



Community Services Cluster
CONTROLLED FUELS POLICY

| | |
|--|--|
| Policy Drafted or Review by | |
| Policy Implementing Departments | |
| Endorsed by the Policy Technical Task Team (PTTT) | |
| Policy Mandated by | |
| Signature of Mandating Official | |
| Approved by | |
| Date Adopted | |
| Date of Next Review | |
| Reviewed Yes/No | |

Table of Contents

| | |
|---|----|
| 1. Preamble..... | 2 |
| 2. Purpose..... | 2 |
| 3. Problem Statement..... | 2 |
| 4. Legislative and Policy Framework..... | 3 |
| 5. Definitions and Acronyms..... | 3 |
| 5.1 Glossary..... | 3 |
| 5.2 Acronyms and Abbreviations..... | 4 |
| 6. Policy Rules..... | 5 |
| 6.1 Combustion Optimisation..... | 5 |
| 6.2 Emission standards..... | 6 |
| 7. Policy Procedures..... | 6 |
| 7.1 Source and Emission Inventories..... | 6 |
| 7.2 Policy Implementation and Communications Plans..... | 7 |
| 8. Policy Evaluation and Review..... | 12 |
| 9. Annex A – RAPA..... | 13 |
| 10. Annex B – Conversion Tables..... | 14 |
| 10.1 Emission limits proposed for eThekweni..... | 14 |
| 10.2 Conversion between units of measurement for the emission limits..... | 14 |

1. PREAMBLE

The City of eThekweni (EM) is a signatory to the C40 Clean Air Accelerator and thereby has committed to implementing ambitious action to improve air quality in its area of jurisdiction. The action is to be by way of developing and implementing substantive policies, projects and programmes to address air pollution. The first of such is the Controlled Fuels Policy which seeks to control emissions from dirty and carbon intensive fuels, such as coal and heavy fuel oil (HFO) from industrial and commercial activities. The controlled fuels policy development project aims to address the poor air quality in the whole eThekweni area which would lead to improved health and livelihood of the affected communities. Pollutants that stand to be reduced because of this policy include PM₁₀, PM_{2.5}, NO_x, volatile organic compounds, SO₂, ozone, formaldehyde as well as other toxic air pollutants such as hydrogen fluoride, hydrochloric acid, sulfuric acid and heavy metals such as arsenic and mercury which are found in these dirty fuels. These pollutants are contributors to PM_{2.5} and lead to its potency towards negative health effects.

The basis for prohibiting or restricting certain fuels already exists in the eThekweni Air Quality Management By-Law that was adopted by Council in 2020. Section 10(2)(b) of the by-law states that the Municipality may “prohibit or restrict the combustion of certain types of fuel”. The Controlled Fuel Policy will be a supporting document to the implementation of the by-law and will further fulfil the requirements to do public participation, solicit council approval, and publish the resulting policy in the provincial gazette as per the by-law clause.

In the context of the current project the term “Controlled Fuels” to refers to fossil fuels used in combustion processes which result in larger quantities of harmful emissions of air pollution and therefore pose a larger risk to human health and the environment.

2. PURPOSE

To establish a policy that will address the poor air quality in the city. The controlled fuel policy will be implemented for the whole eThekweni area, focussing on industrial and commercial facilities.

3. PROBLEM STATEMENT

The concentration of ambient air pollutants in the eThekweni Municipality is in non-compliance with the National Ambient Air Quality Standards (NAAQS), particularly respirable particulate matter (PM_{2.5}). At least 202 fuel burning appliances (FBAs) are used within the municipal jurisdiction where coal, biomass, heavy fuel oil and paraffin are the most commonly used fuels used in industrial and commercial operations to raise steam or electricity and result in emissions to air that influence local and municipal ambient air concentrations.

