TECHNICAL NOTE #25

# Greenhouse Gas Reporting Regulations and their impact on the clay brick industry

This summary is based on the National Greenhouse Gas Emission Reporting Regulations published by the Department of Environmental Affairs on 3 April 2017.

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## TECHNICAL CONTRIBUTORS

This summary was developed by Promethium Carbon for the Energy Efficient Clay Brick (EECB) Project.

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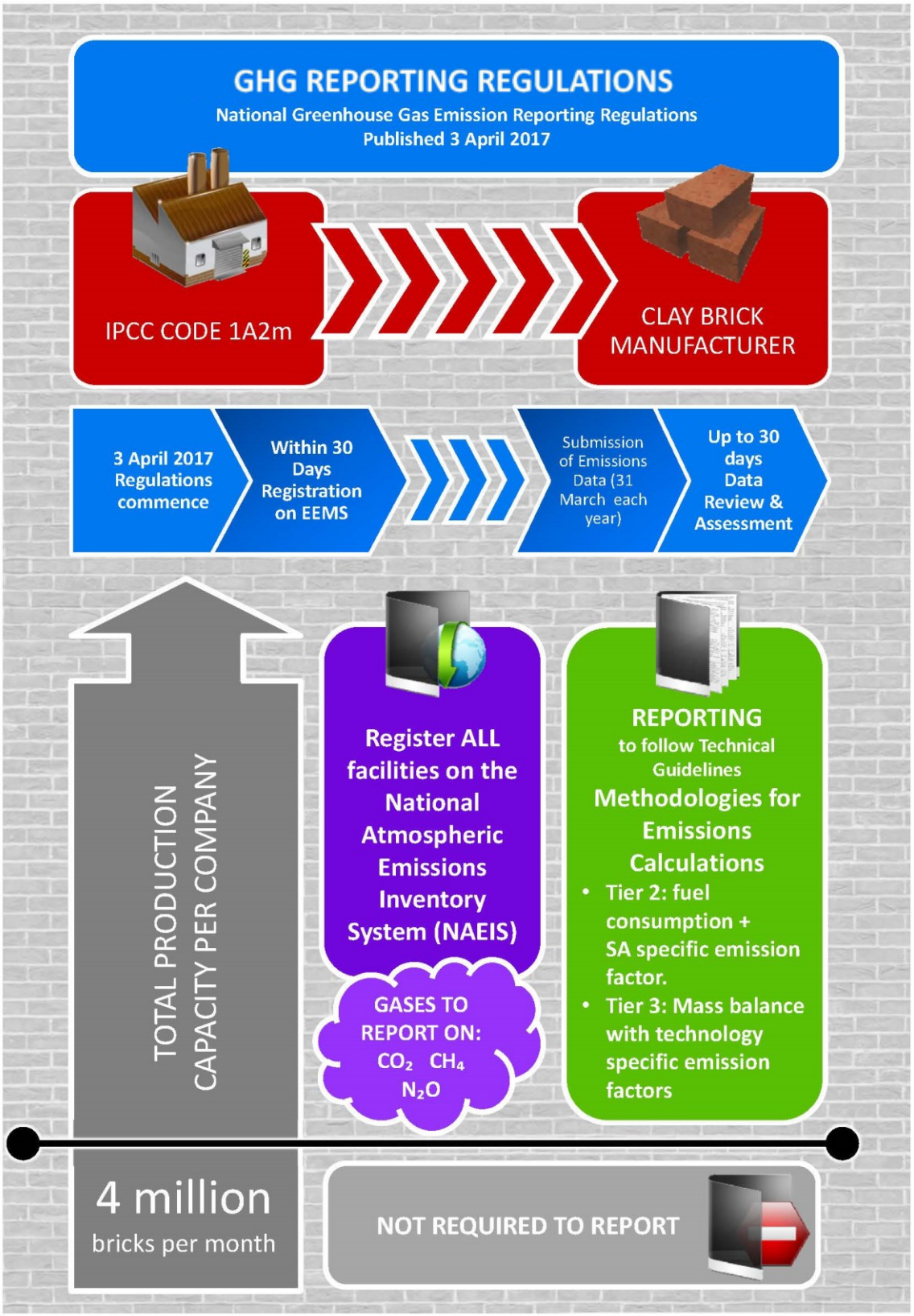

