Monitoring National GHG Emissions

Ms. Mudzunga Thangavhuelelo
Department of Environmental Affairs
South Africa

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Outline of the Presentation

- GHG Inventory and the Policy
- Importance of GHG Emissions Inventory
- History of GHG Inventory
- GHG Inventory Results (2000-2010)
- Monitoring of GHG Inventory
- National System Key Elements
- Tool for monitoring National GHG Emissions Inventory
- Current State of Work
GHG Inventory and the NCCRP

What does the National Climate Change Response Policy (NCCRP) say about the GHG Inventory:

- **Executive Summary** (key elements in the overall approach to mitigation) and section 6.1.7 – “Establish a national system of data collection to provide detailed, complete, accurate and up-to-date emissions data in the form of a Greenhouse Gas Inventory and a Monitoring and Evaluation System to support the analysis of the impact of mitigation measures.

- **Introduction and in relation to international obligations (UNFCCC)** – “Monitor and periodically report to the international community the country’s GHG inventory; steps taken and envisaged to implement the UNFCCC; and any other information relevant to the achievement of the objective of the UNFCCC, including information relevant for the calculation of global emission trends”

- **Section 6.7** – “The DEA in partnership with the South African Weather Service, the host of the SAAQIS, will prepare a GHG Emissions Inventory annually. The inventory will conform to the IPCC’s 2006 or later guidelines, and will be periodically reviewed by an international team of experts. The inventory will also undertake and report analyses of emissions trends, including detailed reporting on changes in emissions intensity in the economy and a comparison of actual GHG emissions against the benchmark national GHG emission trajectory range described in section 6.4”

- **Section 6.7** – “The emissions inventory will be a web-based GHG Emission Reporting System and will form part of the National Atmospheric Emission Inventory component of the SAAQIS. It will be developed, tested and commissioned within two years of the publication of this policy”
Importance of a National GHG Inventory

- National Communications (NCs), Biennial Update Reports (BURs)
- Desired Emissions Reduction Outcomes (DEROs)
- South Africa’s position in negotiations
- NCCRP Imperatives – Transition to a Low Carbon Society
- Presidency Indicators, Millennium Development Goals
- Local and Provincial CC mitigation planning
- Carbon Tax Regime
- M&E system verification
History of GHG Inventory

- The 4th National Greenhouse Gas Inventory has been drafted: 2000-2010
- The independent review for the 2000-2010 inventory has been concluded
- The final draft of the National GHG Inventory for the period 2000-2010 will be published in September 2014
- Draft report available on the DEA website
- This inventory will form part of the BUR chapter
GHG Inventory Results 2000-2010
## Preliminary results of the 2000-2010 GHG Inventory