The policy aims to reduce ambient pollutant concentrations by specifically addressing the use of certain types of fuel that may have a negative impact on ambient air quality thereby contributing to achieve the 2030 Targets set by the City of eThekweni as part of their Clean Air Accelerator commitments which include meeting the current South African National Ambient Air Quality Standards (NAAQS) city wide by 2025 and achieving the more stringent PM_{2.5} NAAQS of 15 µg/m³ by 2030.

4. LEGISLATIVE AND POLICY FRAMEWORK

- a) The Constitution of the Republic of South Africa 1996
- b) Municipal Structures Act (Act 117 of 1998)
- c) Municipal Systems Act (Act 32 of 2000)
- d) National Environmental Management Act (NEMA) (Act 107 of 1998 as amended)
- e) the National Environmental Management Act: Air Quality Act (Act 29 of 2004)
- f) The National Framework for Air Quality Management in the Republic of South Africa (2018)
- g) eThekweni Air Quality Management By-Law (2018).

5. DEFINITIONS AND ACRONYMS

5.1 Glossary

Air pollution: means any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.

Atmospheric emission: means any emission or entrainment process emanating from a point, non-point or mobile sources that result in air pollution.

Biomass: means non-fossilized and biodegradable organic material originating from plants, animals and micro-organisms excluding – (a) sewage, and (b) treated or coated wood waste which may contain halogenated organic compounds or heavy metals.

Commercial operations: in the context of this report “commercial” refers to businesses delivering a service and not necessarily manufacturing products.

Controlled fuels: refers to fossil fuels used in combustion processes which result in larger quantities of harmful emissions of air pollution and therefore pose a larger risk to human health and the environment.

Design capacity: means capacity as installed.

Fuel Burning Appliance: a device that burns fossil-fuel or carbon-based fuel including furnaces, boilers and heaters for commercial or industrial use.

Industrial operations: in the context of this report “industrial” refers to businesses manufacturing goods.

Particulate Matter (PM): these comprise a mixture of organic and inorganic substances, ranging in size and shape and can be divided into coarse and fine particulate matter. The former is called Total Suspended Particulates (TSP), whilst PM₁₀ and PM_{2.5} fall in the finer fraction referred to as Inhalable particulate matter.

TSP: total suspended particulates refer to all airborne particles and may have particle sizes as large as 150 µm, depending on the ability of the air to carry such particles. Generally, suspended particles larger than 75 to 100 micrometre (µm) do not travel far and deposits close to the source of emission.

PM₁₀: thoracic particulate matter is that fraction of inhalable coarse particulate matter that can penetrate the head airways and enter the airways of the lung. Also referred to as PM₁₀, it consists of particles with a mean aerodynamic diameter of 10 µm or smaller, and deposit efficiently along the airways. Particles larger than a mean

size of 10 μm are generally not inhalable into the lungs. These particles are typically found near roadways and dusty industries.

PM_{2.5}: respirable particulate fraction is that fraction of inhaled airborne particles that can penetrate beyond the terminal bronchioles into the gas-exchange region of the lungs. Also known as fine particulate matter, it consists of particles with a mean aerodynamic diameter equal to or less than 2.5 μm (PM_{2.5}) that can be inhaled deeply into the lungs. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

Point sources: are discrete, stationary, identifiable sources of emissions that release pollutants to the atmosphere.

