Eskom	Matimba Power Station annual emission report	Matimba Power Station

Title: **Matimba Power Station annual emission report for 2021/2022 financial year**

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Environmental Officer	**Environmental Manager**	**General Manager**
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Content

1. Introduction

This serves as the annual report required in terms of Section 7.7.3 in Matimba Power Station's Atmospheric Emission License (AEL) "*The License Holder must complete and submit to the Licensing Authority, an annual Report. The report must include information for the year under review (i.e., annual year end of the company). The report must be submitted to the licensing authority not later than 60(sixty) days after the end of each reporting period"*, as well as in terms other reporting requirements listed in the Minimum Emission Standards. The emissions are for Matimba's 2021/2022 financial year, which is from 1 April 2021 to 31 March 2022. Verified emissions of particulates, SO_2 and NO_x (as NO_2), as measured by installed CEMS. Greenhouse Gas Reporting shall be done in accordance with the National Greenhouse Gas Reporting Regulations.

Table 1: Name, description and reference number of plant as specified in the AEL

Name of facility	Eskom Holdings SOC Limited Matimba Power Station
Description of facility	Electricity generation
Enterprise registration number	2002/015527/06
AEL reference number	H16/1/13-WDM05

2. Annual emission information

2.1 Annual consumption rates

Figure 1 and Figure 2 below indicates the monthly coal and fuel oil consumption rates, respectively, in tons for the 2021/2022 financial year.

Figure 1: Coal consumption for 2021/2022 financial year

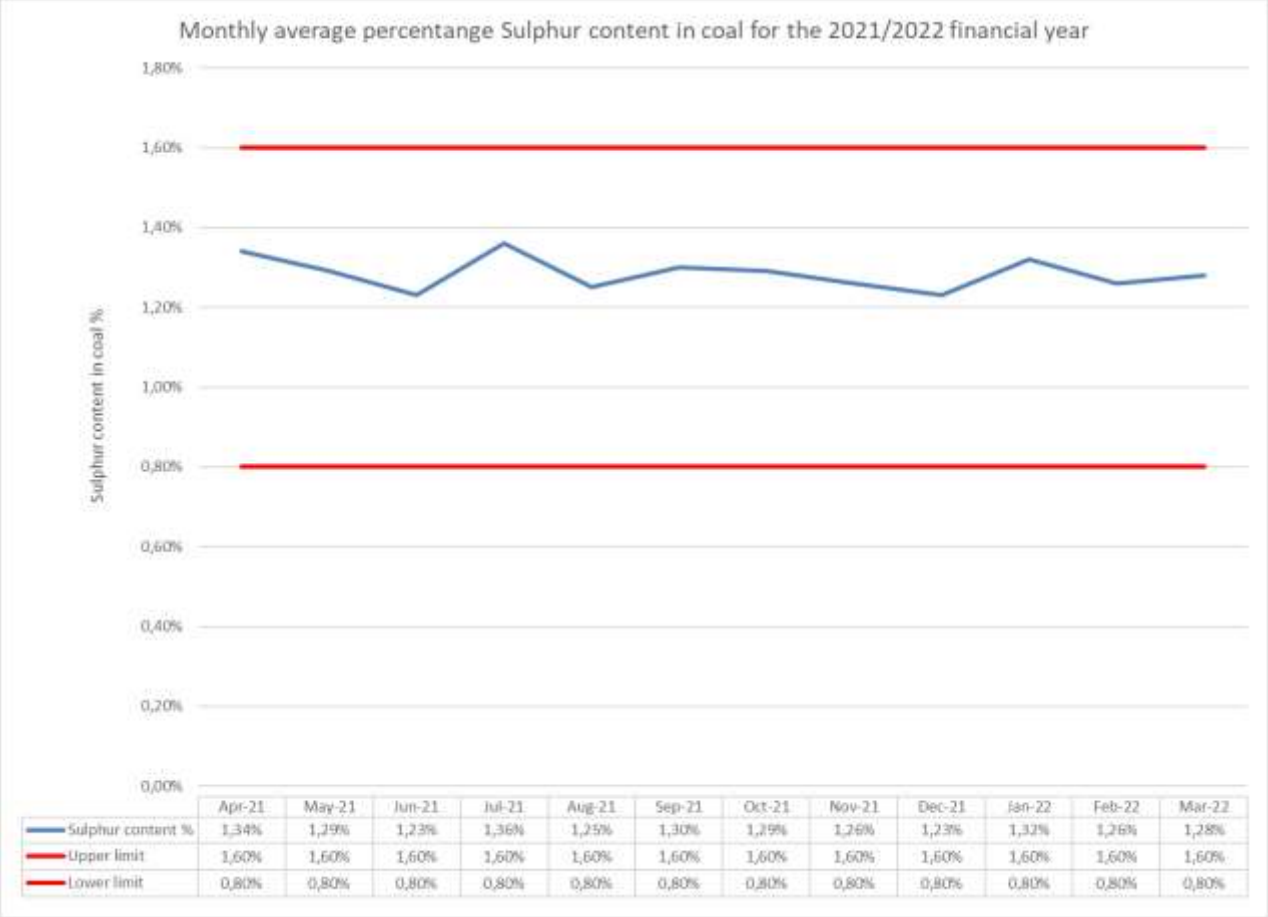
Monthly coal consumption remained below the limit of 1 500 000 Tons per month

Figure 2: Fuel oil consumption for 2021/2022 Financial year

Matimba Power Station exceeded the monthly fuel oil usage limit of 1200 Tons per month in November 2021 and December 2021. The Increased usage of fuel oil was due to multiple start-ups of units that had to be done after several unplanned unit trips and planned outages.