GHG REPORTING REGULATIONS
National Greenhouse Gas Emission Reporting Regulations
Published 3 April 2017
IPCC CODE 1A2m
CLAY BRICK MANUFACTURER
3 April 2017 Regulations commence
Within 30 Days Registration on EEMS
Submission of Emissions Data (31 March each year)
Up to 30 days Data Review & Assessment
TOTAL PRODUCTION CAPACITY PER COMPANY
Register ALL facilities on the National Atmospheric Emissions Inventory System (NAEIS)
GASES TO REPORT ON: $CO_2$ $CH_4$ $N_2O$
REPORTING
to follow Technical Guidelines
Methodologies for Emissions Calculations
• Tier 2: fuel consumption + SA specific emission factor.
• Tier 3: Mass balance with technology specific emission factors
4 million
bricks per month
NOT REQUIRED TO REPORT

# SOUTH AFRICAN GREENHOUSE GAS (GHG) EMISSION REPORTING REGULATIONS AND THEIR IMPACT ON THE CLAY BRICK INDUSTRY

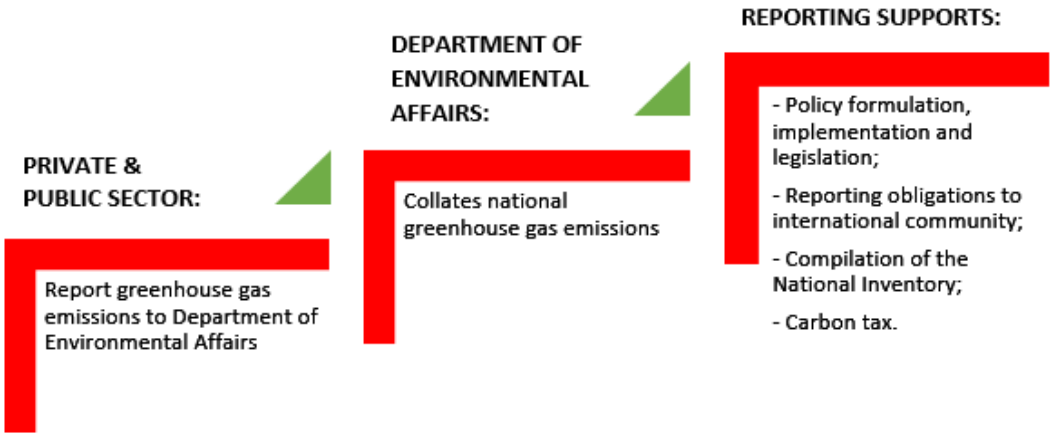
## INTRODUCTION

Climate change is fast becoming a reality. As the earth's climate system changes, so this results in increasing atmospheric temperatures causing changes in many extreme weather events. The effects of climate change will severely impact the Southern African region.

South Africa is committed to shifting the country to a lower-carbon economy. In Paris in 2015, South Africa submitted its *Intended Nationally Determined Contribution (INDC)* which commits the country to an emission reduction target to limit the increase of average global temperatures by 2 degrees centigrade. Overtime the emissions trajectory of the clay brick industry should align with the national intent as expressed in the country's INDC.

As a resource rich country, South Africa has historically developed a carbon intensive economy. Government is developing a pathway to a lower carbon economy and climate resilient society. The *National Greenhouse Gas Emission Reporting Regulations* (promulgated 3 April 2017) is one of the national measures, driven by the Department of Environmental Affairs, to improve quantification and support the reduction of emissions in South Africa. The regulations are to be read in conjunction with the *National Environmental Management: Air Quality Act, 2004* (Act No. 39 of 2004) and the *Technical Guidelines for Monitoring, Reporting, Verification of Greenhouse Gas Emissions by Industry*.

*Figure 1 Purpose of the GHG Reporting Regulations.*




The purpose of the regulations[1] is to introduce a comprehensive, single, national system for the transparent reporting of greenhouse gas emissions, as illustrated above.