5.2 Acronyms and Abbreviations

| | |
|-------------------------|--|
| CO | Carbon monoxide |
| EM | City of eThekweni Municipality |
| FBA | Fuel burning appliances |
| g | Gram |
| g/h | Grams per hour |
| g/MJ | Gram per megajoule |
| HFO | Heavy fuel oil |
| K | Kelvin (temperature) |
| kg/h | Kilogram per hour |
| kg/MJ | Kilogram per megajoule |
| kg/mole | Kilogram per mole |
| LPG | Liquefied petroleum gas |
| m³/h | Cubic metre per hour |
| mg/m³ | Milligram per cubic metre |
| m³/MJ | Cubic metre per megajoule |
| MJ | Megajoule |
| MJ/kg | Megajoules per kilogram |
| MW | Megawatt |
| NAAQS | National Ambient Air Quality Standards |
| NCV | Net calorific value |
| NEMA | National Environmental Management Act |
| NEMAQA | National Environmental Management Air Quality Act |
| NO_x | Oxides of nitrogen |
| NTP | Normal temperature and pressure |
| O₂ | Oxygen |
| PM | Particulate matter |
| PM₁₀ | Particulate Matter with an aerodynamic diameter of less than 10 μm |
| PM_{2.5} | Particulate Matter with an aerodynamic diameter of less than 2.5 μm |
| ppm | Parts per million |
| RAPA | Rapid & Participatory Policy Analysis |
| SO₂ | Sulfur dioxide |

6. POLICY RULES

The policy rules are based on an allowance for operators of FBAs to achieve emission reductions in a flexible manner suited to the operational requirements, while allowing the choice of the most cost-effective way to reduce emissions either by the installation of abatement, operational changes or fuel switching. To achieve the envisaged emission reductions, operational optimisation requirements and emission limits were set for FBAs based on fuel usage or energy input.

6.1 Combustion Optimisation

- a) By the end of 2025, all FBAs are required to report an appropriate **input-output based efficiency measure**.
 - i) All FBAs with a thermal input of more than 0.5 MW shall conduct daily CO or oxygen (O₂) measurements in the FBA stack and use the results to calculate boiler efficiency and report quarterly or annually on daily average values. Measurements may be conducted using a calibrated portable measuring instrument.
 - ii) All FBAs with a thermal input of more than 0.5 MW are required to conduct boiler tune-ups every two years.
- b) In order to verify and audit the information provided by the facilities, periodic inspections should be conducted by officials.
 - i) The purpose of the investigations would be to verify the information provided by the facility, review complaints registers and to assist facilities in drawing up implementation plans.
 - ii) Inspections are to occur as soon as possible, with at least a first round of inspections having been completed during year 3.
 - iii) Facilities that fall in “hotspot” areas should be prioritised for inspections.
 - iv) Each facility utilising FBAs should provide their two-year implementation plan in year 3 which details plans to achieve compliance with the emission limits by policy implementation plan year 5.
 - v) The Municipality’s source and emission inventories should be updated annually based on updated information from these FBA facilities.
- c) Boiler tune-ups¹ must be conducted while burning the type of fuel that provided the majority of the heat input to the boiler for the last 12 months prior to the tune-up. Boiler tune-ups are required to address the following matters:
 - i) Burner inspection: burners must be inspected and burner components replaced as necessary.
 - ii) Flame pattern: the flame pattern should be inspected and adjusted consistent with the manufacturer’s specification if available or best practice if not available.
 - iii) Adjust the air-to-fuel ratio, as applicable.
 - iv) CO emissions: CO must be measured in ppm by volume and a portable CO analyser may be used. CO measurement should be conducted before and after tune-up.
 - v) Oxygen measurements: O₂ measurements must be conducted before and after boiler tune-up and reported in volume percent.
 - vi) Reporting: Tune-up reports should be available on-site and be provided for inspection by the authorities of the City of eThekweni (as required). The report should include details on actions numbered one to five above as well as a description of any corrective actions taken as part of the

¹ Adapted from NESHAP (2016)

tune-up and a detailed inventory of the fuel use on a monthly averaging basis for the period between boiler tune-ups. In the case of the first boiler tune-up, fuel use for the preceding 12 months should be included.

- vii) Each tune-up must be conducted no more than 25 months after the preceding tune-up or commissioning of a new boiler.