2.2 Energy source characteristics

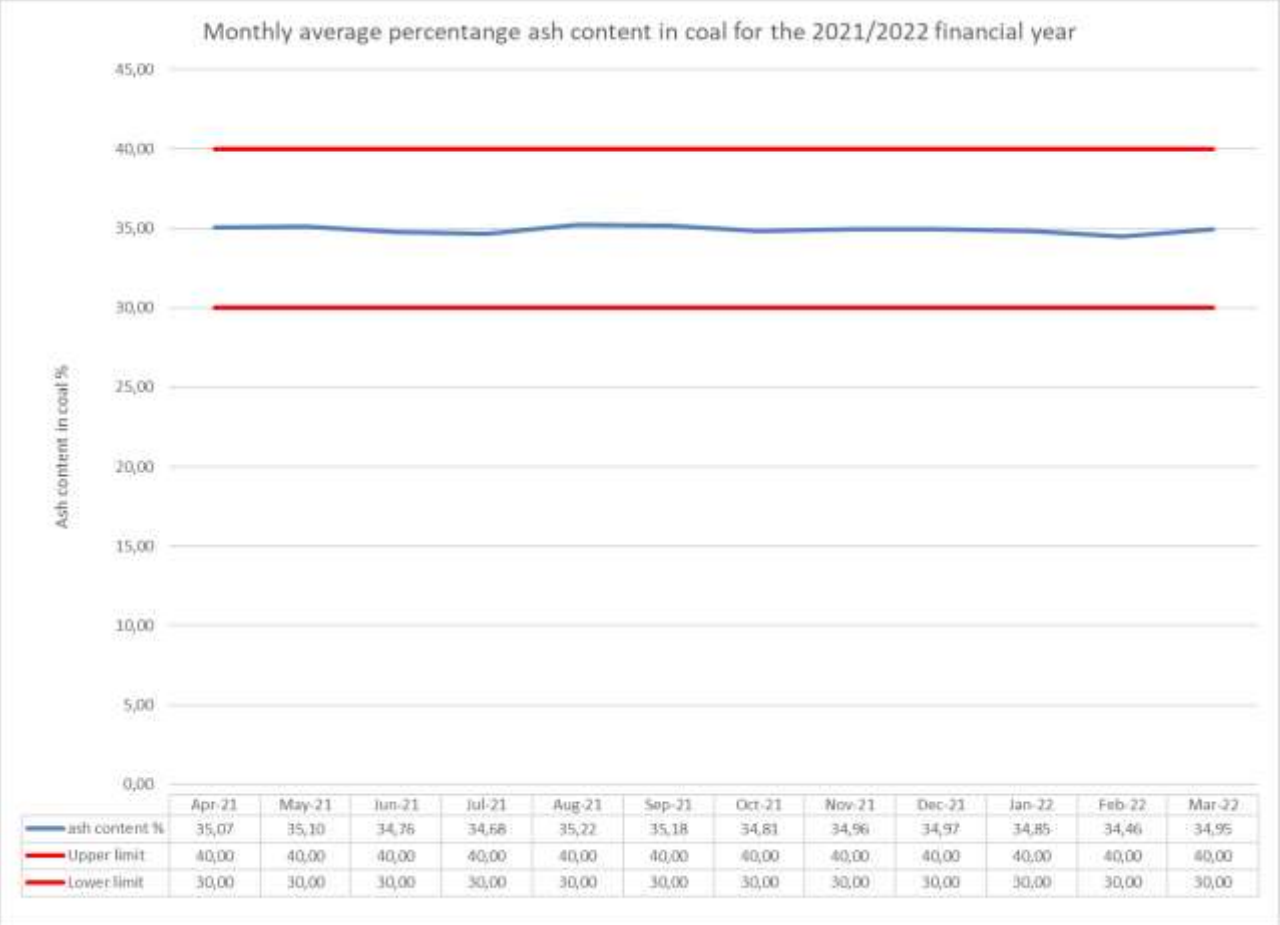
The figures below indicate the Sulphur content and ash content of the coal and Sulphur content of the fuel oil used in the 2021/2022 financial year.



	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
Sulphur content %	1,34%	1,29%	1,23%	1,36%	1,25%	1,30%	1,29%	1,26%	1,23%	1,32%	1,26%	1,28%
Upper limit	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%	1,60%
Lower limit	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%	0,80%

Figure 3: Sulphur content in coal for 2021/2022 financial year

Monthly average Sulphur content of coal has remained within the specified limits. Daily peaks are however still occurring leading to increased SO_x emissions.



	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
ash content %	35,07	35,10	34,76	34,68	35,22	35,18	34,81	34,96	34,97	34,85	34,46	34,95
Upper limit	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00
Lower limit	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00

Figure 4: Ash content in coal for 2021/2022 financial year

The monthly average ash content within the coal remained within the required limits.

