new plant standard of 50 mg/Nm ³ . |
|--|---|-----------------|------|------|--|
| | (monthly) from 1 April 2020 and 2600mg/Nm ³ (monthly) from 1 April 2025 to decommissioning by 2040 | | | | rnative limit request until decommissioning declined because the facility does not comply or meet the requirement of GN 1207 of 2018 (11A), (12A)(a) and (12A)(b). The requirement to comply with the minimum emission standards for new plant as stated in |

| | | the 2015 |
|--|--|-----------------------------|
| | | postponement |
| | | decision with a |
| | | limit of |
| | | 2500mg/Nm ³ from |
| | | 1 April 2020 to 31 |
| | | March 2025 thus |
| | | remains in place. |
| | | |

| | | | 1 April 2020 to 31 |
|--|--|--|--------------------|
| | | | March 2025 thus |
| | | | remains in place. |
| | | | |

The NAQO's decision, summarised above, was subject to the following further conditions, set out in the decision dated 30 October 2021:

a) "This decision will have to be reflected in your AEL to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.

b) You are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Eskom Lethabo Power Station.

c) You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.

d) Eskom Lethabo Power Station's requirement to implement an offset programme to reduce Particular Matter (PM) pollution in the ambient/receiving environment as the facility is located in the VTAPA Priority Area remains in place.

e) The decision may be reviewed by the NAQO with the concurrence of AELA should ambient air quality conditions in the affected area of the plant not conform to ambient air quality standards."

Eskom approached the Minister to appeal the decision of the NAQO.

9.4.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

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As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.4.2. Section 59 Exemption Application

9.4.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Lethabo Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld Priority Area)
- Appendix D: Station Specific Atmospheric Impact Report Lethabo Station

9.4.2.2. Eskom's application with regards to the Lethabo Power Station

- Eskom is requesting an exemption from the new plant MES for PM at Lethabo (U1, U2, U3, U4, and U5) until completion of the abatement projects, after which this station will comply with the new plant MES.
- Eskom is requesting an exemption from the new plant MES for NO_x at Lethabo until completion of the LNB installations.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Lethabo until its assumed shutdown.

| POINT | | MA | | | | | | | | |
|---------------------------|--|---|-------|----------------------|------------|--|--|--|--|--|
| SOURCE CODE | POLLUTANT | mg/Nm ³ Average Period Date To Be Achieved | | Date To Be Achieved | EMISSIONS | | | | | |
| | SO ₂ | 2,600 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | | | | |
| U1, U2, U3, U4, U5, U6 | NOv | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | | | | | |
| | NOX | 750 mg/Nm ³ | Daily | 1 April 2031 | Continuous | | | | | |
| 110 | 100 mg/Nm ³ | | Daily | Immediate | Continuous | | | | | |
| 06 | РМ | 50 mg/Nm ³ | Daily | 1 April 2025 | Continuous | | | | | |
| 112 112 | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | | | | |
| 02, 03 | PM | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous | | | | | |
| 115 | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | | | | |
| 05 | РМ | 50 mg/Nm ³ | Daily | 1 October 2026 | Continuous | | | | | |
| | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | | | | |
| 04 | PIVI | 50 mg/Nm ³ | Daily | 1 April 2027 | Continuous | | | | | |
| | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | | | | |
| U1 | РМ | 50 mg/Nm ³ | Daily | 1 October 2027 | Continuous | | | | | |
| *Emission lin | *Emission limits requested are for normal operations, so excludes upset, startup, shutdown, or maintenance conditions. | | | | | | | | | |

Table 7-4 - Emission limits requested for Lethabo

| STATION | GENERATING | MA | DURATION OF | | | | |
|--|------------|----------------------------|-------------|----------------------|------------|--|--|
| STATION | UNIT | mg/Nm ³ Average | | Date To Be Achieved | EMISSIONS | | |
| DUVHA | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| MATLA | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| LETHABO | All Units | 2,600 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| TUTUKA | All Units | 3,000 mg/Nm ³ | Daily | Immediate - Shutdown | Continuous | | |
| MATIMBA | All Units | 3,500 mg/Nm ³ | Monthly | Immediate - Shutdown | Continuous | | |
| KENDAL | All Units | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | | |
| KENDAL | | 1,000 mg/Nm ³ | Daily | 1 April 2036** | Continuous | | |
| | All Unito | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | | |
| MAJUBA | All Units | 2,100 mg/Nm ³ | Daily | 1 April 2034** | Continuous | | |
| MEDURI | All Linita | 3,500 mg/Nm ³ | Monthly | Immediate | Continuous | | |
| MEDUFI | All Units | 800 mg/Nm ³ | Monthly | 1 April 2032 | Continuous | | |
| *Emission limits requested are for normal operations, so excludes upset, startup, shutdown, or maintenance conditions. **Should semi-dry FGD be installed at Kendal, and DSI FGD at Majuba. | | | | | | | |

Table 0-3 – Sulphur dioxide requested emission limits and timeframes

Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.4.2.3. What is Eskom intending to do at Lethabo to meet the standards for which it is applying?

Decommissioning of Lethabo is planned from 2037 to 2042.

PM

| | | Complete | Planned | |
|---------|--|---|--|--|
| Lethabo | ERP 2024 A; ERP 2024 B; ERP 2024 C | ESP upgrade U6; HFPS on all units; SO₃ plant upgrades on U1, U4, U6 | ESP upgrade U1, U2, U3, U4, U5; SO ₃ plant upgrades U2, U3, U5 | 1 April 2026 (U2, U3) 1 October 2026 (U5) 1 April 2027 (U4) 1 October 2027 (U1) |

- PM emissions are currently controlled by operating and maintaining ESP and SO₃ Injection Plants.
- The ESP upgrade to U6 is complete, as are SO₃ plant upgrades on U1, U4 and U6.
- The ESP upgrades for U1-U5 are planned, as are SO₃ plant upgrades on U2, U3, and U5.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.

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- In the Highveld and Vaal Triangle, key interventions include the distribution of hybrid stoves, ceilings, electrical rewiring and LPG heaters to households, as well as cleanup campaigns to remove illegally dumped waste. Preliminary results show significant reductions in PM₁₀ and PM_{2.5} concentrations and improvements in indoor air quality in participating households.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.

NO_X AND SO₂

- The installation of LNBs is planned from 2027 to be completed by April 2031.
- SO₂ emissions are not controlled directly at the power station.
- Eskom's position is that installation of SO₂ technologies at Lethabo are not economically feasible and are at high risk of not even being technically feasible for implementation.
- Exemption from the new plant MES for SO₂ is requested until shutdown.
- Semi dry FGD is listed under the exemption request. In this regard, Eskom states, "while technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced."

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion | | |
|--|-------------------------|--------------|---------|------------------------------|--|--|
| Duvha | | None | None | N/A | | |
| Matla | | None | None | N/A | | |
| Kendal | | Not Required | None | N/A | | |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 | | |
| Majuba | ERP 2024 B; | None | LNB | 1 April 2030 | | |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 | | |
| Kusile | | LNB | None | N/A | | |
| Matimba | | Not Required | None | N/A | | |
| Medupi | | LNB | None | N/A | | |
| *Includes required optimisation periods of new equipment | | | | | | |

Table 4-2 – Status of NOx abatement projects

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion | | | |
|------------------------|--|----------|---------|---------------------------|-----------------------------------|---------------------------------|--|--|--|
| Duvha | - | - | - | - | - | N/A | | | |
| Matla | - | - | - | - | - | N/A | | | |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A | | | |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 | | | |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 | | | |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 | | | |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | | | |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | | | |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A | | | |
| ¹ Considere | Considered an alternative and is being evaluated as part of this application | | | | | | | | |

Table 4-3 – Status of SO₂ abatement projects

¹Considered an alternative and is being evaluated as part of this application ²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

9.4.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Lethabo Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Lethabo. The requirement that the application must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Lethabo, is comprised of a fleet-wide application and station-specific applications which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Lethabo's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Lethabo and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES as applied for. In HNM's view, these two documents read together contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Lethabo. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Lethabo, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

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In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Lethabo, notification of the exemption applications as well as an opportunity to comment on the application process was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| LOCATION | DATE OF PUBLICATION |
|-----------------------------------|--------------------------|
| City Press (Regional Newspaper) | Sunday 3 November 2024 |
| Sunday Times (National Newspaper) | Sunday 3 November 2024 |
| Beeld (National Newspaper) | Sunday 3 November 2024 |
| Star (National Newspaper) | Sunday 3 November 2024 |
| Daily Sun (National Newspaper) | 6 November 2024 |
| Vaal Weekblad (Local Newspaper) | Thursday 31 October 2024 |

Table 8-3 - Placement of Adverts

In view of the above, it is HNM's view that Eskom's exemption application for Lethabo meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Lethabo and the potential conditions that may apply.

9.4.4. **Recommendation**

In respect of its Lethabo Power Station, it should be noted that given the uncertainty of the power sector transition, it is recommended that no exemption is granted for a period longer than ten years. As such, it is recommended that the exemption granted to Lethabo expires on 1 April 2035.

The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm ³ | Recommendation mg/Nm ³ | Recommended Averaging Period | Recommended Date to Be Achieved |
|--------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------------|
| SO ₂ (U1 – U6) | 1000 | 2600 | Daily | Immediate |
| NO _x (U1 – U6) | 750 | 1100 | Daily | Immediate |
| NO _x (U1 – U6) | 750 | 750 | Daily | 01-Apr-31 |
| PM (U2, U3) | 50 | 100 | Daily | Immediate |
| PM (U2, U3) | 50 | 50 | Daily | 01-Apr-26 |
| PM (U5) | 50 | 100 | Daily | Immediate |
| PM (U5) | 50 | 50 | Daily | 01-Oct-26 |
| PM (U4) | 50 | 100 | Daily | Immediate |
| PM (U4) | 50 | 50 | Daily | 01-Apr-27 |
| PM (U1) | 50 | 100 | Daily | Immediate |
| PM (U1) | 50 | 50 | Daily | 01-Oct-27 |

9.5. ESKOM'S MATLA POWER PLANT ("MATLA")

9.5.1. Summary of Application

9.5.1.1. Background: Postponement Application (2019)

On page 7 of Eskom's motivation, Eskom states:

"In summary the postponements and alternative limits requested for Matla are:

- 1. Unit 1-4 Postponement of the new plant PM MES between 1 April 2020 to 31 March 2025 and an alternative daily limit of 200 mg/Nm3 from 2020 until March 2021 (when ESP upgrades complete). An alternative limit of 100mg/Nm3 from April 2021 to March 2025. An alternative limit of 80 mg/Nm3 from April 2025 onwards.
- 2. Unit 5 & 6 Postponement of PM new plant MES and an alternative limit of 100 mg/Nm3 from 2020 to March 2025. An alternative limit of 80 mg/Nm3 from 2025 onwards.
- *3.* Postponement of the new plant SO₂ standard and an alternative daily limit for SO₂ of 2600 mg/Nm3 from 1 April 2025 onwards.
- Postponement of NO_x new plant MES and an alternative daily limit of 1200 mg/Nm3 from 1 April 2025 until March 2027 (retrofit complete). Compliance of the standard at 750 mg/Nm3 from 1 April 2027 onwards.

