



COUNTRY PAPER | DECEMBER 2016

Experience in Developing Legislation to Support South Africa's Mandatory GHG Emissions Reporting Program and National Inventory Data Flow

LESSONS LEARNED IN SOUTH AFRICA



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Contents

ACKNOWLEDGMENTS	V
LIST OF ACRONYMS	VI
KEY MESSAGES	VII
1. INTRODUCTION	1
2. THE DEVELOPMENT OF SOUTH AFRICA’S LEGISLATION	3
2.1 Final Package of Regulations and Technical Guidelines.....	3
2.2 Regulations in Support of GHG Emission and Other Relevant Policies.....	5
2.3 Process for Developing the Regulations.....	7
2.3.1 First draft of the Regulations.....	7
2.3.2 Consultation workshops.....	7
2.3.3 Refinement of the Regulations.....	10
2.3.4 Development of the Technical Guidelines.....	10
3. LESSONS LEARNED.....	11
3.1 Use the Regulations to Establish a “National System” Approach	11
3.2 Separating Procedural “Regulations” from Methods for Estimating GHGs Based on “Technical Guidelines”	11
3.3 Complete and Continuous Improvement in Reporting through Technical Guidelines Outside of the Regulations	12
3.4 Base the Technical Guidelines on the IPCC Guidelines	14
3.5 Focus Regulations on Working toward Simple, Single Reporting Mechanisms for All Reporting Entities	14
3.6 Engage Stakeholders Early On	15
3.7 Manage Confidentiality.....	16
3.8 Data Quality and Continuous Improvement.....	16
ANNEX A. QUALITY CRITERIA UNDER THE IPCC	18
ANNEX B. TIERED APPROACHES ACCORDING TO THE IPCC.....	19

Box

BOX 1. Continuous Emissions Monitoring	13
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List of Figures

Figure 1. Structure of the Proposed Legislation in South Africa (Regulations) under an Overarching and Existing National Law	3
Figure 2. Schematic Representation of the Quality of Different Tiers of Emissions Estimation Methods for a Hypothetical Case	20

List of Tables

Table 1. Overview of the South African Regulations and Technical Guidelines.....	4
Table 2. Elements of the Country's Industry Mitigation System	6
Table 3. TCCCA Quality Criteria for Emissions Inventory Estimation	18

Acknowledgments

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Please direct any comments and questions about this draft brief to the PMR Secretariat pmrsecretariat@worldbank.org.

List of Acronyms

AQA	Air Quality Act, 2004
DEA	Department of Environmental Affairs
DRM	Disaster Risk Management
EF	Emission Factor
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use, Land-Use Change and Forestry
M&E	Monitoring and Evaluation
MRV	Measurement, Reporting and Verification
MW(th)	Megawatt Thermal
NAEIS	South African National Atmospheric Emission Inventory System
NCCRP	National Climate Change Response Policy
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute

Key Messages

We hope that this case study can be used by other countries to develop sound, reliable, and efficient data flows for greenhouse gas (GHG) mitigation decision making, for transparent reporting, and for education and awareness raising.

Capturing and using data on GHG emissions and removals represents important evidence for the development of efficient action on climate mitigation action. Facility-level emissions of GHGs are in many, if not all, countries a major part of the national total emissions. Many countries are therefore developing or keen to develop specific legislation on these major contributors to emissions. Such legislation may have multiple objectives, including the following:

- To show compliance with emission caps or carbon budgets;
- To enable data collection for input into national or subnational GHG emission inventories;
- To generate data needed by market-based policy instruments, including carbon taxes and emissions trading schemes;
- To generate data to inform and educate the public, to improve understanding of and engagement in climate action;
- To provide the competent authority¹ with the background data needed to duly review any future applications for permits to operate.

Given their different positions and roles in discussions between facilities, governments, and the general public, these different objectives have different implications for the required quality of the data collected.² Therefore, data collected independently for different policy uses are not necessarily the same for all applications. However, collecting different data for different policy uses may lead to a lack of clarity and confusion among many stakeholders. For example, a plant may have an incentive to underestimate its emissions to minimize the (carbon) taxes it has to pay or overestimate its emissions when applying for a permit to operate, whereas the national inventory wants an emissions estimate that is as accurate as possible.

Recognizing this potential problem, South Africa is implementing facility-level GHG reporting legislation that ensures the same data are used for all different policy uses. Its successful implementation would result in a system that is:

- *Efficient to report/collect*: facilities would be required to report only once, and the competent authority would need to review such reports only once

¹ The *competent authority* refers to the National Inventory Unit based at the National Department of Environmental Affairs.

² Pulles, T. 2008. "Quality of Emission Data: Community Right to Know and National Reporting." *Environmental Sciences* 5 (3): 151–160. doi: 10.1080/15693430802141357

- *Trustworthy and reliable*: by ensuring that the data comply with well-known quality criteria, all actors would know that the same data are used in all processes
- *Useful*: in the sense that the same emissions estimates are used in many different policy and monitoring applications.