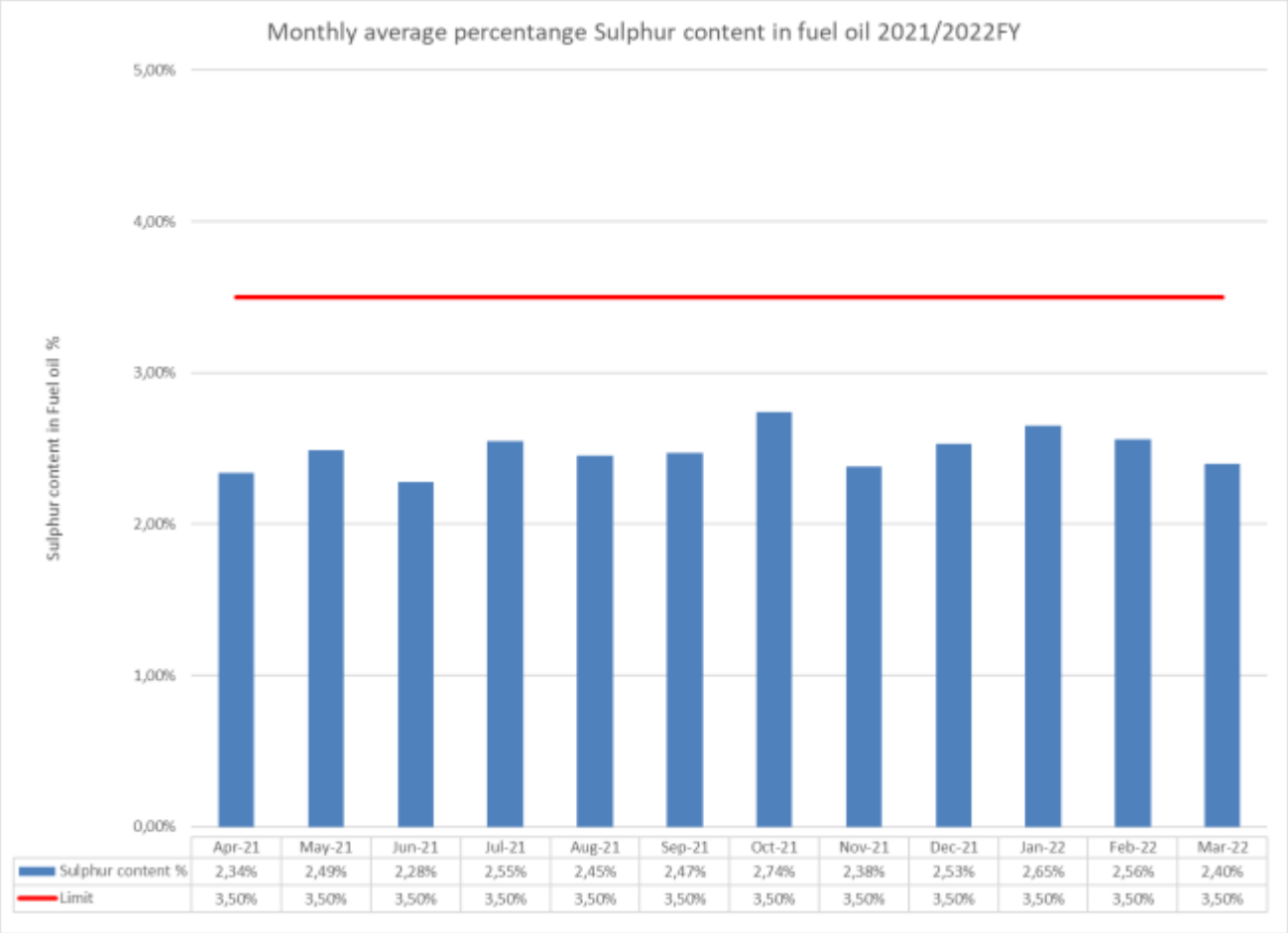


Figure 5: Sulphur content in fuel oil for 2021/2022 financial year

Sulphur content of the fuel oil has remained below the limit of 3,50% in the 2021/2022 financial year. The fuel oil sulphur content for the month of May and July 2021 were averaged data of the three preceding months with available data. The rationale is the laboratory experienced technical difficulties and reliable analysis data couldn't be obtained.

2.3 Emission trends

The emission tonnages in tables 1 and 2 below are that of the 2021/2022 financial year.

Table 2: General overview of emissions at Matimba Power Station 2021/2022

Power Station	Coal-fired emissions (tons/annum)	Fuel-oil emissions (tons/annum)	Total (tons/annum)
Matimba Power Station	**SO_2: 342 163,824** **PM: 3 934,440** **NO_x: 63 479,105**	**SO_2: 791,07**	**SO_2: 342 954,894** **PM: 3 934,440** **NO_x: 63 479,105**

Table 3: Pollutant Emission Trends

Month	PM (tons)	NO_x (tons)	SO_2 (tons)
April 2021	269,900	5770,300	31083,700
May 2021	339,000	6088,879	32026,373
June 2021	348,775	5901,660	30450,980
July 2021	399,053	6320,531	33177,835
August 2021	301,333	5583,684	30403,026
September 2021	231,465	4161,668	20159,130
October 2021	366,174	4592,529	23020,244
November 2021	330,161	4479,088	26258,240
December 2021	343,019	4971,772	27707,403
January 2022	363,634	5203,267	28413,655
February 2022	392,753	4893,211	27912,235
March 2022	249,174	5512,516	31551,002

Table 4: Total volatile organic compound emissions 2021/2022 financial year

Month	TVOC (Kg/month)
April 2021	0,51
May 2021	0,56
June 2021	0,56
July 2021	0,56
August 2021	0,58
September 2021	0,56
October 2021	0,63
November 2021	0,69
December 2021	0,61
January 2022	0,62
February 2022	0,59
March 2022	0,56

*Note: Total volatile organic compound emissions are calculated based on fuel oil quantities used within the specific month.