<table>
<thead>
<tr>
<th>Year</th>
<th>Energy (Gg CO2 eq.)</th>
<th>IPPU (Gg CO2 eq.)</th>
<th>AFOLU (excl. Land) (Gg CO2 eq.)</th>
<th>AFOLU (incl. Land) (Gg CO2 eq.)</th>
<th>Waste (Gg CO2 eq.)</th>
<th>Total (excl. Land) (Gg CO2 eq.)</th>
<th>Total (incl. Land) (Gg CO2 eq.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>381 790</td>
<td>29 961</td>
<td>39 565</td>
<td>9 037</td>
<td>12 434</td>
<td>463 750</td>
<td>433 221</td>
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<td>2001</td>
<td>383 620</td>
<td>28 652</td>
<td>39 725</td>
<td>12 772</td>
<td>13 122</td>
<td>465 118</td>
<td>438 166</td>
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<td>2002</td>
<td>392 107</td>
<td>30 368</td>
<td>38 916</td>
<td>16 060</td>
<td>13 789</td>
<td>475 180</td>
<td>452 324</td>
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<tr>
<td>2003</td>
<td>421 121</td>
<td>30 987</td>
<td>36 995</td>
<td>10 310</td>
<td>14 477</td>
<td>503 581</td>
<td>476 895</td>
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<td>2004</td>
<td>439 835</td>
<td>32 548</td>
<td>37 049</td>
<td>19 545</td>
<td>15 179</td>
<td>524 611</td>
<td>507 107</td>
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<tr>
<td>2005</td>
<td>433 719</td>
<td>33 400</td>
<td>37 235</td>
<td>29 667</td>
<td>15 907</td>
<td>520 262</td>
<td>512 693</td>
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<td>2006</td>
<td>453 536</td>
<td>34 190</td>
<td>37 148</td>
<td>23 869</td>
<td>16 649</td>
<td>541 523</td>
<td>528 244</td>
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<tr>
<td>2007</td>
<td>479 058</td>
<td>33 871</td>
<td>36 522</td>
<td>23 435</td>
<td>17 409</td>
<td>566 860</td>
<td>553 773</td>
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<tr>
<td>2008</td>
<td>475 817</td>
<td>30 229</td>
<td>37 580</td>
<td>25 280</td>
<td>18 170</td>
<td>561 797</td>
<td>549 497</td>
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<tr>
<td>2009</td>
<td>476 346</td>
<td>27 456</td>
<td>36 658</td>
<td>21 688</td>
<td>18 989</td>
<td>559 450</td>
<td>544 480</td>
</tr>
<tr>
<td>2010</td>
<td>495 432</td>
<td>29 634</td>
<td>37 577</td>
<td>18 248</td>
<td>19 806</td>
<td>582 449</td>
<td>563 120</td>
</tr>
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</table>
In 2010 the total GHG emissions in SA were estimated to be 582 MtCO$_2$e – (Excl. land subsector-sinks)

GHG emissions increased by 24.9% between 2000-2010 – (Excl. land subsector) – mainly due to economic growth, preparation of the 2010 world cup, growth in population led to an increase demand of products and energy

A key category analysis was performed on the results and the most contributing GHG were CO$_2$ emissions from the sub-sector Energy industries (mainly from the combustion of solid fuels)

Followed by CO$_2$ from road transportation, then CO$_2$ emissions manufacturing and construction (mainly from the combustion of solid fuels.
Preliminary results of the 2000-2010 GHG Inventory

Gg CO₂eq

- 4 - Waste
- 3.C - AFOLU - Aggregated sources and non-CO2 emissions
- 3.A - AFOLU - Livestock
- 2 - Industrial Processes and Product Use
- 1 - Energy

Year:
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
The Energy sector was by far the largest contributor to the total GHG emissions, with 82.3% in 2000 and increasing to 85.0% in 2010.

The second largest contributing sector was the IPPU sector with 5.1% to the total GHG emissions in 2010.

The third largest was the AFOLU sector which contributed a total 4.9% to the total GHG emissions in 2010.

The percentage contribution from the Waste sector has increased from 2.7% in 2000 to 3.4% in 2010.
The 5th National GHG inventory will be covering the period 2000-2012.

Data collection for this inventory has been initiated.

The inventory team has visited several associations and companies to collect information.

This inventory will form part of the GHG inventory chapter in the TNC.
Monitoring of GHG Emissions in SA
South African MRV System Design Elements

**CC Response M&E System**

- **NCCRD**
  1. Climate change impacts
  2. Adaptation responses
  3. Mitigation responses

**GHG Inventory System**

- **SAAQIS**
  Company / Installation – level emissions

- New & existing Databases
- Project owners & implementers
- Adaptation CD
- Mitigation CD
- Research institutions
- Sphere of departments
- Etc.

- National Communication
- Biennial Update Report
- Annual publication of monitoring process

**Agencies, Ministries, Universities, Companies, installations, municipalities, etc.**
The GHG Inventory forms part of the broader M&E System

To fulfil the requirements of the NCCRP (i.e. compile GHG inventories annually), South Africa has developed a web-based emissions inventory system called the National Atmospheric Emissions Inventory System (NAEIS)

The NAEIS forms part of phase 2 of the South African Air Quality Information System (SAAQIS)

In turn, the NAEIS supports the GHG Inventory National System
National System Key Elements
Climate Change Mitigation MRV system