6.2 Emission standards

- 1) To ensure that ambient improvements are realised, it is proposed that emissions standards be implemented, with compliance to the emission standards achieved by Year 5 of the policy intervention (2030).
 - a) *By 2030, coal-fired FBAs with a combined capacity of larger than 3 MW thermal input design must meet an SO₂ emission standard of 0.250 g/MJ heat input and a PM emission standard of 0.025 g/MJ heat input.*
 - b) *Biomass-fired FBAs with a combined capacity of larger than 3 MW thermal input design must meet a PM emission standard of 0.050 g/MJ heat input.*
 - c) *Residual oil-fired FBAs with a combined capacity of larger than 3 MW thermal input design must meet an SO₂ emission standard of 0.1 g/MJ heat input and a PM emission standard of 0.025 g/MJ heat input.*
 - d) *Residual oil-fired FBAs with a combined capacity larger than 1 MW and smaller than 3 MW must meet an SO₂ emission standard of 0.1 g/MJ heat input.*
 - e) *Residual-oil fired heaters are further required to conduct daily CO measurements and boilers with daily CO measurement exceeding 100 ppm for more than 25 days out of the preceding 30 days may be required to conduct a boiler tune-up as set out in section 2.3.*
 - f) *FBAs with a combined capacity of larger than 30 MW thermal input design must meet a NO_x emission standard of 0.26 g/MJ heat input (to be equivalent to 750 mg/Nm³).*
- 2) Compliance with the emission limits should be tracked from policy intervention year 5 onwards and source and emission inventories should be updated to reflect any improvements achieved.
- 3) A detailed Technical Guidance Document is required to be prepared within 2 years of the policy implementation to provide FBA operators with guidance on choosing the most appropriate implementation option.

7. POLICY PROCEDURES

7.1 Source and Emission Inventories

- a. Due to the limited site-specific FBA parameters and emission information currently available, it is required that a detailed source inventory be compiled during the first year of policy implementation.
 - i. The information collected should include information on the type of fuel burning devices used, physical stack information such as height and diameter, fuel usage, operating hours, energy output and FBA output.
 - ii. This information is then utilised to update the source inventory to ensure a detailed inventory. It is recommended that officials be trained in auditing and verification of the information provided.

- iii. Complaints registers are a by-law requirement, and thus it is recommended that eThekweni and each of the sites implement air quality complaints registers available for auditing purposes. Each facility is required to keep an updated electronic complaints register as well as an electronic incident register to track start-ups, shut-downs, upset conditions and soot blowing. The date and times for these incidents must be noted in the incident register. Facilities that fail to keep updated complaints and incident registers may be liable to an administrative fine to be published in the by-law.
- iv. As part of the source inventory, facilities should provide information on abatement or control equipment installed as well as any change in fuel type or quantities used.
- b. During year two of policy implementation, facilities utilising FBAs with a heat input exceeding 3 MW are required to conduct emission testing to provide updated information for the Municipality's emissions inventory.
 - i. Facilities are to supply all the information required to compile an emissions inventory including flue gas flow rate, flue gas temperature and oxygen content.
 - ii. The information included should specifically include a measure of the FBAs efficiency such as flue gas oxygen content and an input-output based efficiency measure such as the steam to fuel ratio.
 - iii. The information should be utilised by officials to identify and assist facilities that operate inefficient boilers that may result in high emissions.

7.2 Policy Implementation and Communications Plans

The Policy Implementation Plan detailing an overview of the actions required over a five-year period and the responsible parties is provided in Table 1 and the Communications Plan is provided in Table 2.