Figures 6 to 8 below illustrates the monthly tonnages of pollutants emitted in the 2021/2022 financial year.

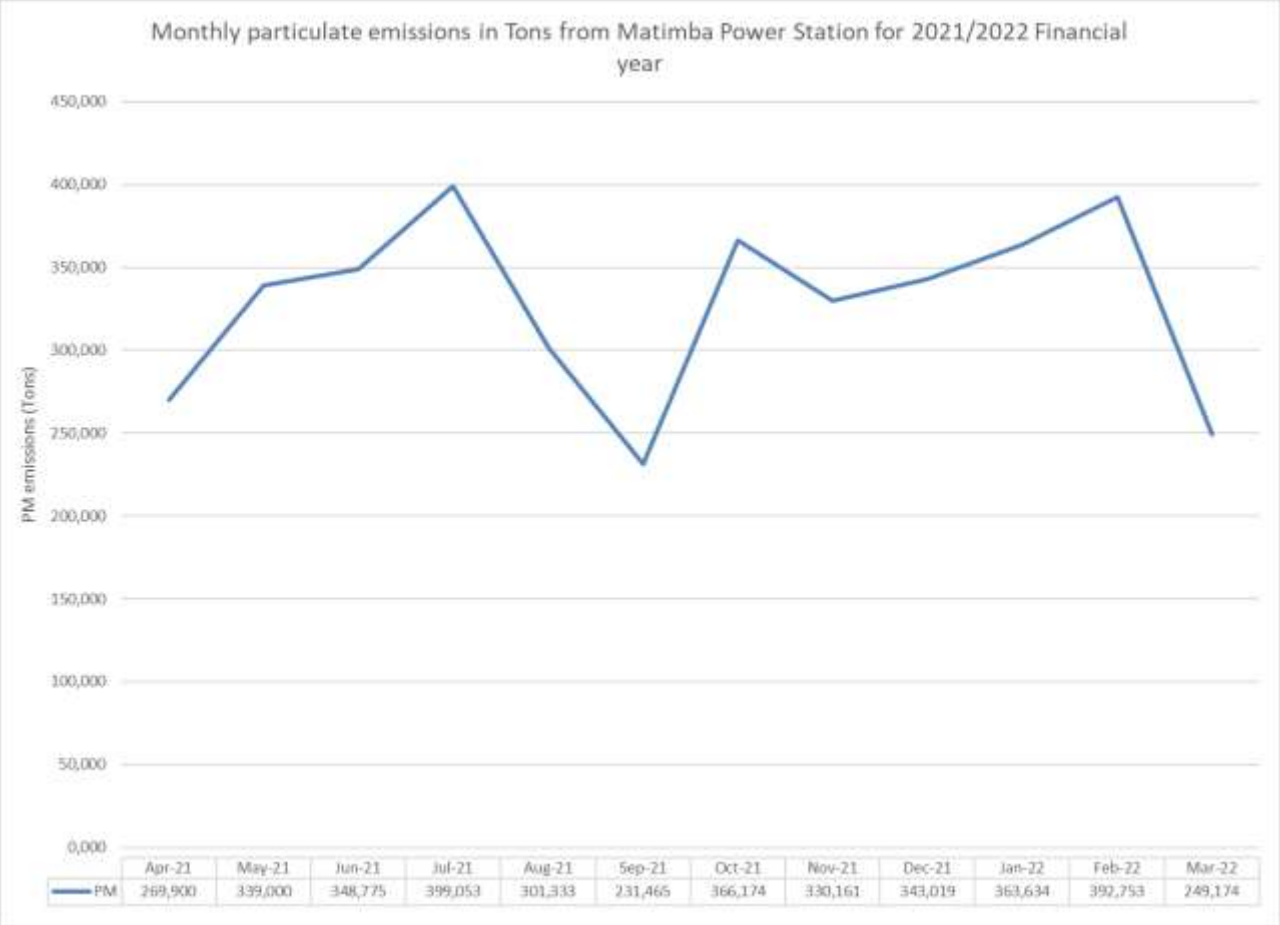


Figure 6: Monthly Particulate Emissions in tons from Matimba Power Station 2021/2022

Matimba experienced increases in particulate emissions in May to July 2021 and October 2021 to February 2022. The increase was due to multiple unexpected breakdowns on the dust handling plant, on the sulphur plant and on the ash conveyancing plant. The daily average limit of 50mg/Nm^3 was exceeded 178 times in the period between April 2021 and February 2022, 14 Section 30 incidents were reported as a result of these exceedances. Corrective actions have been implemented to repair defective plant areas and no exceedances occurred in March 2022. More information on exceedances will be provided in annexure 1. Particulate emissions for September 2021 were significantly lower than other months due to unit 1 being on outage and unit 4 being off from 10 September 2021 until 20 September 2021. Detailed daily emission concentrations are illustrated in the monthly reports submitted to your office.