Based on the remaining life of the Matla power station, the techno-economics and cost benefits assessment shows that any additional measures other than what was committed to above is not financially viable.

It is requested that the proposed alternative limits only apply during normal working conditions, and not during start-up or shut-down, upset conditions and maintenance periods."

This is also set out in table 2 on page 6 of Eskom's motivation for its application, which shows the applicable limits contained in Matla's AEL as well as the requested emission limits:

| | Current Limit (from AEL) | | Requested Emission Limits* | | | |
|--------------------|-----------------------------|---------------------|-------------------------------------|----------------------|---------------------|---------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| | 200 (Units 1-4) | Daily | 1 April 2015 – 1 March 2020 | 200** (Units 1-4) | Daily | 1 April 2020 |
| | 50 | Daily | 1 April 2020 | 100 (Units 1-4) | Daily | 1 April 2021 |
| Particulate Matter | 50 | Daily | | 80 (Units 1-4) | Daily | 1 April 2025 |
| | 100 (Units 5 &6) | Daily | 1 April 2015 to 31 March 2020 | 100 (Units 5 & 6) | Daily | 1 April 2020 |
| | 50 | Daily | 1 April 2020 | 80 (Units 5 & 6) | Daily | 1 April 2025 |
| | 3500 | Daily | 1 April 2015 | | | |
| Sulphur dioxide | 2600 | Daily | 1 April 2020 – 31 March 2025 | 3500 | Daily | 1 April 2020 |
| | 500 | Daily | 1 April 2025 | 2600 | Daily | 1 April 2025 |
| Nitrogen oxides | 1200 | Daily | 1 April 2015 – 31 March 2020 | 1200 | Daily | 1 April 2020 |
| | 750 | Daily | 1 April 2020 | 750 | Daily | 1 April 2027 |

In paragraph 5 of Eskom's motivation, it sets out the reasons for applying for a postponement. In this regard, it is stated that, "such reasons are set out below and include the fact that emissions from Matla will not result in non-compliance with National Ambient Air Quality Standards (NAAQS), together with a suite of undesired environmental consequences of compliance with the MES including associated water demands, transport impacts and increases in waste and carbon dioxide (CO2) production. These undesired consequences together with the financial costs of compliance (such as an increase in the electricity tariff) must be weighed up against the benefits that will accrue as a result of compliance with the MES, It is Eskom's view that the benefit of compliance does not justify the non-financial and financial costs of compliance (see section 5.5. below for the details of the cost implication of MES compliance)."

9.5.1.2. The NAQO's decision in respect of Eskom's application for its Matla Power Plant

Below is a summary of what Eskom applied for in 2019 and the NAQO's decision taken in respect thereof:

| S 21 Category | Appliance | Postponement sought | Emission Standards | | | |
|--|-----------|--|-------------------------------|--------------------|------|---|
| | | | Minimum Emission Standards | | | Decision |
| | | | Pollu tant | <mark>201</mark> 5 | 2020 | |
| Subcategory 1.1: Solid Fuel Combustion Installation | Units 1-4 | 200mg/Nm ³ from 1 April 2020 100 mg/Nm ³ from 1 April 2021 80 mg/Nm ³ from 1 April 2025 until decommissioning | РМ | 100 | 50 | Alternative limit request until decommissioning is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a) and (12A)(c)(i)). |
| | Units 5-6 | 100 mg/Nm ³ from 1 April 2020 80 mg/Nm ³ from 1 April 2025 | | | | 1 April 2020 to 31 March 2025 is declined because the facility did not demonstrate the intention to comply with the new plant standard of 50 mg/Nm ³ . |
| | 6 Units | 3500 mg/Nm ³ from 1 April 2020 | SO ₂ | 3500 | 1000 | Postponement/ alternative limit request until |

| | 2600 mg/Nm ³ from 1 April 2025 until decommissioning by 2034 | | | | decommissioning declined because the facility do not comply or meet the requirement of GN1207 of 2018 (11A), (12A)(a) and (12A)(b). The requirement to comply with the minimum emission standards for new plant as stated in the 2015 postponement decision with a limit of 2600 mg/Nm³ from 1 April 2020 to 31 March 2025 thus remains in place. |
|---------|---|-----|------|-----|---|
| 6 Units | 1200 mg/Nm ³ from 1 April 2020 750 mg/Nm ³ from 1 April 2027 | NOx | 1100 | 750 | Alternative limit request declined because the facility does not comply or meet the requirement of GN 1207 of 2018 (12A)(a) and (12A)(b). Postponement request until 31 March 2025 declined because the facility does not show the intention to comply with the new plant standards of 750 mg/Nm ³ . |

The NAQO's decision, summarised above, was subject to the following further conditions, as set out in its decision dated 30 October 2021:

1. "The decision will have to be reflected in Eskom's AEL to be of force and effect. Therefore, Eskom must liaise with the relevant AELA as soon as possible so that the required amendments, variations and additions to its AEL can be effected.

- 2. Eskom is required to submit a quarterly progress report on the implementation of its compliance road map and the commitments that it made in support of its postponement application for its Matla Power Station.
- 3. Eskom is also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the DFFE's financial year.
- 4. Eskom's Matla Power Station's requirement to implement an offset programme to reduce PM pollution in the ambient/receiving environment, as the facility is located in the HPA, remains in place.
- 5. The decision may be reviewed by the NAQO with the concurrence of the AELA should AAQ conditions in the affected area of the plant not conform to AAQS."

Eskom approached the Minister to appeal the decision of the NAQO.

9.5.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.5.2. Section 59 Exemption Application

9.5.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Matla Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld Priority Area)
- Appendix D: Station Specific Atmospheric Impact Report Matla Station

9.5.2.2. Eskom's application with regards to Matla

- Eskom is requesting an exemption from the new plant MES for PM at Matla (U4, U5, and U6) until completion of the abatement projects, after which this station will comply with the new plant MES. U1, U2 and U3 should be compliant from 1 April 2025.
- Eskom is requesting an exemption from the new plant MES for NO_x at Matla until its assumed shutdown.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Matla until its assumed shutdown.

| POINT | | M | DURATION OF | | | | |
|---|-----------------|--------------------------|----------------|----------------------|------------|--|--|
| SOURCE CODE | POLLUTANT | mg/Nm ³ | Average Period | Date To Be Achieved | EMISSIONS | | |
| U1, U2, U3, | SO ₂ | 2,600 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | |
| U4, U5, U6 | NOx | 1,100 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | |
| | | 100 mg/Nm ³ | Daily | Immediate | Continuous | | |
| 01, 02, 03 | PIVI | 50 mg/Nm ³ | Daily | 1 April 2025 | Continuous | | |
| | DM | 100 mg/Nm ³ | Daily | Immediate | Continuous | | |
| 04, 05, 06 | PM | 50 mg/Nm ³ | Daily | 1 April 2026 | Continuous | | |
| *Emission limits requested are for normal operations, so exclude upset startup, shutdown, or maintenance conditions | | | | | | | |

Table 7-2 - Emission limits requested for Matla

• Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.5.2.3. What is Eskom intending to do at Matla to meet the standards for which it is applying?

Matla Power Station will be shut down by 2036.

PM

| | Complete | Planned | |
|---------------------------------------|---|----------------|---------------------------|
| 00 | | | |
| Matla | All Unit ESP upgrades; HFPS on U1, U2, U4, U6 | HFPS on U3, U5 | 1 April 2026 (U4, U5, U6) |
| · · · · · · · · · · · · · · · · · · · | | | |

• Compliance with the new plant MES can only be achieved once the abatement projects are complete (1 April 2026 for U4-6).

- Eskom intends to improve PM reduction efficiency and will meet the new plant MES for PM. All unit ESP upgrades and HFPS installation on U1, U2, U4 and U6 are complete. HFPS installation on U3 and U5 are pending.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- In the Highveld and Vaal Triangle, key interventions include the distribution of hybrid stoves, ceilings, electrical rewiring and LPG heaters to households, as well as cleanup campaigns to remove illegally dumped waste. Preliminary results show significant reductions in PM₁₀ and PM_{2.5} concentrations and improvements in indoor air quality in participating households.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.

NO_X and SO_2

- Given the assumed shutdown phases of Matla (between 2031 and 2036), NO_x abatement technologies at this station are not planned as the station would be shutting down at the same time as the NO_x upgrades were underway.
- Eskom rather intends to optimise its process, but it will not meet the new plant MES.
- In respect of SO₂, Eskom is considering multiple factors, including costs and benefits, and does not intend to install SO₂ abatement technology to meet the new plant MES, but rather intends to reduce its emission impact by improving operational efficiencies and limiting its level of production (load).
- Exemption from the new plant MES for SO₂ is requested until shutdown.

| | FRP Alternative | Complete | Planned | Timeframe to Full Completion | | |
|--|----------------------------|--------------|---------|------------------------------|--|--|
| | | Complete | Tiannea | rimerume to r un completion | | |
| Duvha | ERP 2024 A; ERP 2024 B; | None | None | N/A | | |
| Matla | | None | None | N/A | | |
| Kendal | | Not Required | None | N/A | | |
| Lethabo | | None | LNB | 1 April 2031 | | |
| Majuba | | None | LNB | 1 April 2030 | | |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 | | |
| Kusile | | LNB | None | N/A | | |
| Matimba | - | Not Required | None | N/A | | |
| Medupi | | LNB | None | N/A | | |
| *Includes required optimisation periods of new equipment | | | | | | |

Table 4-2 – Status of NOx abatement projects

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 206 of 207

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion |
|------------|---------------------|-------------------|---------|---------------------------|-----------------------------------|---------------------------------|
| Duvha | - | - | - | - | - | N/A |
| Matla | - | - | - | - | - | N/A |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| 1Considere | d on alternative on | d in haing avalue | | his application | | |

Table 4-3 – Status of SO₂ abatement projects

¹Considered an alternative and is being evaluated as part of this application ²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

9.5.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Matla Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report. On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Matla. The requirement that the application must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Matla, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Matla's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Matla and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES, as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Matla. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Matla, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Matla, notification of the exemption applications, as well as an opportunity to comment on the application process, was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| Table 8-3 - Placement of Adverts | | | | | |
|----------------------------------|--|--|--|--|--|
| DATE OF PUBLICATION | | | | | |
| Sµnday 3 November 2024 | | | | | |
| Sunday 3 November 2024 | | | | | |
| Sunday 3 November 2024 | | | | | |
| Sunday 3 November 2024 | | | | | |
| Wednesday 6 November 2024 | | | | | |
| Thursday 1 November 2024 | | | | | |
| Thursday 1 November 2024 | | | | | |
| Thursday 1 November 2024 | | | | | |
| Thursday 1 November 2024 | | | | | |
| Thursday 1 November 2024 | | | | | |
| | | | | | |

In view of the above, it is HNM's view that Eskom's exemption application for Matla meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Matla and the potential conditions that may apply.