Table 1: Policy Implementation Plan

| | Year | Action Number | Predecessor | Responsible Party | Frequency | Action Required |
|---|------|---------------|-------------|----------------------|----------------------------|---|
| Year 1: Source Inventory Compile detailed source inventory | | | | | | |
| Design and Implement source and emission inventory database. | 2025 | 1.1 | | EM | Once | Design of an electronic database or modification of existing data collection database to accommodate the additional FBA sources. Assign a database custodian. |
| Collect information on types of devices, fuel usage, energy output, etc. | 2025 | 1.2 | 1.1 | EM | Once | Communication to inform stakeholders of the policy and requirements. Inform stakeholders of emission standards and implementation timeframes, determine fines for non-compliance and requirements for complaints registers and incident registers. Inform Stakeholders of the database, the procedure to update information and a list of information requirements. |
| | 2025 | 1.3 | 1.2 | FBA Operators | Once off and Annual update | Provide all the relevant information to the database |
| | 2025 | 1.4 | 1.3 | EM and FBA Operators | Annual | Review information provided for completeness, FBA Operators requested to provide adequate information. |
| Implement complaints registers and tracking of upset conditions and soot blowing. | 2025 | 1.5 | | FBA Operators | | Implement and maintain a complaints register. Implement an electronic incident register for startup and upset conditions and soot blowing. Provide start and finish dates and times for each incident. Provide this information to authorities when requested. |

| | Year | Action Number | Predecessor | Responsible Party | Frequency | Action Required |
|---|------|---------------|-------------|----------------------|-------------|--|
| Development of Technical Guidance Document for FBA operators and training material for officials implementing the policy. | 2025 | 1.6 | | EM | | Develop a Technical Guidance Document (Companion Document) to assist FBA Operators to implement the policy and select the most appropriate implementation options. Document to contain guidance on the implementation of a complaints register and an incident register. Develop training material for officials implementing the policy and conducting inspections of facilities. |
| Training for officials in all management areas. | 2025 | 1.7 | 1.6 | EM | | Training for officials in all management areas to implement the policy and ensure compliance with the policy. |
| Year 2: Emissions Inventory | | | | | | |
| Compile a comprehensive emission inventory . | | | | | | |
| Update emission inventory . | 2026 | 2.1 | 1.2 | FBA Operators | Annual | Provide stack parameters, fuel usage and measured emissions where database is incomplete. Update all with measured emission rates from Year 1 measurements. |
| | 2026 | 2.2 | 2.1 | EM and FBA Operators | Annual | Review information provided for completeness, FBA Operators requested to provide adequate information. Failure to provide adequate information may result in the imposition of a fine. |
| Conduct baseline dispersion modelling with updated emission inventory and identify potential hotspots. | 2026 | 2.3 | 2.1 and 2.2 | EM | As required | Utilise updated source and emission inventories to conduct dispersion modelling. Identify potential hotspots and prioritise areas and facilities for inspection. |
| Year 3: Inspections and Tracking | | | | | | |
| Facilities using FBAs to provide implementation plans for achieving emission reductions. | 2027 | 3.1 | 1.6 | FBA Operators | Once off | Provide an implementation plan to achieve the emission limits by 2029/2030. |
| Facilities to provide required efficiency measurements. | 2027 | 3.2 | 1.6 | FBA Operators | Annually | Facilities to conduct daily average efficiency measurements and report monthly average values annually. Provide daily efficiency measures to authorities on request. |

| | Year | Action Number | Predecessor | Responsible Party | Frequency | Action Required |
|---|-------------|----------------------|--------------------|--------------------------|-----------------------|--|
| Facility inspection by City of eThekweni officials to verify and audit information provided. | 2027 | 3.3 | 1.7 | EM | At least one Annually | Facility inspections to ensure that facilities have an electronic complaints register and incident register and that records are being kept. Review efficiency measures and procedures for conducting efficiency measurements. |
| Annual updating of source and emission inventories. | 2027 | 3.4 | 1.2 | FBA Operators | Annually | Provide updated inventory and fuel use data. |
| Year 4: Preparation for Compliance. | | | | | | |
| Annual reporting cycle. | 2028 | 4.1 | | FBA Operators | Annually | Provide updated inventory, fuel use data. and efficiency measurements |
| Updated Implementation Plans | 2028 | 4.2 | 3.1 | FBA Operators | On Request | Provide an updated implementation plan to achieve emission limits and efficiency requirements on request by authorities. |
| Year 5: Compliance with Emission Standards | | | | | | |
| Compliance with emission standards achieved. | 2029/2030 | 5.1 | | | | Tracking of Compliance in each management area. |
| Track measured ambient air quality to assess improvement. | 2030 | 5.2 | | EM | Ongoing | Track ambient air quality across the management areas to evaluate policy performance. |