[1] See: NEMAQA Greenhouse Gas Reporting G38857 GN541

At a country level, understanding the country's national greenhouse emissions profile will assist South Africa to develop effective and appropriate measures to mitigate climate change. A comprehensive national inventory will also assist government, and the private sector, to allocate resources to where they are needed most and where they may have the highest impacts. The emissions on which carbon tax (Technical Note #24) will be paid will need to be calculated according to the *National Greenhouse Gas Emission Reporting Regulations* as well as the *Technical Guidelines for Monitoring, Reporting, Verification of Greenhouse Gas Emissions by Industry*.

At a company level, understanding the business' direct greenhouse gas emissions will assist in determining carbon tax and carbon budget obligations. (Technical Note #26)

## WHO MUST REPORT?

The *National Greenhouse Gas Emission Reporting Regulations* require brick manufacturers to report direct greenhouse gas emissions from facilities within South Africa.

**Brick manufacturers who produce over 4 million bricks per month, across all their South African facilities, must report their direct greenhouse gas emissions.**

Brick manufacturers who exceed the threshold of 4 million bricks per month must register all their facilities with the National Atmospheric Emissions Inventory System (also known as the NAEIS[2]). The threshold was initially 10 000 bricks per month, however after the Clay Brick Association engaged with the Department of Environmental Affairs, the threshold was lifted.

Brick manufacturers will be familiar with the NAEIS system, as air quality data is already captured on the system as part of the air emissions license. However these Regulations are unique as they request greenhouse gas emissions data, as opposed to general air pollutants. In addition the greenhouse gas emissions data will need to be submitted in a separate form to general air pollutants.

The timeframe for registration is 30 days after the regulations come into force (for exisiting operations) or 30 days after starting manufacturing activities once the regulation is in force (for new operations).

[2] Further information on the NAEIS and SA Air Quality Information System (SAAQIS) is available at www.saaqis.org.za/Emissions3.aspx

## WHAT ARE THE REPORTING REQUIREMENTS?

There are three greenhouse gases that brick manufacturers must report on, annually. These are carbon dioxide, methane and nitrous oxide. In the brick manufacturing sector, these greenhouse gases are released from the combustion of fossil fuels such as coal and natural gas.

These fossil fuels are combusted to generate thermal energy required in the brick manufacturing process. Carbon dioxide is the major greenhouse gas emitted in the brick sector. However the regulations require that methane and nitrous oxide are calculated using default values. All greenhouse gases must be reported in tonnes, reflecting annual volumes released.

The Department of Environmental Affairs has developed *Technical Guidelines for Monitoring, Reporting, Verification of Greenhouse Gas Emissions by Industry* to assist organisations report their emissions as specified by the regulations. The *Technical Guidelines*[3] may be updated from time to time by the Department of Environmental Affairs. The regulations and Technical Guidelines allow for reporting on one of three tiers[4] (as per the *2006 Intergovernmental Panel on Climate Change Guidelines*). Currently the Technical Guidelines mention thresholds for brick manufacturing[5].

### 1.1. METHODOLOGIES

Brick manufacturers must use either a Tier 2 (country or technology specific emission factors) or Tier 3 (mass balance) methododology to calculate their greenhouse gas emissions. At a Tier 3 level brick manufactuerers will be able to use site specific net calorific values and emission factors. Tier 1 methodology is based on very conservative default values and is not available for use by the brick manufacturing sector. Greenhouse gas emissions must be reported in gigagrams[6].

### 1.2. TIER 2 METHODOLOGY TO CALCULATE EMISSIONS

This methodology estimates emissions from the combustion of fossil fuels such as coal or natural gas. The calculation entails multiplying the quantity of combusted fossil fuel by a specific net calorific value and a specific emission factor[7].

[3] See PDF: Technical Guidelines - Monitoring, Reporting and Verification (GHG)
[4] Further details can be found in the chapter on Stationary Combustion in the *Technical Guidelines*.
[5] Section 5 Reporting Sectors (Page 18) and Section 9 Activity Data (page 29).
[6] 1 gigagram is the equivalent of 1 000 tonnes or 1 000 000 kilograms.
[7] If needed, brick manufacturers may submit applications to revise the specified emission factors. Submissions will be reviewed by the National Inventory Unit based at the National Department of Environmental Affairs.