9.5.4. **Recommendation**

In respect of its Matla Power Station, Eskom is to be granted exemptions, as per the table below, until the recommended shut down date of **20 July 2034** (as per Eskom's Annex 10 Eskom IRP information, dated January 2023). The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved | COMMENTS |
|--------------------------------------|-------------------------------|--------------------------|------------------------------------|---------------------------------------|---|
| SO ₂ (U1-U6) | 1000 | 2600 | Daily | Immediate | |
| | | | | | It should be noted that while HNM acknowledges Eskom's assertion, in its postponement application, that NO _x abatement can be retrofitted by 01 April 2027, due to the upcoming closure of the plant, on 20 July 2034, HNM is of the view that investment in abatement measures is better allocated to the local offset programme, this informing its decision to recommend the granting of the |
| NO _x (U1-U6) | 750 | 1100 | Daily | Immediate | limit of 1100 mg/Nm ³ . |

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved | COMMENTS |
|--------------------------------------|-------------------------------|--------------------------|------------------------------------|---------------------------------------|----------|
| PM (U4-U6) | 50 | 100 | Daily | Immediate | |
| PM (U4-6_ | 50 | 50 | Daily | 1 April 2026 | |

9.6. ESKOM'S TUTUKA POWER PLANT ("TUTUKA)

9.6.1. Summary of Application

9.6.1.1. Background: Postponement Application (2018)

On page 3 of Eskom's motivation, which accompanied its postponement application, Eskom summarises its application as follows,

"Eskom herewith formally makes an application to the National Air Quality Officer (NAQO) for postponement of the compliance timeframes associated with the Minimum Emission Standards (MES) and asks for alternative limits for particular matter (PM) and nitrogen oxides (NO_x) and sulphur dioxide (SO₂) for its Tutuka Power Station. This application also asks for reconsideration of the limits granted to Eskom in response to Tutuka Power Station's previous postponement application that was made in 2014.

Tutuka is installing a Fabric Filter Plant (FFP) to reduce particulate emissions as per its previous postponement request but due to delays this will only be completed by 2027. An alternate daily PM emission limit of 300 mg/Nm3 or a monthly limit of 200 mg/Nm3 is thus requested until 2027, the station will comply with the MES limit once the FFP is installed. In order to reduce NO_x emissions the station is planning to install low NO_x burners. This project will be completed by 2026 and an alternative limit of 1200 mg/Nm3 is requested until then, the station will comply with the NO_x MES once the project is complete. To reduce SO₂ to the new plant level of 1000 mg/Nm3 would require installation of Flue Gas Desulphurisation (FGD) which is not considered appropriate for Tutuka and an alternate limit of 3000 mg/Nm3 is requested for the station until decommissioning."

In table 3 on page 7 of Eskom's motivation, it sets out the maximum emission rates as listed in Tutuka's AEL, which are the emission rates that were granted to it pursuant to a postponement application it made in 2015, and which currently apply to the plant:

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| Pollutant Name | Maximum release rate | | | | | | |
|-----------------|--------------------------------------|--------------------------------------|----------------|--|--|--|--|
| | Limit value (mg/Nm ³) | Date to be achieved by | Average period | | | | |
| | 350 | 1 April 2015 – 31 December 2018 | Daily | | | | |
| PM | 200 | 1 January 2019 – 31 December 2019 | Daily | | | | |
| | 100 | From 1 January 2020 | Daily | | | | |
| SO ₂ | 3400 | 1 April 2020 – 31 December 2025 | Daily | | | | |
| NOx | 1200 | 1 April 2015-31 March 2020 | Daily | | | | |
| | 750 | From 1 April 2020 | Daily | | | | |

A summary of the requested emission limits for the Tutuka Power Station are depicted in table 5 of its motivation in the postponement application, as follows:

| | Maximum release rate | | | | | | | |
|----------------|--|-----------------------------------|------------------------|--|--|--|--|--|
| Pollutant Name | Limit value (mg/Nm ³) Date to be achieved by | | Average period | | | | | |
| РМ | 300 (daily) OR 200 (monthly) | 1 January 2019 – 31 March 2027 | Daily OR Monthly | | | | | |
| | 50 | From 1 April 2027 onwards | Daily | | | | | |
| 50 | 3000 | 1 April 2020 – 31 March 2025 | Daily | | | | | |
| 302 | 3000 | From 1 April 2025 – onwards | Daily | | | | | |
| Nov | 1200 | 1 April 2020-31 March 2026 | Daily | | | | | |
| NUX | 750 | From 1 April 2026 onwards | Daily | | | | | |

In paragraph 8 of its motivation, Eskom sets out the reasons motivating Tutuka's postponement application. Eskom explains the cause of PM, NO_x and SO_2 pollution and addresses the technology options for emission reduction as well as its abatement technology retrofit schedule.

In relation to abating PM pollution, Eskom states that "*Tutuka is working towards completing a full FFP retrofit to ensure compliance with the "new plant" emission limit of 50 mg/Nm3. Eskom is further considering non-FFP solutions to bring the plant into compliance with the new plant standards.*"

In terms of NO_x emission reduction, it is stated that "*Tutuka Power Station currently emits unabated* NO_x emissions as the station's original design did not include LNB [low NO_x burner] technology. Tutuka

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is working towards completing a full LNB retrofit to ensure compliance with the 'new plant' emission limit of 750 mg/Nm3, with which the station is currently not complying with most of the time."

With regard to SO_2 emission abatement, Eskom states that " SO_2 emissions are released as a result of the sulphur content in the coal. Flue gas desulphurization (FGD) technology is the only effective control measure to reduce SO_2 emissions. The FGD is a process which passes flue gas through alkaline solution/media. FGD technology is expensive, requires significant quantities of water, creates a new waste stream and increases greenhouse gases. Only the new power stations, namely Kusile and Medupi, are scheduled for being equipped with FGD Plants, while a pilot project is being executed to determine the correct technology to install at Matimba and Kendal power station. Tutuka Power Station currently emits unabated SO_2 emissions as the station's original design did not include FGD technology."

According to its motivation, Eskom intends to complete the retrofit of FFP at its Tutuka Power Plant in 2027 and of LNBs by 1 April 2026.

9.6.1.2. The NAQO's decision in respect of Eskom's application for its Tutuka Power Plant

Below is a summary of what Eskom applied for in 2018 and the NAQO's decision in respect thereof:

| S 21 | Applianc | Postponement | Emission | n Stand | | |
|--|----------|--|---------------------|--------------|------|---|
| Category | e | Sought | Minimum Standard | e Emis Is | sion | Decision |
| | | | Polluta | 201 | 202 | |
| | | | nt | 5 | 0 | |
| Subcatego ry 1.1: Solid Fuel Combustion Installation | 6 Units | 300 mg/Nm ³ (daily) or 200mg/Nm ³ (monthly) from 1 January 2019 until 31 March 2027 | PM | 100 | 50 | Alternative limit request beyond 2025 is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A) (a) and (12A) (c)(i). The requirement to comply with the minimum emission standards for new plant as stated in the 2015 postponement decision with a limit of 100mg/Nm3 from 1 January 2020 to 31 March 2025 thus remains in place. |

| | 0000 (NL 0 | SO ₂ | 350 | 100 | Alternative limit until |
|--|------------------------|-----------------|-----|-----|-------------------------------|
| | 3000mg/Nm3 | | 0 | 0 | decommissioning is |
| | from 1 April | | | | declined as the facility |
| | 2020 | | | | does not comply or |
| | 3000mg/Nm ³ | | | | meet the requirement |
| | from 1 April | | | | of GN 1207 of 2018, |
| | 2025 until | | | | (12A) (a) and (12A) |
| | decommissioni | | | | (b). The requirement |
| | ng | | | | to comply with the |
| | | | | | minimum emission |
| | | | | | standards for new |
| | | | | | plant as stated in the |
| | | | | | 2015 postponement |
| | | | | | decision with a limit of |
| | | | | | 3400mg/Nm ³ from 1 |
| | | | | | April 2020 to 31 March |
| | | | | | 2025 thus remains in |
| | | | | | place. |
| | 1200 mg/Nm^3 | NOx | 110 | 750 | Postponement/alternat |
| | from 1 April | | 0 | | ive limit beyond 2025 |
| | 2020 to 21 | | | | is declined as the |
| | 2020 to 31 | | | | facility do not comply |
| | | | | | or meet the |
| | 750 mg/Nm ³ | | | | requirement of GN |
| | from 1 April | | | | 1207 of 2018 11A, |
| | 2026 onwards | | | | (12A) (a) and (12A) |
| | | | | | (b). |
| | | | | | Postponement of |
| | | | | | compliance with the |
| | | | | | minimum emission |
| | | | | | standards for new |

| | | | plant is granted with a |
|--|--|--|-------------------------|
| | | | limit of 1100mg/Nm3 |
| | | | from 1 April 2020 to 31 |
| | | | March 2025. |
| | | | |

The NAQO's decision, summarised above, was subject to the following further conditions, set out in the decision dated 30 October 2021:

- a) "This decision will have to be reflected in your Atmospheric Emission License (AEL) to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.
- b) You are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Eskom Tutuka Power Station.
- c) You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.
- d) Eskom Tutuka Power Station's requirement to implement an offset programme to reduce Particulate Matter (PM) pollution in the ambient/receiving environment as your facility is located in the Highveld Priority Area remains in place.
- *e)* A detailed compliance roadmap must be submitted to the Department a year from the date of issue of this decision.
- *f) The decision may be reviewed by the NAQO with the concurrence of AELA should ambient air quality conditions in the affected area of the plant not conform to ambient air quality standards.*"

Eskom approached the Minister to appeal the decision of the NAQO.