Table 2: Communication Plan


| Communication | Task | Receiver | Sender | Medium | Contents |
|--|-------------------------|---|-----------------------|-----------------------|---|
| Public Participation Process | Prior to Implementation | All stakeholders on database | Project Team | In person / Online | Policy content Policy implementation plan |
| Policy communication | 1.2 | Operators of FBAs | EM | Document by email | Summary of the policy Responsibilities of Operators Duty of Officials Template for Source reporting detail information requirements (with units of measure) Requirement for the implementation plan Requirement of and template for an electronic Complaints Register Requirement of and template for an electronic Incident Register Non-compliance Consequence |
| | | City Officials tasked with implementation | EM | Email | As above Communication that training will be provided |
| City Officials Training | 1.7 | City Officials tasked with implementation | Service Provider / EM | Face to face training | Summary of the policy Responsibilities of Operators Duty of Officials Template for Source reporting detail information requirements (with units of measure) Requirement of and template for an electronic Complaints Register Requirement of and template for an electronic Incident Register Non-compliance Management |
| Communication to National and Provincial Departments (Air quality) | | | | | |
| Communication to National and Provincial Departments not on stakeholder database | | | | | |

8. POLICY EVALUATION AND REVIEW

| Goal / Objective / Implementation plan task | Policy Evaluation | | | |
|---|--|--|--|--|
| | Responsibility for evaluation | Evaluation reported to | Frequency of evaluation | Measurement criteria |
| Assess ambient air quality measured within the city | Senior Air Quality Data Administrator/ Data Team | Meteorologist & Senior Manager Pollution Control & DH PCRM | Annual (first quarter for preceding calendar year) | More than 80% valid data available in each year for all pollutants Count of hourly and daily exceedances trends to decreasing and compliance with NAAQS by 2030 Calculated annual average concentrations show a decreasing trend and compliance with NAAQS by 2030 |
| Collect information on types of devices, fuel usage, energy output, etc. | Meteorologist / AQMP Team | AQO/Senior Manager PC & DH: PCRM | Quarterly | Template of information required formulated in Q1 of Year 1. Thereafter the details for at least 90% of known FBAs collected by the end of Q4 in Year 1 after policy implementation. Continuous additions thereafter. |
| Maintain emission inventory | Meteorologist/ AQMP Team | AQO/Senior Manager: PC & DH:PCRM | Annual | Report on the addition of new sources / number of sources updated. |
| Conduct baseline dispersion modelling with updated emission inventory and identify potential hotspots | Meteorologist/ AQMP Team | Senior Manager: PC/ AQO & DH PCRM | End of Year 2 after Policy Implementation | Change in Annual PM2.5 at certain key receptors |
| Annual reporting | Meteorologist/ AQMP Team | Senior Manager: PC/ AQO & DH PCRM | | % compliance with reporting of facilities in database |
| Facility inspection by City of eThekweni officials to verify and audit information provided | Specialized/Chief/Senior EHP | ESHM Manager & Compliance Officers & DH PCRM | Annually | %facilities audited |
| Compliance with emission standards achieved | EHSM & Compliance Officers | SM:PC & DH:PCRM | Annually | % facilities compliance |

9. ANNEX A – RAPA

Policy Process Flow 10 KEY STEPS

- Policy Gap Identification
- Research & Benchmarking
- Establish working group :include the Research and Policy Advocacy Department (RAPA)
- Drafting Policy According to **6P format**
- Stakeholder Consultations
- Submit to PTTT for comments
- Consolidate comments and finalise draft
- Send to PTTT for checking and validation to the PTTT Sub-Committee for Endorsement  LEGAL FOR VETTING
- Submit policy to approving body (DCMs forum or Council)
- APPROVED POLICY : copy must be sent to RAPA

10. ANNEX B – CONVERSION TABLES

10.1 Emission limits proposed for eThekweni

Example of emission reporting under the proposed eThekweni emission limits.