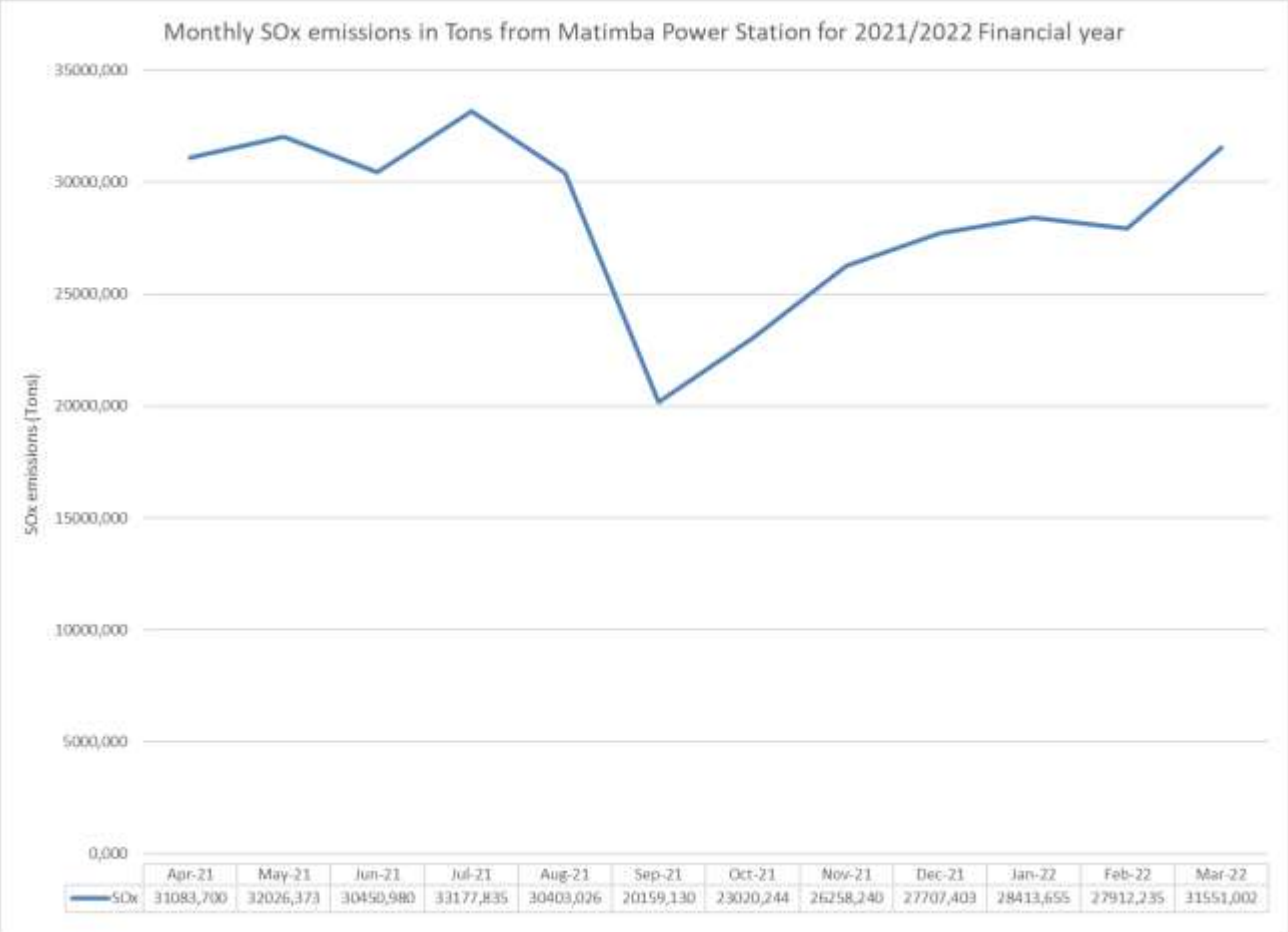


Figure 7: Monthly SO_2 Emissions in tons from Matimba Power Station 2021/2022

The reduction in SO_2 emissions in September 2021 is due to unit 1 being on outage and unit 4 being off from 10 September 2021 until 20 September 2021. Occasional daily peaks are still observed in the sulphur content of coal which leads to sporadic increases of the Sox emissions. Interventions such as blending high sulphur content coal with lower sulphur content coal, daily monitoring, and trending of sulphur content versus emissions is being conducted to manage the SO_2. No exceedances of the Monthly limit of 3500mg/Nm^3 occurred in the reporting period. Detailed daily emission concentrations are illustrated in the monthly reports submitted to your office.