The new legislation developed in South Africa shows that these attributes are possible. Reaching the above objectives requires the following:

- Clearly define the who, what, when and how of the reporting obligations;
- Ensure that the criteria for data quality developed and applied under the national reporting systems of the UNFCCC (see appendix A), are met when facilities report under this new regulation; these quality criteria include transparency, consistency, completeness, comparability, and accuracy;
- Allow reporting facilities to develop new and improved emission estimation methods, but avoid unnecessarily long and complicated technical discussions;
- Ensure that the new legislation fits transparently with existing legislation on facility reporting of environmental data.

The main difficulties in developing such legislation are that some legal instruments may already exist and that governments, industry, and NGOs may have different views on the quality of the data. Therefore, it is instrumental to organize discussion workshops with all relevant government institutions on the one hand and between government, industry, and NGOs on the other. In South Africa, such workshops took place in August 2015 as part of the refinement process. They were successful in the sense that the participants of these workshops found common ground on the quality criteria to be incorporated in the new reporting legislation.

Stakeholder engagement could have been enhanced with the provision of additional technical information. The “technical guidelines” that specify the methods allowed for calculation and reporting of data should be available when consultations on the legislation are held. It was unfortunate that this document was not available when the workshops were held in South Africa. This made it very difficult for industry to understand what the impact of the new legislation on their operations and hence on their costs would be.

1. Introduction

South Africa's National Climate Change Response Policy (NCCRP) sets out a number of key goals. Reaching these goals will enable South Africa to meet its commitments under the United Nations Framework Convention on Climate Change (UNFCCC). The key elements that will ensure South Africa can effectively track and steer greenhouse gas (GHG) emissions and removals are the following:

- Establishment of a national system for GHG measurement, reporting and verification (MRV).
- Meeting UNFCCC reporting commitments on steps taken and envisaged to implement the UNFCCC (focusing on understanding and driving down GHG concentration trends).
- Integration of these MRV activities with established South Africa systems for Air Pollution Management.

South Africa recognized that it needed legislation to establish a robust data flow to underpin the country's domestic action on GHG mitigation and to meet its increasingly ambitious international reporting commitments. The Department of Environmental Affairs (DEA) was the lead agency for the work on the regulations. These Regulations, prescribing National Greenhouse Gas Emissions Reporting (hereafter called "Regulations") are developed as a subordinate legal instrument to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004, also known as the AQA). Since the draft GHG regulations are based on a provision in the Air Quality Act, the Regulations draft links as closely as possible to the air quality reporting obligations.

With the help of international expertise from Aether, contracted by the World Bank, South Africa has now established draft Regulations. The Regulations lay a strong foundation for reporting within South Africa to support the development and monitoring of domestic mitigation actions (policies and measures) and South Africa's international reporting commitments. This report highlights the activities and outputs of the work done to develop these Regulations.

The Regulations give a clear mandate for an efficient, reliable data flow for tracking GHG emissions and removals in South Africa; they facilitate the collection of essential data on national GHG emissions (and removals).

The purpose of the Regulations was to introduce a *single* national reporting system for the transparent reporting of GHG emissions, which will be used to:

- Deliver sound evidence for decision making on GHG mitigation action—to inform policy formulation, implementation, and legislation on the establishment of fair and transparent GHG strategies, plans, taxes (e.g., planned carbon tax), budgets, offsets, and the like, thereby permitting measures to drive down emissions and encourage removals;
- Meet country's reporting obligations under the UNFCCC to which it is bound; and

- To establish and maintain a trusted National Greenhouse Gas Inventory, consistent with estimates for air pollution, that could be used to involve a wide spectrum of stakeholders and provide support, education, engagement and awareness raising.

The team also noted that these Regulations had to be consistent and work efficiently with a number of additional elements. South Africa had also started working on other related legislation in the field of Climate Change and Air Pollution. Moreover, facility- or company-level data were to be collected for different policy instruments. Major overlaps and/or conflicts thus needed to be addressed to avoid burdening reporting organizations with different requirements. The following elements were considered in the course of this project:

1. **Location and ownership: Air Quality and air pollution data** need to include the exact location of the emissions (stacks). For GHG emissions reporting and taxation purposes, location is less important than the attribution of ownership. In the draft Regulations, the reporting boundaries for **GHG emissions data** are linked to "operational control." This provides flexibility for industry to report either at the *company* level, including several locations/facilities, or at the level of *individual* facilities.
2. **Nomenclature:** For management of *air pollution* impacts, the reported data need a clear presentation of the relevant processes resulting in those emissions. Individual processes in a given industry sector can produce significantly different air pollutant emission intensities because of different technologies and feedstocks. Therefore, a more detailed, process-level split to facilities is often required. **GHG data** follow slightly more aggregated Intergovernmental Panel on Climate Change (IPCC) source categories, which are more independent or more aggregated, compared to the details for air pollution reporting. Nevertheless, there is still a good level of consistency between the more detailed Air Pollution nomenclature and the one used for the GHG regulation.
3. **Reporting threshold:** Another important issue is setting the thresholds for reporting. **Air quality reporting** thresholds set the level of "operating capacity"—for particular types of processes or consumption/use of fuels and materials—above which installations are required to report. The draft **GHG Regulations** set thresholds in terms of fuel or product consumption that can be aligned with taxation (e.g., carbon tax thresholds). The difference between the air pollution and GHG thresholds will need to be incorporated into the guidelines that accompany the different GHG mitigation mechanisms.