9.6.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.6.2. Section 59 Exemption Application

9.6.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Tutuka Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld and Vaal Triangle)
- Appendix D: Station Specific Atmospheric Impact Report Tutuka Station

9.6.2.2. Eskom's application with regards to the Tutuka Power Station

- Eskom is requesting an exemption from the new plant MES for PM at Tutuka until completion of the abatement projects, after which this station will comply with the new plant MES.
- Eskom is requesting an exemption from the new plant MES for NO_x at Tutuka until completion of the LNB installations.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Tutuka until its assumed shutdown.

| POINT | | | DURATION OF | | | | | |
|--|--|--------------------------|----------------|----------------------|------------|--|--|--|
| SOURCE CODE | POLLUTANT | mg/Nm ³ | Average Period | Date To Be Achieved | EMISSIONS | | | |
| | SO ₂ | 3,000 mg/Nm ³ | Daily | Immediate - shutdown | Continuous | | | |
| Stack 1 (U1- | 1 (U1- tack 2 4 -6) PM 1,100 mg/Nm ³ 750 mg/Nm ³ 300 mg/Nm ³ 50 mg/Nm ³ | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | | | |
| 3) Stack 2 | | 750 mg/Nm ³ | Daily | 1 April 2029 | Continuous | | | |
| (U4 -6) | | Daily | Immediate | Continuous | | | | |
| | | 50 mg/Nm ³ | Daily | 1 April 2027 | Continuous | | | |
| *Emission limits requested are for normal operations, so exclude upset, startup, shutdown, or maintenance conditions | | | | | | | | |

Table 7-3 - Emission limits requested for Tutuka

Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.
9.6.2.3. What is Eskom intending to do at Tutuka to meet the standards for which it is applying?

Shutdown of Tutuka is planned from 2036 to 2041.

PM

Complete

Planned

| wajupa | inor redulted | none | N/A |
|--------|--|---|----------------|
| Tutuka | ESP upgrades U6, U5; HFPS U4, U6 | ESP upgrades U1, U2, U3, U4; DHP refurb U1, U2, U3, U4; HFPS U1, U2, U3, U5 | 1 January 2027 |
| 17 1 | and the second sec | L 1 | N1/A |

- Regarding Tutuka, compliance with the new plant MES can only be achieved once the abatement projects are complete.
- Eskom intends to improve PM reduction efficiency which entails ESP and DHP refurbishment and HFPS installation. Completed projects comprise ESP upgrades on U6 and U5 and installation of HFPS on U4 and U6.
- To offset Eskom PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- In the Highveld and Vaal Triangle, key interventions include the distribution of hybrid stoves, ceilings, electrical rewiring and LPG heaters to households, as well as cleanup campaigns to remove illegally dumped waste. Preliminary results show significant reductions in PM₁₀ and PM_{2.5} concentrations and improvements in indoor air quality in participating households.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.
- In the Waterberg area, key interventions include introducing cleaner household energy sources, managing waste burning, reforestation and surfacing bare public grounds.

NO_X AND SO₂

• Eskom plans to install LNBs at Tutuka from 2025 (given the timeframes to complete LNB installation, Tutuka will not comply with the new plant MES by 1 April 2025).

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- In respect of SO₂, Eskom is considering multiple factors including costs and benefits and does not intend to install SO₂ abatement technology, but rather intends to reduce its emission impact by improving operational efficiencies.
- Exemption from the new plant MES for SO₂ is requested until shutdown.
- Semi dry FGD is listed under the exemption request. In this regard, Eskom states that, "while technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced."

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion | | | |
|--|-------------------------|--------------|---------|------------------------------|--|--|--|
| Duvha | | None | None | N/A | | | |
| Matla | | None | None | N/A | | | |
| Kendal | | Not Required | None | N/A | | | |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 | | | |
| Majuba | ERP 2024 B; | None | LNB | 1 April 2030 | | | |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 | | | |
| Kusile | | LNB | None | N/A | | | |
| Matimba | | Not Required | None | N/A | | | |
| Medupi | | LNB | None | N/A | | | |
| *Includes required optimisation periods of new equipment | | | | | | | |

Table 4-2 – Status of NOx abatement projects

Table 4-3 – Status of SO₂ abatement projects

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion |
|---------|-----------------|----------|---------|---------------------------|-----------------------------------|---------------------------------|
| Duvha | - | - | - | - | - | N/A |
| Matla | - | - | - | - | - | N/A |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |

¹Considered an alternative and is being evaluated as part of this application

²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

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9.6.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Tutuka Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Tutuka. The requirement that the application must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application, for all of the stations applied for, including Tutuka, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Tutuka's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Tutuka and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES, as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Tutuka. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Tutuka, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Tutuka, notification of the exemption applications as well as an opportunity to comment on the application process, was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about

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| LOCATION | DATE OF PUBLICATION |
|-----------------------------------|---------------------------|
| City Press (Regional Newspaper) | Sunday 3 November 2024 |
| Sunday Times (National Newspaper) | Sunday 3 November 2024 |
| Beeld (National Newspaper) | Sunday 3 November 2024 |
| Star (National Newspaper) | Sunday 3 November 2024 |
| Mpumalanga News | Wednesday 6 November 2024 |
| Standerton Advertiser | Thursday 1 November 2024 |
| Mpumalanga Lowvelder | Thursday 1 November 2024 |
| Ridge Times | Thursday 1 November 2024 |
| Witbank News | Thursday 1 November 2024 |
| Middelburg Observer | Thursday 1 November 2024 |

Table 8-3 - Placement of Adverts

In view of the above, it is HNM's view that Eskom's exemption application for Tutuka meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Tutuka and the potential conditions that may apply.

9.6.4. **Recommendation**

In respect of its Tutuka Power Station, Eskom is to be granted exemptions, as per the table below, until the recommended shut down date of **5 June 2030** (as per Eskom's Annex 10 Eskom IRP information, dated January 2023). The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved | Comments |
|---|----------------------------|--------------------------|------------------------------------|---------------------------------------|----------|
| SO ₂ (Stack 1 (U1-U3), Stack 2(U4- U6)) | 1000 | 3000 | Daily | Immediate | |
| NO _x (Stack 1 (U1-U3), Stack 2(U4- U6)) | 750 | 1100 | Daily | Immediate | |

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| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved | Comments |
|---|----------------------------|--------------------------|------------------------------------|---------------------------------------|---|
| NO _x (Stack 1 (U1-U3), Stack 2(U4- U6)) | 750 | 750 | Daily | 01-Apr-29 | |
| PM (Stack 1 (U1-U3), Stack 2(U4- U6)) | 50 | 300 | Daily Monthly | Immediate | As indicated in the methodology, the setting of conditions considered the degree of non-compliance. For Tutuka, a significant degree of PM non-compliance has been requested in the exemption application (300 mg/Nm ³ when the MES is 50 mg/Nm ³). In its Postponement Application and subsequent ERP 2022, Eskom indicated it can meet a 200 mg/Nm ³ monthly average until the PM retrofit in 2027. Due to the extent of the non-compliance requested, it is HNM's opinion that the lower limit on the monthly average should also apply to constrain the exceedance as far as is technically feasible. |
| | | | | | |

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved | Comments |
|--|----------------------------|--------------------------|------------------------------------|---------------------------------------|----------|
| | | | | | |
| PM (Stack 1 (U1-U3), Stack 2(U4- U6)) | 50 | 50 | Daily | 01-Apr-27 | |

9.7. ESKOM'S MAJUBA POWER PLANT ("MAJUBA")

9.7.1. Summary of Application

9.7.1.1. Background: Postponement Application (2018)

On page 6 of Eskom's motivation, which accompanied its postponement application, Eskom summarises its application as follows:

"It is requested that the proposed alternative limits only apply during normal working conditions, and not during start-up or shut-down, upset conditions and maintenance periods.

In summary the postponement for Majuba requested is:

- 1. Postponement of the SO₂ new plant MES and an alternative limit of 3000 mg/Nm3 from 2025 onwards;
- 2. An alternative limit of 1400 mg/Nm3 monthly for NO_x until 2026 (completion of low NO_x retrofit) and compliance to the new plant standard from there onwards.

No postponement for the PM standards is requested."

| | Current Limit (from AEL) | | | Requested Emission Limits* | | |
|-----------------------|-----------------------------|---------------------|-------------------------------|----------------------------|---------------------|---------------------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| Particulate Matter | 100 | Daily | 1 April 2015 | 50 | Daily | 1 April 2020 |
| Sulphur | 3500 | Daily | 1 April 2015 | 3500 | Daily | 1 April 2020 |
| Dioxide | 5000 | Daily | 1 April 2013 | 3000 | Daily | 1 April 2025 |
| Nitrogen | 1500 | Daily | 1 April 2015-31 March 2020 | 1400 | Monthly | 1 April 2020 |
| Uxides | | | | 750 | Daily | 1 April 2026 until decommissioning |

*The requested interim emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O2.

In paragraph 5 of its motivation, Eskom sets out its reasons for applying for a postponement in respect of it Majuba Power Station. In this regard, it is stated that:

"As mentioned above, the Application for postponement must be accompanied by reasons. Such reasons are set out below and include the fact that emissions from Majuba will not result in non-compliance with National Ambient Air Quality Standards (NAAQS), project delays and a suite of undesired environmental consequences of compliance with the MES including associated water demands, transport impacts and increases in waste and carbon dioxide (CO2) production. These undesired consequences together with the financial costs of compliance (such as an increase in the electricity tariff) must be weighed up against the benefits that will accrue as a result of compliance with the MES. It is Eskom's view that the benefit of compliance does not justify the non-financial and financial costs of compliance. ...None of these reasons should be seen as exclusive (i.e. it is not one reason alone that prevents compliance) but rather all in combination. Before presenting these various reasons, the reader is referred to Annexure A, in which various information is presented on the Majuba Power Station."