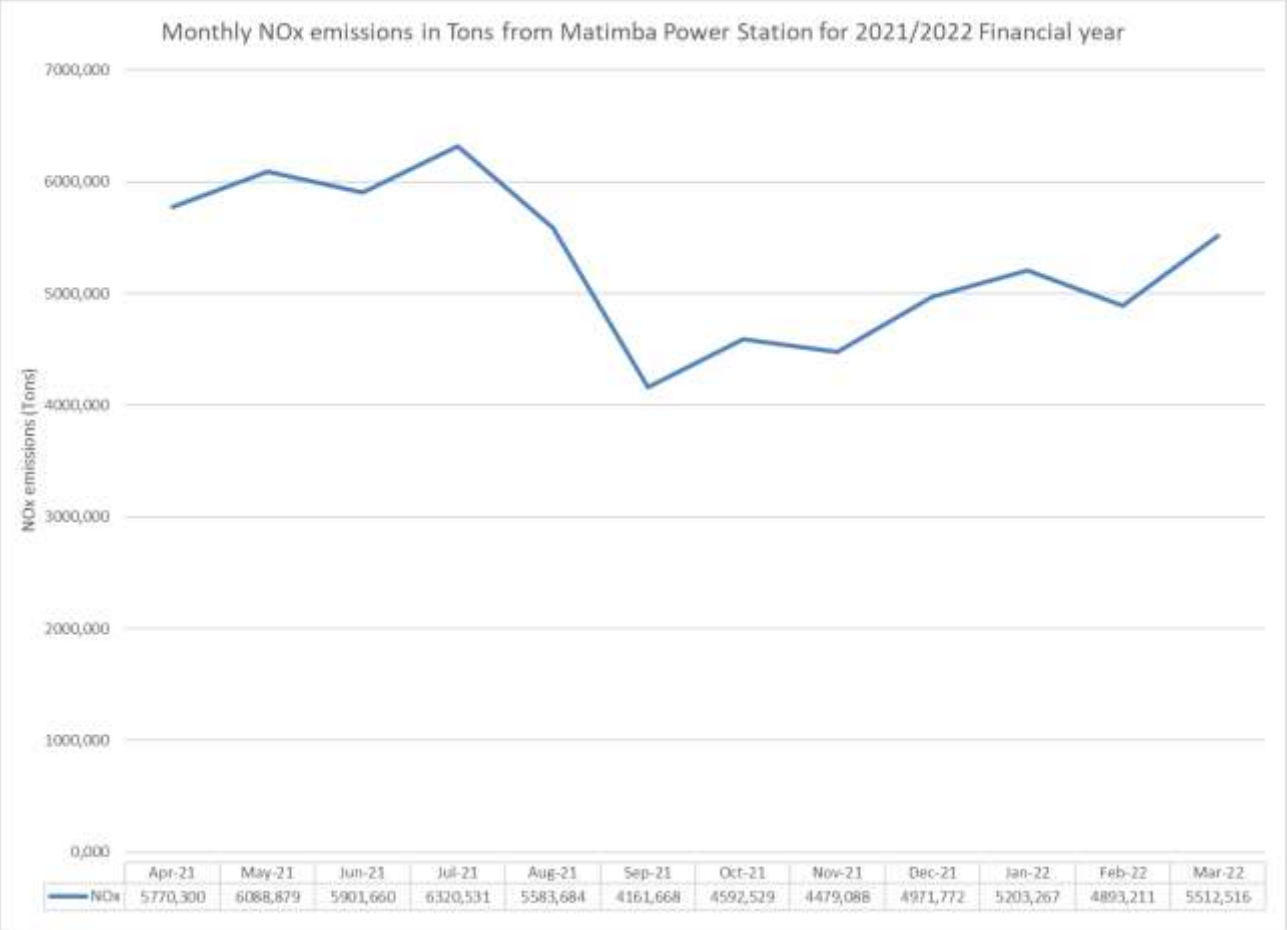


Figure 8: Monthly NO_2 Emissions in tons from Matimba Power Station 2021/2022

Particulate emissions exceeded the 50mg/Nm^3 limit 178 times in the 2021/2022 financial year, 14 of these exceedance incidents passed the 48-hour grace period. The exceedances were due to breakdowns on the ash handling plant and ash conveyancing plant, and defects on the sulphur plant. All breakdowns and defects were thoroughly investigated, and corrective actions were implemented to prevent re-occurrence. Emission performance have improved significantly and no exceedances occurred in March 2022.

NO_x emissions performance improved since the previous financial year. One (1) exceedance of the daily limit of 750mg/Nm^3 was noted in January 2022. The exceedance was attributed to a defective Oxygen analyser and emissions returned to below the limit after maintenance and calibration was performed on the analyser.

No exceedances of the monthly SO_2 limit of 3500mg/Nm^3 occurred in the 2021/2022 financial year.

For a detailed summary of exceedances refer to Annexure 1.

Data indicating compliance with the daily average emission limits of the respective pollutants is presented in the monthly emission reports sent to the Department.