Data Management & Reporting
- Web-based system
- IPCC sectors - data flows

Process Governance
- Institutional Arrangements
- National Inventory Unit

GHG Inventory National System
South African Institutional Arrangements

UNFCCC Focal Point

MRV unit

National GHG Unit

IGCCC

DOE Energy IPPU

DOT Energy

DST All Sectors

DTI IPPU Energy Waste

DMR Energy AFOLU

DAFF AFOLU Energy

DWA WASTE

DLA AFOLU

NT All sectors

SANEDI ESKOM

Transnet – Rail, Freight, Ports, Pipelines ACSA - Aviation

SANSA – Space Agency

ARC

Stats-SA

National Statistical Quality Framework
<table>
<thead>
<tr>
<th>Structure</th>
<th>Responsibilities</th>
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| SAGIMS Management         | - Internal & External Communication;  
                             - Facilitate Emission Factor submissions to EFDB;  
                             - Strengthen relationships with data providers;  
                             - Manager SAGIMS review process (see sec D2);  
                             - Review SAGIMS operation policy;  
                             - Monitor and review ERP’s;  
                             - Ensure effective and efficient operation of SAGIMS; |
| Data Collection & Inventory Compilation | - Preparation of Data Collection Plans;  
                             - Liaise with data providers;  
                             - Provide technical support to data providers;  
                             - Keep abreast with IPCC methodology Developments;  
                             - Develop inventory improvement plans;  
                             - Prepare annual inventory plans. |
| Information Management    | - Effective and efficient data management;  
                             - Resolve of SAGIMS system errors;  
                             - Ensure quality control of data in accordance with SAAQIS requirements;  
                             - Inform on SAGIMS element requirements (e.g. auditing);  
                             - Prepare reports as per the request on inventory manager or specialists. |
Tool for the Monitoring of GHG Emissions
NAEIS System Overview

- Activity Data Sub-Module
- Emission Factor Sub-Module
- Emissions Processing: the heart of the EI inventory module
- Emissions Reporting
  - E = M x NCV x EF
  - Emission Summary Tables
  - Public Interface for emissions results
    - Inventory results are documented and archived
The NAEIS and the IPCC sectors

- Energy, IPPU
  - Activity Data
  - Processor
  - EF
  - Emissions allocation
  - Emissions reporting
  - Input data preparation for allocation

- Models/measurements outside the SAAQIS System
  - QA/QC done outside SAAQIS

- Process 1: Agriculture
- Process 2: LULUCF
Emissions associated with Energy and Industrial process activities are calculated within the system.

Emissions from complex sectors such as Waste, Agriculture and Land Use and calculated outside the system.

Outputs from these processes are fed into the system so that the NAEIS can generate a national emissions profile.

The process used to collect, analyse and report data for the Agriculture sector is defined below.

The process is defined such that it meets the requirements of the IPCC guidelines and NAEIS timelines.
Current state of Work

- **Cross-cutting issues:**
  - Mandatory reporting regulations for GHG emissions into the NAEIS system
  - Development and Implementation of the National System

- **Energy Sector:**
  - An economy-wide fuel consumption survey with emphasis on all demand-side sectors and some energy carries
  - Development of country specific emission factors for electricity generation
  - Development of reporting guidelines
  - Training on the NAEIS system

- **Industrial Processes and Product Use:**
  - Development of reporting guidelines
  - Awareness on the application of higher tier methods
  - Stakeholder engagements on the conclusive reporting of GHG emissions
  - Training on the NAEIS system
Current state of Work

- **Agriculture:**
  - Livestock population values under review by the Agricultural Research Council (ARC)
  - Enhanced characterization for Sheep
  - Country-specific emission factors for enteric fermentation have just been developed as part of a PhD thesis
  - Cropland Management Survey planned for 2014

- **Forestry and land Use:**
  - Cropland management systems survey draft in place and to be reviewed over the next three months
  - Survey on different types of fertilisers used
  - Survey on Fuel-wood gathering data by species type
  - Multi-Phase Sampling Land Use approach under development (to save mapping costs and collect information on management practices)

- **Waste:**
  - Improvements on the collection of activity data for the waste sector
THANK YOU

Jongikhaya Witi and Lungile Manzini
CD: Climate Change - Monitoring and Evaluation

jwiti@environment.gov.za
lmanzini@environment.gov.za