1. Calculate the fuel energy content.

Example: A coal fired boiler using 500 kg/h of coal with a net calorific value (NCV) of 20 MJ/kg will use 10 000 MJ/h fuel.

2. Calculate the emission rate of pollutant.

From the emission test results (flow rate and pollutant concentration), calculate the emission rate for each pollutant.

Example: Flow rate of flue gas (calculated at NTP, or at 273 K and 101.3 kPa) 5 000 m³/h; concentration of pollutant 100 mg/Nm³. The emission rate will then be 500 000 mg/h or 500 g/h.

Result: The emission figure for comparison to the proposed standard will then be 500 g/10 000 MJ or 0.05 g/MJ.

10.2 Conversion between units of measurement for the emission limits

Table 3 and Table 4 summarise the proposed City of eThekweni emission limits for boilers of certain sizes in the proposed units of measurement (mg/MJ). Table 5 summarizes the emission limits for controlled emitters as regulated under Section 23 of NEMAQA. Estimated equivalents are presented in Table 6.

Table 3: Proposed City of eThekweni Emission Limits for Boilers >3 MW heat input

| Fuel | Pollutant | Proposed limit |
|--------------|-----------------|-----------------------|
| Coal | SO ₂ | 0.25 g/MJ heat input |
| | PM | 0.025 g/MJ heat input |
| Biomass | SO ₂ | |
| | PM | 0.05 g/MJ heat input |
| Residual oil | SO ₂ | 0.1 g/MJ heat input |
| | PM | 0.025 g/MJ heat input |

Table 4: Proposed City of eThekweni Emission Limits for Boilers between 1 and 3 MW

| Fuel | Pollutant | Proposed limit |
|--------------|-----------------|-----------------------|
| Residual oil | SO ₂ | 0.1 g/MJ heat input |
| | CO | 100 parts per million |

Table 5: Emission limits set by small boiler regulations (Section 23 of NEMAQA)

| Fuel | Pollutant | Limit value @NTP, varying O ₂ |
|---------------------------|-----------------|--|
| Solid fuels | SO ₂ | 2800 mg/m ³ |
| | PM | 120 mg/m ³ |
| Liquid fuels | SO ₂ | 500 mg/m ³ |
| | PM | 120 mg/m ³ |
| Gaseous (natural and LPG) | SO ₂ | 35 mg/m ³ |
| | PM | 10 mg/m ³ |
| Biomass | SO ₂ | 1000 mg/m ³ |
| | PM | 120 mg/m ³ |

Assumptions: Coal at 20 MJ/kg; flue gas mass flow per MJ heat input 0.45 kg/MJ or 0.35 m³/MJ at NTP; molecular mass of flue gas similar to air at 29 kg/mole. Using these assumptions, comparable values are as follows:

Table 6: Comparison of proposed emission limits for City of eThekweni and Section 23 of NEMAQA

| Fuel | Pollutant | Small boiler value @NTP, varying O ₂ | Proposed eThekweni values |
|---------------------------|-----------------|---|---------------------------|
| Solid fuels | SO ₂ | 2800 mg/m ³ | 980 mg/m ³ |
| | PM | 120 mg/m ³ | 98 mg/m ³ |
| Liquid fuels | SO ₂ | 500 mg/m ³ | 500 mg/m ³ |
| | PM | 120 mg/m ³ | 98 mg/m ³ |
| Gaseous (natural and LPG) | SO ₂ | 35 mg/m ³ | |
| | PM | 10 mg/m ³ | |
| Biomass | SO ₂ | 1000 mg/m ³ | |
| | PM | 120 mg/m ³ | 42 mg/m ³ |