2.4 Energy sent out

Figure 9 illustrates the monthly energy sentout for the 2021/2022 financial year

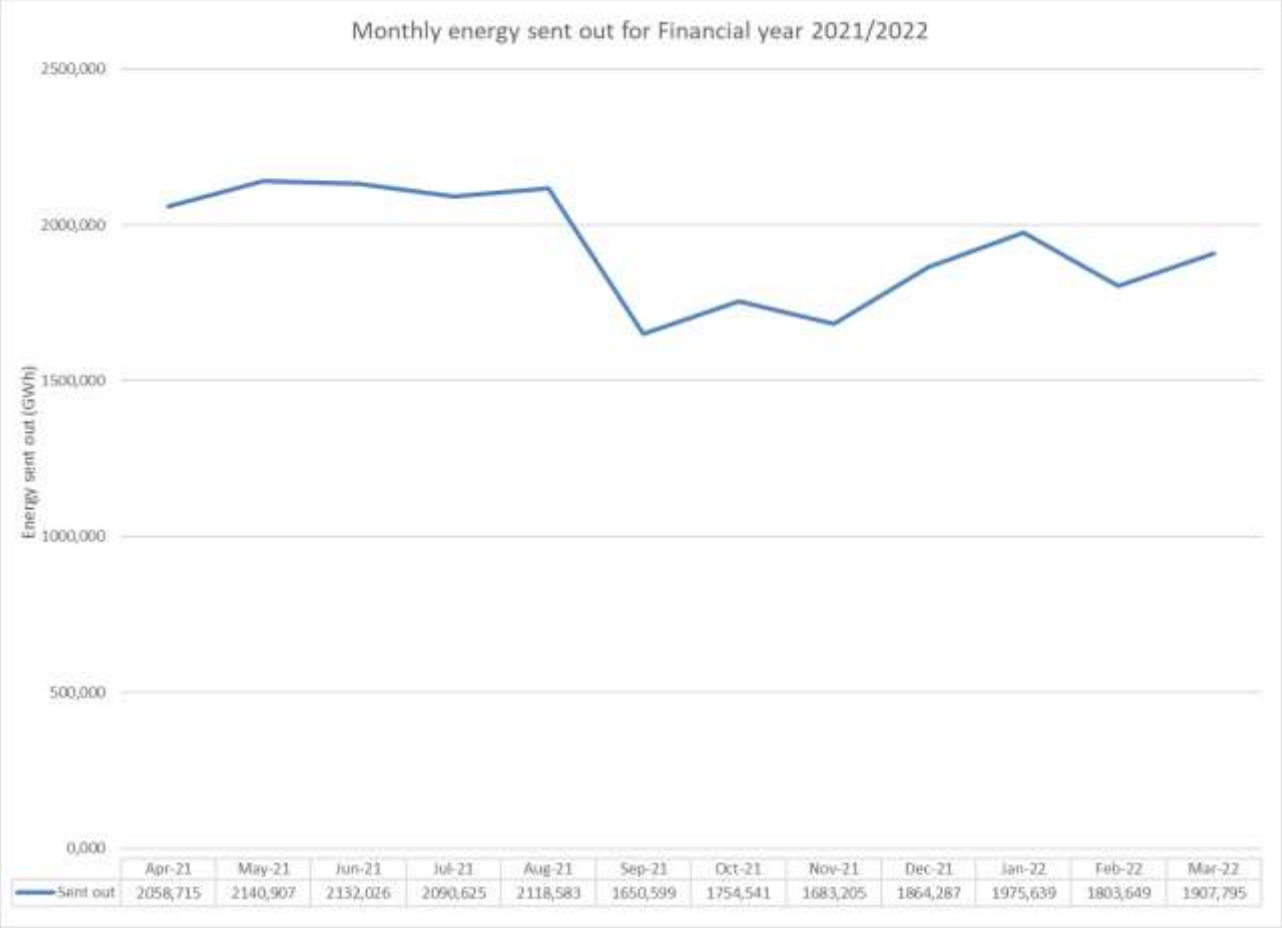


Figure 9: Monthly Energy Sent out GWh at Matimba Power Station 2021/2022

2.5 Ambient air quality monitoring

Matimba power Station monitors the effect of its emissions on the surrounding environment through an ambient air quality monitoring station located in the Marapong community. Detailed ambient monitoring reports are submitted to your office monthly along with the Matimba monthly emission report.

Table 5 and 6 below illustrates the compliance for the past calendar year (January 2021 – December 2021) as per the National Air Quality Standards.

Table 5: Ambient Monitoring station availability

	NO1	NO2	NOX	O3	SGT	SO2	TMP	WDR	WSP	WVL	$PM_{2.5}$	PM_{10}	CO	HG	HUM	Data Recovery	Station Availability
Jan-21	32	32	32	33	33	33	33	33	32	33	0	32	0	0	32	33	33
Feb-21	96	96	96	98	100	98	100	100	100	100	98	98	98	95	100	98	98
Mar-21	79	79	79	91	99	91	99	99	99	99	39	92	91	91	99	86	92
Apr-21	90	90	90	91	98	91	98	98	98	98	91	91	91	88	98	94	91
May-21	98	98	98	99	100	99	100	100	100	100	99	99	98	65	100	92	99
Jun-21	74	74	74	88	97	88	98	97	98	97	89	88	88	87	97	86	89
Jul-21	13	13	13	63	67	64	67	67	67	67	65	55	13	64	67	51	65
Aug-21	17	17	17	45	54	58	58	58	16	58	0	42	0	0	58	40	48
Sep-21	0	0	0	0	0	0	59	59	59	59	22	22	0	13	59	25	28
Oct-21	11	11	11	39	99	0	27	99	100	99	90	100	0	79	99	65	100
Nov-21	37	37	37	63	99	57	77	99	99	99	63	62	0	12	82	68	63
Dec-21	63	63	63	63	100	83	8	100	100	100	83	83	0	0	100	73	83
Average	51	51	51	64	79	64	69	84	81	84	61	72	40	49	83	68	74

Average data recovery was below the required 90% for most of the Months of 2021 with only February 2021, April 2021 and May 2021 data recovery achieving the 90% threshold. The poor performance was mostly due to frequent power interruptions and damaged analysers.