The motivation then addresses several aspects of the above, in more detail, under the following headings:

- a) Remaining Power Station Life
- b) Water Availability
- c) Environmental Implication of FGD
- d) Impact on Ambient Air Quality
- e) Cost Implications of Compliance with the MES

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f) Project Delays

9.7.1.2. The NAQO's decision in respect of Eskom's application for its Majuba Power Plant

Below is a summary of what Eskom applied for in 2018 and the NAQO's decision in respect thereof:

| S 21 Category | Appliance | Postponement Sought | Emission Standards | | | |
|---|-----------|---|--------------------|--------|------|---|
| | | 14 | Minimum | Emissi | on | Decision |
| | | | Standards | 1 | | and the second second |
| | | | Pollutant | 2015 | 2020 | |
| Subcategory 1.1: Solid Fuel Combustion Installation | 6 Units | 3500mg/Nm ³ from 1 April 2020 until 31 March 2025 3000 mg/Nm ³ from 1 April 2025 until decommissioning by 2051. | SO2 | 3500 | 1000 | Postponement of compliance timeframe with the minimum emission standards beyond 2025 is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (11A). Alternative limit request is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a) and (12A)(b). The requirement to comply with the minimum emission standards for new plant as stated in the 2015 postponement decision with a limit of 3200 mg/Nm ³ from 1 April 2020 to 31 March 2025 |

| | | | | | thus remains in place. |
|--|--|-----|------|-----|---|
| | 1400mg/Nm ³ (monthly) from 1 April 2020 750 mg/Nm ³ from 1 April 2026 until decommissioning by 2051. | NOx | 1100 | 750 | Alternative limit is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A) (a) and (12A)(b). |
| | | | | | application beyond 31 March 2025 is declined as the facility does not comply or meet the requirement of GN 1207 of 2018 (11A). |
| | | | | | Postponement issued from 1 April 2020 to 31 March 2025 with the emission limit of 1300 mg/Nm³ . |

The NAQO's decision, summarised above, was subject to the following further conditions, set out in its decision dated 30 October 2021:

- a) "This decision will have to be reflected in your Atmospheric Emission Licence (AEL) to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.
- b) You are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Eskom Majuba Power Station.

- c) You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.
- d) Eskom Majuba Power Station's requirement to implement an offset programme to reduce Particulate Matter (PM) pollution in the ambient/receiving environment as your facility is located in the Highveld Priority Area remains in place.
- *e)* The decision may be reviewed by the NAQO with the concurrence of AELA should ambient air quality conditions in the affected area of the plant not conform to ambient air quality standards."

Eskom approached the Minister to appeal the decision of the NAQO.

9.7.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.7.2. Section 59 Exemption Application

9.7.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Majuba Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Highveld and Vaal Triangle)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Highveld Priority Area)
- Appendix D: Station Specific Atmospheric Impact Report Majuba Station

9.7.2.2. Eskom's application with regards to the Majuba Power Station

• Majuba is currently compliant with the new plant MES for PM.

- Eskom is requesting an exemption from the new plant MES for NO_x at Majuba until completion of the LNB installations.
- Eskom is requesting an exemption from the new plant MES for SO₂ at Majuba until its assumed shutdown.
- A lower emission concentration can be achieved with the installation of DSI (by 1 April 2034), but MES still will not be achieved.

| · · · · · · · · · · · · · · · · · · · | | | | | | | |
|--|--------------------------|--------------------------|----------------|---------------------|------------|--|--|
| POINT | BOLLUTANT | I | DURATION OF | | | | |
| CODE | FOLLOTANT | mg/Nm ³ | Average Period | Date To Be Achieved | EMISSIONS | | |
| 01/0040 | 80. | 3,000 mg/Nm ³ | Daily | Immediate | Continuous | | |
| SV0013, SO ₂ SV0014, | 2,100 mg/Nm ³ | Daily | 1 April 2034** | Continuous | | | |
| SV0015, | NOx | 1,100 mg/Nm ³ | Daily | Immediate | Continuous | | |
| SV0002, SV0011, | | 750 mg/Nm ³ | Daily | 1 April 2030 | Continuous | | |
| SV0012 | PM | 50 mg/Nm ³ | Daily | Immediate | Continuous | | |
| *Emission limits requested are for normal operations, so exclude upset, startup, shutdown, or maintenance conditions. **Should DSI be installed | | | | | | | |

Table 7-7 - Emission limits requested for Majuba

Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.7.2.3. What is Eskom intending to do at Majuba to meet the standards for which it is applying?

Shutdown of Majuba is planned from 2047 to 2052.

PM

- Majuba is currently compliant with new plant MES for PM.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- In the Highveld and Vaal Triangle, key interventions include the distribution of hybrid stoves, ceilings, electrical rewiring and LPG heaters to households, as well as cleanup campaigns to remove illegally dumped waste. Preliminary results show significant reductions in PM₁₀ and PM_{2.5} concentrations and improvements in indoor air quality in participating households.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.

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NO_X AND SO₂

- Eskom plans to reduce NO_x emissions with the installation of LNBs from 2026 (completion 2030).
- Furthermore, Eskom is assessing the potential to reduce SO₂ emissions with the installation of DSI technology from 2029. However, Eskom states that, "while technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced."
- Regarding the DSI FGD being evaluated for Majuba, it should be noted that although this would reduce SO₂ emissions, it would not achieve MES compliance.

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion | | |
|--|-------------------------|--------------|---------|------------------------------|--|--|
| Duvha | | None | None | N/A | | |
| Matla | | None | None | N/A | | |
| Kendal | | Not Required | None | N/A | | |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 | | |
| Majuba | ERP 2024 B; | None | LNB | 1 April 2030 | | |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 | | |
| Kusile | | LNB | None | N/A | | |
| Matimba | | Not Required | None | N/A | | |
| Medupi | | LNB | None | N/A | | |
| *Includes required optimisation periods of new equipment | | | | | | |

Table 4-2 – Status of NOx abatement projects

Table 4-3 – Status of SO₂ abatement projects

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion |
|---------|-----------------|----------|---------|---------------------------|-----------------------------------|---------------------------------|
| Duvha | - | - | - | - | - | N/A |
| Matla | - | - | - | - | - | N/A |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| | | | | | | |

¹Considered an alternative and is being evaluated as part of this application

²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 229 of 230

9.7.3. HNM's view on whether or not the exemption application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Majuba Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Majuba. The requirement that the application must be in writing is clearly met.

It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Majuba, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Majuba's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Majuba and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES, as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Majuba. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Majuba, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Majuba, notification of the exemption application as well as an opportunity to comment on the application process was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 230 of 231

public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| Table 0-0 - Thatement of Adverts | |
|-----------------------------------|---------------------------|
| NEWSPAPER NAME | DATE OF PUBLICATION |
| City Press (Regional Newspaper) | Sunday 3 November 2024 |
| Sunday Times (National Newspaper) | Sunday 3 November 2024 |
| Beeld (National Newspaper) | Sunday 3 November 2024 |
| Star (National Newspaper) | Sunday 3 November 2024 |
| Mpumalanga News | Wednesday 6 November 2024 |
| Standerton Advertiser | Thursday 1 November 2024 |
| Mpumalanga Lowvelder | Thursday 1 November 2024 |
| Ridge Times | Thursday 1 November 2024 |
| Witbank News | Thursday 1 November 2024 |
| Middelburg Observer | Thursday 1 November 2024 |

Table 8-3 - Placement of Adverts

In view of the above, it is HNM's view that Eskom's exemption application for Majuba meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Majuba and the potential conditions that may apply.

9.7.4. **Recommendation**

In respect of its Majuba Power Station, it should be noted that given the uncertainty of the power sector transition, it is recommended that no exemption is granted for a period longer than ten years. As such, it is recommended that the exemption granted to Majuba expires on 1 April 2035.

The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT | New Plant | Recommendation | Recommended | Recommended |
|-----------------|-----------|----------------|-------------|-------------|
| AND | MES | mg/Nm3 | Averaging | Date to Be |
| EMISSION | mg/Nm3 | | Period | Achieved |
| UNIT | | | | |
| SO_2 | | | | |
| (SV0013, | | | | |
| SV0014, | | | | |
| SV0015, | | | | |
| SV0002, | | | | |
| SV0011, | | | | |
| SV0012) | 1000 | 3000 | Daily | Immediate |
| NO _x | | | | |
| (SV0013, | | | | |
| SV0014, | | | | |
| SV0015, | | | | |
| SV0002, | 750 | 1100 | Daily | Immediate |

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| POLLUTANT | New Plant | Recommendation | Recommended | Recommended |
|-----------|---------------|----------------|-------------|------------------------|
| AND | MES mg/Nm3 | mg/INM5 | Averaging | Date to Be Achieved |
| UNIT | ing/1 (inc | | 1 01104 | 1 Kenne v Cu |
| SV0011, | | | | |
| SV0012) | | | | |
| | | | | |
| NOx | | | | |
| (SV0013, | | | | |
| SV0014, | | | | |
| SV0015, | | | | |
| SV0002, | | | | |
| SV0011, | | | | |
| SV0012) | 750 | 750 | Daily | 01-Apr-30 |

9.8. ESKOM'S MEDUPI POWER PLANT ("MEDUPI")

9.8.1. Summary of Application

9.8.1.1. Background: Postponement Application (2020)

On page 4 of Eskom's motivation, which accompanied its postponement application in respect of its Medupi Power Plant, Eskom states as follows:

"A MES postponement decision was issued to Medupi in 2015 and again in 2018 in respect of compliance to the MES SO₂ limit. With the amendments of the MES regulations in October 2018, it is necessary to submit this application for alternative limits and the postponement for SO₂. Eskom has applied and received a condonation for the late submission of an application for Medupi until November 2019, and an initial application was made by that date. This document is an update of the November 2019 application with some revised information (in particular an updated Atmospheric Impact Report and motivation) as Eskom committed to in the November 2019 application and with edits after the Public Participation completed in August 2020."

"Medupi already achieves the 50 mg/Nm3 Particulate Matter (PM) daily for 'new' MES limits and meets the "new" plant standards for nitrogen oxide ($NO_x - 750 \text{ mg/Nm3}$), as such no changes in terms of either of these pollutants is requested.

Eskom has an existing postponement decision granting a monthly limit of 3500 mg/Nm3 for SO₂ until 31 May 2025. From 1 April 2025 Eskom is required to comply with a SO₂ limit of 1000 mg/Nm3. Previous planning indicated that FGD would be installed at Medupi 6 years after completion of each unit thus between 2021 and 2026. Unfortunately, there have been significant delays in the implementation of the project and in confirming funding. This in combination with the deterioration in Eskom's financial position, the negative environmental impacts and the limited health benefits

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 232 of 233 associated with the FGD implementation has led to a re-evaluation and consideration of an alternative approach in respect of SO₂ reduction. The alternative approach considers the enablement of a Just Energy Transition Strategy for Eskom and further investigation into less costly SO₂ reduction technologies. Eskom is thus requesting a postponement from compliance to the new plant MES until 31 March 2025 with an alternate limit of 4000 mg/Nm3 monthly from 2020 until 2030. Achieving the new plant limit of 1000 mg/Nm3 post-2030 would be subject to a review of alternative less costly SO₂ reduction technology and the level of compliance with ambient air standards.