This calculation is undertaken for each greenhouse gas that is reported on. The formula follows below:

*Figure 2: Formula for Tier 2 emissions calculation*

$$E = Q \times EC \times EF / 1\,000\,000$$

*Where*:

**E** is the greenhouse gas emission (carbon dioxide, methane or nitrous oxide) in gigagrams

**Q** is the quantity of fossil fuel such as coal (in tonnes) or natural gas (in normal cubic metres)

**EC** is the net calorific value of the fossil fuel such as coal (in terajoules/tonnes) or natural gas (in terajoules/normal cubic metres).

**EF** is the emission factor for the fuel, in kilograms per terajoule, specified in Annexure A of the *Technical Guidelines*

1 000 000 kilograms is the equivalent to 1 gigagram of greenhouse gas.

The table below provides the default emission factors and net calorific values for diesel, natural gas, coal and heavy fuel oil. The emission factor and net calorific value for fly ash would be a function of the amount of carbon.

*Table 1 Default emission factors and net calorific values for stationary combustion relevant to the Clay Brick Manufacturer, sourced from Annexure A (page 153 and 154) of the Technical Guidelines.*

| Fuel Type | $CO_2$ (kg $CO_2$/TJ) | $CH_4$ (kg $CH_4$/TJ) | $N_2O$ (kg $N_2O$/TJ) | Net Calorific Value *(TJ/tonne)* |
|---|---|---|---|---|
| Diesel | 74 100 | 3 | 0.6 | 0.0381 |
| Natural Gas | 56 100 | 1 | 0.1 | 0.048 |
| Other Bituminous Coal | 94 600 | 1 | 1.5 | 0.0192 |
| Residual Fuel Oil (Heavy Fuel Oil) | 77 400 | 3 | 0.6 | 0.0404 |

## 1.3. TIER 3 METHODOLOGY TO CALCULATE EMISSIONS

This methodology entails the direct measurement of activity and emission data at individual plant level. In some cases, direct measurements produce better estimates of emissions. Tier 3 methodology either includes Continuous Emissions Monitoring of flue gases or a detailed mass balance.

Reporting using Tier 3 methodology requires:

i. The amounts of fossil fuel combusted, fuel type (e.g. coal or gas), combustion technology.
ii. A specific South African emission factor for each technology.

The mass balance approach (which uses the quantities of input and output materials) is likely to be the preferred method in the brick manufacturing sector. Continuous Emissions Monitoring of flue gases may be comparatively costly for entities who do not already have such equipment in place. Recommendations for the measurement methodology is made in the regulations.

The *2006 IPCC Guidelines* recommend the use of *ISO 12039:2001* and *ISO 10396:2006* (*Stationary Source Emissions*) and the *US EPA Method 3* and *Method 3A* as measurement methodologies to measure $CO_2$ (main greenhouse gas released during combustion) when using the Continuous Emissions Monitoring in the Tier 3 methodology.

## 1.4. ACTIVITY DATA & DATA QUALITY

Quality data is needed to provide a transparent, complete and correct report on the emission of greenhouse gases. Activity data (e.g. fuel consumption) that has been directly measured is typically the most accurate type of data.

All information must be collected and stored in a consistent and systematic manner, preferably in electronic format (examples of required information is provided below). Hardcopy data, such as supplier invoices, should also be systematically filed and kept for a period of five years.

Activity data in the brick manufacturing sector largely relates to the combustion of fuel. The data required is the amount of coal or gas consumed in the operation. Where direct measurements are not available, data in supplier invoices can be used as substitutes.

## WHAT ARE THE TIMELINES?

The regulations specify the following timelines regarding the reporting of emissions.