Detailed explanations for data recovery and monitoring station availability are provided in the ambient monitoring reports submitted to your office monthly.

Table 6: National Ambient Air Quality Limits exceedances

	SO2 10-minute	SO2 hourly	SO2 daily	NO2 hourly	PM10 daily	PM2.5 daily	CO hourly	O3 8-hourly
Jan-21	0	0	0	0	0	0	0	0
Feb-21	0	0	0	0	1	6	0	0
Mar-21	4	2	0	0	1	2	0	0
Apr-21	6	8	1	0	5	6	0	0
May-21	10	4	0	0	13	12	0	0
Jun-21	2	0	0	0	11	8	0	0
Jul-21	1	0	0	0	10	6	0	0
Aug-21	ND	ND	ND	ND	ND	ND	ND	9
Sep-21	ND	ND	ND	ND	ND	ND	ND	ND
Oct-21	ND	ND	ND	0	2	1	ND	0
Nov-21	0	0	0	0	0	0	ND	0
Dec-21	0	0	0	0	0	0	ND	0
Total exceedances	23	14	1	0	43	41	0	9
Allowed total exceedances	526	88	4	88	4	4	88	11

*ND= No Data

The number of exceedances of the PM10 and PM2.5 daily limits has exceeded their allowed number of exceedances per year of 4

2.6 CEMS monitoring data availability

Table 7: Monitoring data availability for Matimba Power Station 2021/2022

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
PM (%)	99,41	99,95	100,00	99,65	99,54	99,07
SO_2 (%)	89,13	98,32	99,94	82,90	83,01	54,62
NO_x (%)	94,24	96,30	99,94	82,83	83,07	61,03

Average monitor availability for the 2021/2022 financial year was below 80% for Gaseous emissions monitors for unit 6. The monitor was reported to be defective on 17 April 2021. Maintenance could not be performed due to a directive from the Department of Labour, prohibiting access to the stack lifts, following a safety incident. Access was granted in August 2021 and the monitor was repaired on 21 August 2021. Particulate matter monitors availability was well above the required 80%.

2.7 Major upgrades projects

No major upgrades were done for 2022 financial year.

2.8 Greenhouse gas emissions

Greenhouse Gas Reporting shall be done in accordance with the National Greenhouse Gas Reporting Regulations

2.9 Results of spot measurements or correlation tests:

Table 8: Dates of last conducted CEMS verification tests for PM, SO_2 and NOx

Name of service provider:		Stacklabs Environmental Services CC		
Address of service provider:		10 Chisel Street Boltonia Krugersdorp 1739		
Stack/ Unit	**PM**	**SO_2**	**NOx**	**CO_2**
1	2020/09/30 06h04	2020/09/09 13h00	2020/09/09 13h00	2020/09/09 13h00
2	2021/01/26 04h52	2021/01/27 13h00	2021/01/27 13h00	2021/01/27 13h00
3	2021/08/10 12h05	2020/09/24 07h00	2020/09/24 07h00	2020/09/24 07h00
4	2021/07/13 14h31	2020/09/16 02h00	2020/09/16 02h00	2020/09/16 02h00
5	2020/10/06 05h39	2020/10/08 02h30	2020/10/08 02h30	2020/10/08 02h30
6	2020/09/09 06h41	2020/09/09 13h00	2020/09/09 13h00	2020/09/09 13h00

*Reports will be submitted via a "*Zend to*" link due to size limitations.

2.10 Action taken addressing complaints

Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modelling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
Pieter Pieterse	Normal ash dump operations were altered as a result of ash disposal space constraints	Average fugitive dust fallout from March to December 2021 in direction of property where complaint originated from: 494 mg/m^2/day	N/A	Acquire additional resources to manage dust suppression system.	Completed
				Connect additional dust suppression equipment (pipeline)	31 March 2022
Manketti Lodge	Unavailability of downstream plants leading to ash being dumped at the Emergency ash offloading area	Average fugitive dust fallout from November 2021 to February 2022 in direction of property where complaint originated from: 933 mg/m^2/day and 728 mg/m^2/day	N/A	Investigate feasibility of installing dust suppression system at the emergency ash offloading facility.	13 July 2022

2.11 Summary of exceedances of emission limits

Refer to Annexure 1 - AEL exceedance reporting tool

2.12 NAEIS reporting

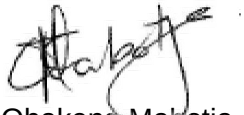
Matimba Power Station has submitted all emission data On the NAEIS system before the 30th of March 2022

3. Declaration of accuracy

The rest of the information demonstrating compliance with the emission license conditions is supplied in the monthly emission reports sent to your office.

I hereby declare the following:

- Normal operating conditions were maintained during emission tests.
- The information in this report is correct



Obakeng Mabotja
GENERAL MANAGER: MATIMBA POWER STATION