A strict interpretation of the amendment of the MES regulations in 2018 has potentially restricted the legal mechanisms which would provide the authorities with the ability to grant the required time for the investigation of less costly SO₂ reduction technologies and Eskom's financial recovery. This application should thus also be considered as a request for exemption from compliance with the present MES timeframes to the Minister of DEFF, as allowed for in terms of section 59 of NEMAQA, if so required." (sic)

A summary of the indulgence sought by Eskom is recorded on page 9 of its motivation, as follows:

"In summary, the application submitted for Medupi is:

(i) Alternative monthly SO₂ limit of 4000 mg/Nm3 from 1 April 2020 until 31 March 2030.

(ii) Alternative monthly SO₂ limit from 1 April 2030 until decommissioning will be proposed based on the SO₂ emission reduction technology selected if a suitable technology is identified.

Medupi will comply with the new plant standard for PM and NO_x and no change in respect of these pollutants is requested. In terms of the existing license and postponement decisions, it is understood that the previously granted postponement of the SO₂ limit will remain in place until 2025 as a minimum (compliance to a monthly limit of 3 500 mg/Nm3). Based on the techno-economics and with due consideration of the issues described in this application, any additional measures other than what was committed to above and the emission limits requested are not financially viable. The monthly averaging period has been requested due to the variability in coal quality which results in days where a daily limit is exceeded and others where the emissions are below the daily limit."

Eskom's request is also set out in table 1 on page 9 of its motivation, which shows the applicable limits contained in Medupi's AEL as well as the emission limits requested:

| Point source SV0002, | Current Limit (from AEL) | | | Requested Emission Limits* | | | |
|--------------------------------------|------------------------------|------------------|---------------------------|--------------------------------------|------------------|---------------------------|--|
| 0011,0012, 0013,0014 and 0015 | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by | |
| | | | | To be proposed based on technologies | | 1 April 2030 | |
| Nitrogen Oxide (NO _x) | 750 | Daily | 1 April 2015 | 750 | Daily | 1 April 2020 | |

*The requested alternate emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O₂.
* Limit as per 2018 MES application grant (LP/ES-MT/WDM/20170825)

| Point source SV0002, | Current Limit (from AEL) | | | Requested Emission Limits* | | | |
|---------------------------------------|-----------------------------|------------------|---------------------------|----------------------------|------------------|---------------------------|--|
| 0011,0012, 0013,0014 and 0015 | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by | |
| Particulate Matter (PM) | 50 | Daily | 1 April 2015 | 50 | Daily | 1 April 2020 | |
| Sulphur Dioxide (SO ₂) | 3500 | Monthly* | 1 April 2015 | 4000 | Monthly | 1 April 2020 | |

In paragraph 6 of Eskom's motivation, it sets out the reasons for applying for a postponement.

The following reasons are listed, and each is then elaborated on in its motivation:

- (i) Coal quality and the high sulphur content of Waterberg coals;
- (ii) Delays in FGD project timeframes and further study time requirements;
- (iii) The cost of SO₂ reduction and Eskom's financial position;
- (iv) Water use associated with SO₂ reduction;
- (v) Waste, sorbent and energy impacts of SO₂ reduction technologies;
- (vi) The state of air in the Waterberg and the predicted impact of Eskom's application;
- (vii) The potential impact on national electricity supply; and
- (viii) Eskom's Just Energy Transition Strategy and climate change response.

9.8.1.2. The NAQO's decision in respect of Eskom's application for its Medupi Power Plant

Below is a summary of what Eskom applied for in 2020 and the NAQO's decision taken in respect thereof:

| S21 Category | Applian ce | Postponemen t period | Emission Standards | | | | |
|--|---------------|--|--|------|------|--|--|
| | | sought | Minimum Emission Standards (mg/Nm³) | | | Decision | |
| | | | Poll ut- ant | 2015 | 2020 | | |
| Subcatogo | | | | | | | |
| ry 1.1: Solid Fuel Combustio n Installations | 6 Units | 4000mg/Nm ³ (monthly) from 1 April 2020 until decommissioni ng | SO ₂ | 3500 | 1000 | Alternative limit is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a)(b). | |

| 1000 mg/Nm ³ (monthly) from 1 April 2030 until decommissioni ng | Postponeme compliance v minimum em standards fo beyond 2025 as the facility comply or m requirement 2018, (11A). requirement with the mini emission sta new plant as 2015 postpo decision with 3500mg/Nm 2020 to 31 M thus remains | nt of vith the ission new plant is declined does not eet the of GN1207 of The to comply mum ndards for stated in the nement a limit of ³ from 1 April larch 2025 in place. |
|---|--|--|
|---|--|--|

The NAQO's decision, summarised above, was subject to the following further conditions, as set out in its decision dated 30 October 2021:

- 1. "The decision will have to be reflected in Eskom's AEL to be of force and effect. Therefore, Eskom must liaise with the relevant AELA as soon as possible so that the required amendments, variations and additions to its AEL can be effected.
- 2. Eskom is required to submit a quarterly progress report on the implementation of its compliance road map and of its commitments made in support of its postponement application for its Medupi Power Station.
- 3. Eskom is also required to provide a progress report on the implementation of offset projects where applicable, as well as of other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the DFFE's financial year.
- 4. Eskom's Medupi Power Station is required to implement an offset programme to reduce SO₂ pollution in the ambient/receiving environment, as the facility is located in the WBPA. A definite offset implementation plan is expected from Eskom's Medupi Power Station within 90 days from the date of issue of the decision."

Eskom approached the Minister to appeal the decision of the NAQO.

9.8.1.3. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.8.2. **Section 59 Exemption Application**

9.8.2.1. Structure of the application

- Cover Page •
- Fleet Summary Report •
- Appendix A: Station Specific Exemption Report Medupi Station •
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Waterberg Area)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Waterberg Area) •
- Appendix D: Station Specific Atmospheric Impact Report Medupi Station •

9.8.2.2. Eskom's application with regards to the Medupi Power Station

- Medupi is currently compliant with the new plant MES for PM. •
- Medupi is currently compliant with the new plant MES for NO_x. •
- Eskom is requesting an exemption from the new plant MES for SO₂ at Medupi until completion • of the FGD installations (1 April 2032).

| Point | | M | Maximum release rate* | | | | |
|--------------------|----------------------|-------------------------|-----------------------|------------------------|------------|--|--|
| Source Code | Pollutant | mg/Nm³ | Average Period | Date To Be Achieved | Emissions | | |
| SV0013, | 80. | 3,500mg/Nm ³ | Monthly | Immediate | Continuous | | |
| SV0014, SV0015, | 502 | 800mg/Nm ³ | Monthly | 1 April 2032 | Continuous | | |
| SV0002, SV0011 | NOx | 750 mg/Nm ³ | Daily | Immediate | Continuous | | |
| SV0012 | PM | 50 mg/Nm ³ | Daily | Immediate | Continuous | | |
| *Applicable to | normal operations is | o excludes upset starti | in shutdown a | nd maintenance periods | | | |

Table 7-8 - Emission limits requested for Medupi

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 237 of 238 Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.8.2.3. What is Eskom intending to do at Medupi to meet the standards for which it is applying?

Shutdown of Medupi is planned from 2065.

PM

- Medupi has no PM projects planned as this station has PJFF and complies with the new plant MES.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.
- In the Waterberg area, key interventions include introducing cleaner household energy sources, managing waste burning, reforestation and surfacing bare public grounds.

NO_X and SO₂

- NO_x emissions at Medupi will comply with the new plant MES from 1 April 2025, and therefore no NO_x abatement projects are planned at this station.
- To achieve compliance with new plant MES for SO₂, Medupi will install a wet FGD, due to commence in FY2028, with completion in FY2032.

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion |
|-----------------------|-------------------------|------------------|---------|------------------------------|
| Duvha | | None | None | N/A |
| Matla | | None | None | N/A |
| Kendal | | Not Required | None | N/A |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 |
| Majuba | ERP 2024 B; | None | LNB | 1 April 2030 |
| Tutuka | ERP 2024 C | None | LNB | 1 January 2028 |
| Kusile | | LNB | None | N/A |
| Matimba | - | Not Required | None | N/A |
| Medupi | | LNB | None | N/A |
| *Includes required of | optimisation periods | of new equipment | | |

| Tuble 4-2 Olulus of NOX usulement projects | Table 4-2 – | Status | of | NOx | abat | tement | pro | jects |
|--|-------------|--------|----|-----|------|--------|-----|-------|
|--|-------------|--------|----|-----|------|--------|-----|-------|

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion |
|------------------------|---------------------|-------------------|-------------------|---------------------------|-----------------------------------|---------------------------------|
| Duvha | - | - | - | - | - | N/A |
| Matla | - | - | - | - | - | N/A |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Matimba | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| ¹ Considere | d an alternative an | d is being evalua | ated as part of t | his application | | |

Table 4-3 – Status of SO₂ abatement projects

¹Considered an alternative and is being evaluated as part of this application ²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

9.8.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s 59

In this section, consideration will be given to whether Eskom's exemption application for Medupi Power Station meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Medupi. The requirement that the application must be in writing is clearly met.

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 239 of 240

It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Medupi, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Medupi's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Medupi and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES, as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Medupi. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Medupi, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Medupi, notification of the exemption application as well as an opportunity to comment on the application process was issued to the general public via advertisements published in the newspapers outlined in table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, table 8-3 is copied here:

| LOCATION | DATE OF PUBLICATION |
|-----------------------------------|---------------------------|
| City Press (Regional Newspaper) | Sunday 3 November 2024 |
| Sunday Times (National Newspaper) | Sunday 3 November 2024 |
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| Mogol Pos (Local Newspaper) | Friday 1 November 2024 |

Table 8-3 - Placement of Adverts

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In view of the above, it is HNM's view that Eskom's exemption application for Medupi meets the criteria set forth in s59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Medupi and the potential conditions that may apply.

9.8.4. **Recommendation**

In respect of its Medupi Power Station, it should be noted that with the proposed commissioning of FGD at Medupi by 1 April 2032, the plant will come into compliance with the new plant MES. As such, it is recommended that the exemption granted to Medupi expires on 1 April 2032.