*Table 2: Key Dates for Consideration*

| Aspect of the Regulations | Timeline |
|---|---|
| Registration on NAEIS[8] | 30 days after the commencement of the Regulations (3 April 2017) or within 30 days after commencing a relevant activity once the Regulations are in force[9]. |
| Change of details on NAEIS | 30 days from the date the data provider becomes aware of such change occurring. |
| Submission of GHG emissions and related data | Electronic submission on the NAEIS by 31 March each year. Where 31 March falls on a Saturday, Sunday or public holiday, the deadline is the next working day. |
| Data review and assessment | Undertaken by the competent authority, 30 days after the data is submitted on NAEIS. |
| Verification and validation of data | 60 days after receiving written notice from the National Inventory Unit based at the National Department of Environmental Affairs (in case of queries). |
| Record of information submitted | Must be kept for 5 years by data providers. |

[8] National Atmospheric Emissions Inventory System

[9] A ministerial application requesting an extension of the registration deadline by 30 days, has been submitted by the Department of Environmental Affairs. The 30 day extension will come into force on the date that the minister approves the application and publishes it in the Government Gazette.

## HOW SHOULD THE DATA BE REPORTED?

Eligible companies must register their facilities on the NAEIS[10] within 30 days after the commencement of the Regulations (3 April 2017) or within 30 days after commencing such an activity after the commencement of the Regulations. Greenhouse gas emissions must be reported for a calendar year, on an annual basis. The following tables are examples of the required information[11].

*Table 3 Registration on the Electronic NAEIS System. Additional rows should be added to the table below to accommodate registration of all facilities.*

| REGISTRATION ITEM | | DETAILS | COMMENTS |
|---|---|---|---|
| **Data Provider Name** | | | |
| **Data Provider ID** | | | *To be generated by the system* |
| **Physical Address of the data provider** | | | |
| **Contact Person** | | | *Name, Designation, Contact no, e-mail address* |
| **Facility/ies** | | | |
| FACILITY 1 | **Name of Facility 1** | | *Name used to identify the facility* |
| | Physical Address | | *Physical address of the facility* |
| | Relevant IPCC Code for the facility | | *See Annexure 1 for IPCC codes* |
| | Installed capacity of the facility | | *Quantity and units* |
| | Description of Non – combustion sources | | *Description of process, technology and products* |
| | Description of combustion source | | *Description of process, technology and fuel types* |
| FACILITY 2 | **Name of Facility 2** | | *Name used to identify the facility* |
| | Physical Address | | *Physical address of the facility* |
| | Relevant IPCC Code for the facility | | *See Annexure 1 for IPCC codes* |
| | Installed capacity of the facility | | *Quantity and units* |
| | Description of Non – combustion sources | | *Description of process, technology and products* |
| | Description of combustion source | | *Description of process, technology and fuel types* |
| FACILITY 3 | **Name of Facility 3** | | *Name used to identify the facility* |
| | Physical Address | | *Physical address of the facility* |
| | Relevant IPCC Code for the facility | | *See Annexure 1 for IPCC codes* |
| | Installed capacity of the facility | | *Quantity and units* |
| | Description of Non – combustion sources | | *Description of process, technology and products* |

[10] In cases where the NAEIS is unable to meet the registration requirements, the registration must be done by submitting the information specified in Annexure 2 in an electronic format to the competent authority.
[11] http://www.saaqis.org.za/Emissions3.aspx.

*Table 4 Annual Greenhouse Gas Emissions Reporting on NAEIS*

| **Name of Data Provider** | |
|---|---|
| **Data Provider ID** | |
| **Date of Submission:** | |
| **Year of data:** | |
| **Comments:** | |

| **IPCC Code (see Annexure 1)** | Sub category[4] (disaggregated by fuel / product type / production process) | **Activity data[5]** | | | **Emissions (tonnes/year)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of activity data | Value of activity data | Units of activity data | GHG-1[6] | | | GHG-2 | | | GHG-3 | | |
| | | | | | Value | Tier | Ref | Value | Tier | Ref | Value | Tier | Ref |
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**For further information** on **the Climate, Carbon and Energy Regulations:**
The Clay Brick Association of South Africa
Website: **www.claybrick.org/climate-carbon-energy-regulations**



*This summary of the greenhouse gas reporting regulations has been developed by Promethium Carbon for the Energy Efficient Clay Brick (EECB) Project. The project is funded by the Swiss Agency for Development and Corporation (SDC) and implemented by Swisscontact in close partnership with the Clay Brick Association of Southern Africa (CBA).*

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