The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION | New Plant MFS | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be | COMMENTS |
|--|---------------------|--------------------------|------------------------------------|---------------------------|---|
| UNIT | mg/Nm3 | | 1 criou | Acineveu | |
| SO ₂ (SV0013, | | | | | |
| SV0014, | | | | | |
| SV0015, | | | | | |
| SV0002, | | | | | |
| SV0011, | | | | | |
| SV0012) | 1000 | 3500 | Monthly | Immediate | |
| SO ₂ (SV0013, SV0014, SV0015, SV0002, SV0011, | | | | | The above recommendation is subject to the Minister's review of the Cost Benefit Analysis in respect of FGD. |
| SV0012) | 1000 | 1000 | Daily | 01-Apr-32 | |

9.8.4.1. Medupi Flue Gas Desulphurisation (FGD) Cost Benefit Analysis (CBA) and power system modelling

Eskom's exemption application indicated that CBAs had been undertaken for their three ERP Scenarios, the first of which included installing an FGD at Medupi. This CBA includes abatement interventions for PM and NO_x from all eight plants, as well as the corresponding health benefits from these.

HNM has the following concerns with the CBA's undertaken by Prime Africa for Eskom's exemption application:

- The issue of airshed saturation (cumulative impact) is not accounted for, and this is an important determinant of health impacts. For example, in a saturated airshed, asthmatics respond to lower emission levels more quickly and intensely than healthy, unexposed individuals.
- The use of Exposure Response Functions from other countries likely underestimates South Africa's baseline TB and HIV concerns, which impact on respiratory, cardiovascular and immunological response.
- Synergistic pollutant interactions were not incorporated, which contribute to cumulative impacts.
- The value of abating additional pollutants to PM, Nox and SOx were not included.
- Morbidity impacts were not included (cost of medical treatment, loss of employment, impacts of health risk on households, employers, and the healthcare and insurance industries, educational impacts for sick children and childcare implications, consideration for vulnerable populations such as children, the elderly, and those with chronic health conditions).
- Environmental aspects such as infrastructure and services to provide water and waste management (sorbents) associated with the FGD were not included.

To respond to the concerns articulated above, the following must be included in the quantitative assessment:

- Health costs (addressing all concerns cited above)
- Technology costs (construction, maintenance and operation)
- Energy efficiency penalty

- CO₂ costs
- Cost of sorbent supply, including infrastructure costs
- Waste treatment
- Cost of water supply, including infrastructure costs

The CBA must be limited to SO_2 health impacts, holding all other pollutants constant. Further, plant closure dates of 2045, 2055 and 2071 must be considered in separate scenarios. The report must also provide commentary on construction and operational risks, timing and duration of outages required to install the FGD, finance availability, project status currently and the plant emission levels post the retrofit. Implications for SO_2 emissions and the FGD plant of running Medupi at reduced utilisation rates must be commented upon.

As indicated previously the CBA must consider two scenarios each achieving different levels of SO2 emissions reductions, and independent power system modelling must be undertaken to explore the implications of installing retrofit technologies as well as alternatives.).

9.9. ESKOM'S MATIMBA POWER PLANT ("MATIMBA)

9.9.1. Summary of Application

9.9.1.1. Background: Postponement Application (2020)

On page 4 of Eskom's motivation, which accompanied its postponement application, Eskom states as follows:

"A MES postponement decision was issued to Matimba in 2015 and again in 2018 in respect of compliance to the MES SO2 limit. With the amendments of the MES regulations in October 2018, it is necessary to submit this application for alternative limits. Eskom has applied and received a condonation for the late submission of an application for Matimba until November 2019, and an initial application was made by that date. This document is an update of the November 2019 application with some revised information (in particular an updated Atmospheric Impact Report and motivation) as Eskom committed to in the November 2019 application and with edits after the Public Participation completed in August 2020."

"Matimba already achieves the 100 mg/Nm3 Particulate Matter (PM) daily for 'existing' MES limits and the "existing" limit of nitrogen oxide (NOx - 1100 mg/Nm3). However, Eskom's Matimba Power Station will not be able to comply with the 750 mg/Nm3 daily 'new plant' MES for NOx, the new plant

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and existing plant SO2 limit of 1000 mg/Nm3 and 3500 mg/Nm3 respectively, and the 50 mg/Nm3 daily PM limit, consistently. As such Matimba is requesting an alternative monthly PM limit of 50 mg/Nm3, a monthly NOx limit of 750 mg/Nm3 as well as a monthly SO2 limit of 4000 mg/Nm3, until decommissioning of the station. Eskom has a present postponement decision granting a monthly limit of 3500 mg/Nm3 monthly limit for SO2 until 31 May 2025. Eskom will be unable to meet the SO2 new plant daily limit of 1000 mg/Nm3 from 2025 without the installation of Flue Gas Desulphurisation (FGD) technology – which Eskom argues in this application, is not warranted or appropriate." (sic)mA summary of the indulgence sought by Eskom is recorded on page 9 of its motivation, as follows: "In summary, the application submitted for Matimba is:m(i) Alternative monthly limit of 750 mg/Nm3 for NOx from 1 April 2020 until decommissioning.m(ii) Alternative monthly limit of 750 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of A000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOx from 1 April 2020 until decommissioning.m(iii) Alternative monthly limit of 4000 mg/Nm3 for SOX from 1 April 20

The emission limits proposed in this application are informed by plant design, plant operations, coal quality and the existing regulatory requirements.

In terms of the existing license and postponement decisions, Matimba has until 1 April 2025 to comply with the SO2 limit. It is understood that the previously granted postponements of limits (monthly limit of 3500 mg/Nm3) will remain in place until 2025 as a minimum.

Based on the techno-economics and with due consideration of the issues described in this application, any additional measures other than what was committed to above and the emission limits requested are not financially viable...."

Eskom's request is also set out in table 1 on page 9 of Eskom's motivation, which shows the applicable limits contained in the Matimba power plant's AEL and the requested emission limits:

| | Current Limit (from AEL) | | | Requested Emission Limits* | | |
|----------------------------|------------------------------|---------------------|---------------------------|----------------------------|---------------------|---------------------------|
| | Limit value | Averaging period | Date to be achieved by | Limit value | Averaging period | Date to be achieved by |
| Units 1, 2 and 3 (PM) | | Doily | 1 April 2020 | 50 | Monthly | 1 April 2020 |
| Units 4, 5 and 6 (PM) | 50 | Daily | r April 2020 | 50 | monuny | 1 April 2020 |
| Units 1, 2, and 3 (SO2) | 3500 | Monthly* | 1 April 2020 | 4000 | Monthly | 1 April 2020 |
| Units 4, 5 and 6 (SO2) | | | | | liciting | |
| Units 1, 2 and 3 (NOx) | 750 | Daily | 1 April 2020 | 750 | Monthly | 1 April 2020 |
| Units 4, 5 and 6 (NOx) | | | | | | |

*The requested alternate emission limits above are in mg/Nm3 at 273 K, 101.3 kPa, dry and 10% Oz.
* Limit as per 2018 MES application grant (LP/ES-MT/WDM/20170825)

In paragraph 6 of Eskom's motivation, it sets out the reasons for applying for a postponement.

The following reasons are listed, and each is then elaborated on in its motivation:

- a) Coal quality and the high sulphur content of Waterberg coals;
- b) Plant performance and the need for operational flexibility;
- c) The remaining life of Matimba power station;
- d) The cost of SO₂ reduction and Eskom's financial position;
- e) Water availability and water use associated with SO₂ reduction;
- f) The environmental implications of SO₂ reduction (waste, sorbent and energy impacts);
- g) The state of air in the Waterberg and the predicted impact of Eskom's application;
- h) The potential impact on national electricity supply; and
- i) Eskom's Just Energy Transition Strategy and climate change response.

With regard to the coal quality in the Waterberg area, Eskom states, in its motivation, that,

"The root cause of the high SO2 emissions experienced is the high sulphur content in the coal supplied to the station by the Exxaro Grootegeluk Coal Mine...In the short to medium-term, there is no simple remedy to the situation, and all potential solutions bring along with them significant operational, environmental and financial implications. Load losses, coal beneficiation practices, alterations to existing coal contracts and options to source coal from other mines are all options that have been looked into to find potential solutions but have proven not to be feasible. To better manage coal quality, Eskom is monitoring the sulphur content of the coal daily, and, where high levels are seen, the station engages with the mine to increase off-take from low sulphur mine sources. The mine and station are also engaging in coal quality forecasting and blending low and high sulphur areas in the mine to improve the average quality of the station feed."

Below is a summary of what Eskom applied for in 2020 and the NAQO's decision in respect thereof:

| S21 Category | Appliance | opliance Postponeme nt period sought | Emission Standards | | | |
|--|-----------|--|--------------------|---------------------|-----------------|--|
| | | | Minim Stand | num Emi Iards (m | ssion g/Nm³) | Decision |
| | | | Poll ut- ant | 2015 | 2020 | |
| Subcategory 1.1: Solid Fuel Combustion Installations | 6 Units | 50mg/Nm ³ (monthly) from 1 April 2020 until decommissio ning | РМ | 100 | 50 | Alternative limit is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a) and (12A)(c)(i). |
| | | 4000mg/Nm ³ (monthly) from 1 April 2020 until decommissio ning | SO ₂ | 3500 | 1000 | Alternative limit is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a) and (12A)(b). The requirement to comply with the minimum emission standards for new plant as stated in the 2015 postponement decision with a limit of 3500mg/Nm ³ |

| | | | | from 1 April 2020 to 31 March 2025 thus remains in place. |
|--|--|------|-----|---|
| 750m (moni from 2020 decor ning | ng/Nm ³ NOx thly) 1 April until mmissio | 1100 | 750 | Alternative limit is declined as the facility does not comply or meet the requirement of GN 1207 of 2018, (12A)(a). |

The NAQO's decision, summarised above, was subject to the following further conditions, set out in its decision dated 30 October 2021:

- a) "This decision will have to be reflected in your AEL to be of force and effect. Therefore, you must liaise with the relevant AELA in this regard as soon as possible so that the required amendments, variations and additions to your AEL can be effected.
- b) You are required to submit a quarterly progress report on the implementation of your compliance road map and commitments that you made in support of the postponement application for Eskom Matimba Power Station.
- c) You are also required to provide a progress report on implementation of offset projects where applicable, as well as other reporting requirements included in the AEL. The reports must be submitted to the NAQO and the AELA following the Department of Forestry, Fisheries and the Environment's financial year.
- d) Eskom Matimba Power Station's requirement to implement an offset programme to reduce SO2 pollution in the ambient/receiving environment as the facility is located in the Waterberg-Bojanala Priority Area. A definite offset implementation plan is expected from Eskom Holdings SOC Limited (Matimba Power Station) within 90 days from the date of issue of this decision.
- e) The decision may be reviewed by the NAQO with the concurrence of AELA should ambient air quality conditions in the affected area of the plant not conform to ambient air quality standards."

Eskom approached the Minister to appeal the decision of the NAQO.

9.9.1.2. The Minister's Response (2024)

In May 2024, the Minister approved the MES suspensions for the power stations set to shut down by 31 March 2030 (Hendrina, Grootvlei, Arnot, Camden and Kriel) and, under s59 of the NEMAQA, instructed Eskom to apply for MES exemptions for the remaining stations (Lethabo, Kendal, Tutuka, Matla, Duvha, Majuba, Matimba and Medupi). The Minister would then assess each application based on its merits and supporting information.

As part of the Minister's decision, Eskom was required to review its 2022 ERP to address emission reductions in the Eskom Fleet.

9.9.2. Section 59 Exemption Application

9.9.2.1. Structure of the application

- Cover Page
- Fleet Summary Report
- Appendix A: Station Specific Exemption Report Matimba Station
- Appendix B: Cumulative Airshed Atmospheric Impact Report (Waterberg Area)
- Appendix C: Airshed Specific Health Cost Benefit Analysis (Waterberg Area)
- Appendix D: Station Specific Atmospheric Impact Report Matimba Station

9.9.2.2. Eskom's application with regards to the Matimba Power Station

- Matimba is currently compliant with the new plant MES for PM.
- Matimba is currently compliant with the new plant MES for NO_x.
- Eskom is requesting an exemption from the new plant MES for SO₂ Matimba until its assumed shutdown.

| | POINT | | М | DURATION OF | | |
|---|--|-----------------|--------------------------|----------------|-------------------------|------------|
| | SOURCE CODE | POLLUTANT | mg/Nm ³ | Average Period | Date To Be Achieved | EMISSIONS |
| | SV0013, | SO ₂ | 3,500 mg/Nm ³ | Monthly | 1 April 2025 - shutdown | Continuous |
| I | SV0014, SV0015, | NOx | 750 mg/Nm ³ | Daily | 1 April 2025 | Continuous |
| | SV0002, SV0011, SV0012 | РМ | 50 mg/Nm ³ | Daily | 1 April 2025 | Continuous |
| ſ | *Emission limits requested are for normal operations, so exclude upset, startup, shutdown, or maintenance conditions | | | | | |

Table 7-5 - Emission limits requested for Matimba

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 249 of 250 Eskom states that, based on the analysis completed for this application, the exemptions requested are appropriate and balance the environmental and health impacts of its emissions with the national requirements for security of supply and sustainable growth and development.

9.9.2.3. What is Eskom intending to do at Matimba station to meet the standards for which it is applying?

Shutdown of Matimba is planned from 2039 to 2043.

PM

- Although Matimba has recently (in terms of its application) experienced elevated PM emissions, these are being addressed, which will ensure compliance with the new plant MES from 1 April 2025. Despite this compliance, HFPS installations are planned for Matimba to reduce emissions further. Since emissions will comply with the new plant MES by 1 April 2025, priority has been given to other stations' abatement projects to bring them into compliance, after which Matimba projects will commence.
- To offset Eskom's PM emissions further, Eskom has introduced an AQO program, a key component of Eskom's ERP. This program aims to offset PM emissions by implementing interventions that deliver net AAQ benefits, focusing on PM₁₀ and PM_{2.5}.
- Eskom plans to expand its AQO program to additional communities and explore new interventions, such as dust suppression on unpaved roads and veld fire management.
- In the Waterberg area, key interventions include introducing cleaner household energy sources, managing waste burning, reforestation and surfacing bare public grounds.

NO_X and SO₂

- NO_x emissions at Matimba will comply with the new plant MES from 1 April 2025, and no NO_x abatement projects are planned at this station.
- SO₂ emissions are currently not controlled at Matimba.
- An exemption from the new plant MES for SO₂ is requested until shutdown.

Semi dry FGD is listed under the exemption request. In this regard, Eskom states that, "while technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced."

| | ERP Alternative | Complete | Planned | Timeframe to Full Completion |
|--|---------------------------|--------------|---------|------------------------------|
| Duvha | | None | None | N/A |
| Matla | | None | None | N/A |
| Kendal | | Not Required | None | N/A |
| Lethabo | FRP 2024 A [.] | None | LNB | 1 April 2031 |
| Majuba | ERP 2024 B; ERP 2024 C | None | LNB | 1 April 2030 |
| Tutuka | | None | LNB | 1 January 2028 |
| Kusile | | LNB | None | N/A |
| Matimba | | Not Required | None | N/A |
| Medupi | | LNB | None | N/A |
| *Includes required optimisation periods of new equipment | | | | |

Table 4-2 – Status of NOx abatement projects

Table 4-3 – Status of SO₂ abatement projects

| | ERP Alternative | Complete | Planned | Evaluation ¹ | Exemption Request ² | Timeframe to Full Completion |
|---------|-----------------|----------|---------|---------------------------|-----------------------------------|---------------------------------|
| Duvha | - | - | - | - | - | N/A |
| Matla | - | - | - | - | - | N/A |
| Kusile | ERP 2024 A | Wet FGD | - | - | - | N/A |
| Medupi | ERP 2024 A | - | Wet FGD | - | - | 1 April 2032 |
| Kendal | ERP 2024 B | - | - | Semi-Dry FGD ² | - | 1 April 2036 |
| Majuba | ERP 2024 B | - | - | DSI FGD ² | - | 1 April 2034 |
| Lethabo | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Tutuka | ERP 2024 C | - | - | - | Semi-Dry FGD | N/A |
| Matimba | ERP 2024 C | - | - | _ | Semi-Dry FGD | N/A |

¹Considered an alternative and is being evaluated as part of this application

²While technologies are included in this table, exemption for these is being requested, with this position maintained by Eskom from previous applications, and therefore no completion dates are provided as concept and design has not commenced.

9.9.3. HNM's view on whether or not the Exemption Application meets the legal criteria of s59

In this section, consideration will be given to whether Eskom's exemption application for Matimba Power Station, meets the requirements for an exemption in terms of s59, as discussed in section 7.2 of this report.

On 10 December 2024, Eskom submitted, in writing, a fleet-wide and station-specific exemption applications for a number of power stations, including Matimba. The requirement that the application must be in writing is clearly met.

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It is further required that the application be accompanied by reasons. Eskom's s59 application for all of the stations applied for, including Matimba, is comprised of a fleet-wide application and station-specific applications, which together run to over 500 pages with annexures. Eskom's Fleet exemption application highlights the specific environmental and operational challenges it faces at a fleet level. In Matimba's station-specific exemption application, Eskom addresses a wide range of issues at a general level and specific to Matimba and, in particular, sets out certain of the consequences for not obtaining an exemption from the MES, as applied for. In HNM's view, these two documents, read together, contain a copious amount of information, including Eskom's reasons for requiring an exemption from the MES for Matimba. Accordingly, Eskom complies with the requirement to advance reasons.

No applicant can be exempt from sections 9, 22 or 25 of NEMAQA. In its application for Matimba, Eskom is applying for an exemption from the MES contained in the List of Activities, which are regulations promulgated in terms of section 21 of NEMAQA. Eskom is not applying for an exemption from any one of the precluded sections and thus complies with this provision.

In terms of section 59(3)(a), the Minister may require the applicant to take appropriate steps to notify relevant government bodies, interested parties and the public. To comply with this, it is necessary to publish the notice in at least two nationally circulated newspapers, providing reasons for the application and additional details.

To HNM's knowledge, the Minister did not specifically direct Eskom to comply with section 59(3)(a) of NEMAQA however, from a reading of its application, it would appear that Eskom has nonetheless complied. According to its exemption application for Matimba, notification of the exemption application as well as an opportunity to comment on the application process, was issued to the general public via advertisements published in the newspapers outlined in Table 8-3, in November 2024, in English. The purpose of the advertisement was to notify the general public of the application, inform the public about public meetings, and provide an opportunity to register on the project database and provide input into the process. For ease of reference, Table 8-3 is copied here:

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Table 8-3 - Placement of Adverts

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 252 of 253
In view of the above, it is HNM's view that Eskom's exemption application for Matimba meets the criteria set forth in section 59 of NEMAQA. What must now be considered is the scope of the exemption to be granted to Eskom for Matimba power station and the potential conditions that may apply.

9.9.4. **Recommendation**

In respect of its Matimba Power Station, it should be noted that given the uncertainty of the power sector transition, it is recommended that no exemption is granted for a period longer than ten years. As such, it is recommended that the exemption granted to Matimba expires on 1 April 2035.

The emission limits requested by Eskom, in its exemption application, have been considered by HNM, which makes the following recommendations:

| POLLUTANT AND EMISSION UNIT | New Plant MES mg/Nm3 | Recommendation mg/Nm3 | Recommended Averaging Period | Recommended Date to Be Achieved |
|--|-------------------------|--------------------------|------------------------------------|---------------------------------------|
| SO ₂ (SV0013, SV0014, SV0015, SV0002, SV0011, SV0012) | 1000 | 3500 | Monthly | Immediate |

10. CONCLUSION

This report, as previously stated, was compiled under severe time constraints. Nonetheless, the assessment methodology employed has been rigorous and has taken account of all the complex and inter-locking factors that consideration of the section 59 Exemption Applications entail. This report and its recommendations attempt to balance the needs of the country in terms of the security of energy supply and the cost thereof, as well as the critical health and socio-economic considerations, particularly in those communities and towns near the power stations.

Regrettably, this has required making very difficult decisions and trade-offs. The consequences on electricity supply of enforcing the MES will mean the closing of power stations and the loss of approximately 24 000Mw of electricity. That is a consequence the country simply cannot bear; it would be disastrous. Consequently, our recommendation to Minister George is that the exemptions should be granted but subject to a range of stringent conditions that will bind Eskom to limit and mitigate the impact on health in those communities affected by Eskom's non- compliance with the MES. These conditions set out clear targets to reduce pollutants and are time bound.

Report and Recommendations in respect of the Exemption Application of Eskom submitted in terms of Section 59 of the National Environmental Management Air Quality Act 39 of 2004 Page 253 of 254 We have also recommended a number of conditions that involve studies that will investigate key areas of Eskom's functioning including Despatch Prioritization and reducing loads at power stations in order to reduce the amount of coal burnt. There are also other important studies required of Eskom, set out in the conditions, that will contribute to the transition from coal to renewable energy sources, and the reduction of pollutants from power stations.

The legal analysis of the section 59 Exemption Applications is extensive and clearly set out in the report.

We would like to thank Eskom for answering our clarity seeking enquiries and the DFFE for also providing clarity on certain issues.

We would also like to thank the experts who advised HNM on the complicated and critical areas which this report traverses, and for working tirelessly to meet stringent deadlines.