2. The Development of South Africa's Legislation

This chapter presents details of the legislation (Regulations) that were developed, more specifically, how they will fit in with other mechanisms to drive good environmental stewardship and the key steps on how the regulations were developed. Section 2.1 presents an overview of the final Regulations and Technical Guidelines. Section 2.2 explains how these regulations are linked to other greenhouse gas-related instruments. Section 2.3 discusses the key practical activities/steps undertaken in developing the Regulations and Technical Guidelines.

2.1 Final Package of Regulations and Technical Guidelines

The Regulations were designed as a bylaw ("Regulations") under the existing Air Quality Act, as schematically shown in figure 1. The Regulations lay down the procedures for all those who are required to report GHG emissions; define the methods that must be used for GHG reporting (by referring to a separate technical guidelines document); provides for updating and improving of these methods by industries themselves; and allows an introductory period (of 5 years) during which industries can develop reporting methods that are more accurate than the IPCC Tier 1 defaults (see appendix B). Table 1 summarizes the key elements of the Regulations and the related parts of the technical guidance. The Regulations define the scope, timeframes, reporting formats, and organizational arrangements while the Technical Guidelines specify the methods to be used for the calculations.

FIGURE 1. Structure of the Proposed Legislation in South Africa (Regulations) under an Overarching and Existing National Law

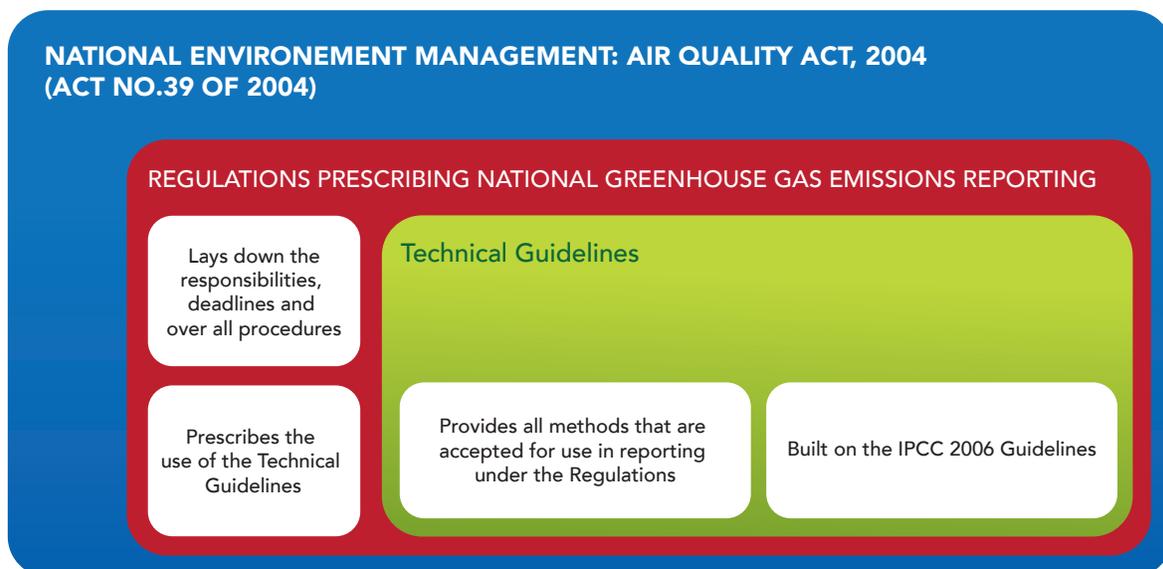


TABLE 1. Overview of the South African Regulations and Technical Guidelines

Good practice issue	Implemented in		Comment
	Regulations (# ^a)	Technical Guidelines (section ^b)	
<p><i>What</i> to report:</p> <ul style="list-style-type: none"> Gases, source categories and thresholds 	7(1) referring to annexure 1	Sections 2.3, 2.4, and 2.5.	<p>This Regulation refers to “relevant greenhouse gases” in relation to an explicit list of IPCC source category definitions. Through this these gases are the same as the ones defined in the IPCC 2006 Guidelines.</p> <p>Source categories are derived from the IPCC 2006 Guidelines; only those that generally are performed in larger installations in industrial facilities are included.</p> <p>For a subset of the IPCC source categories a threshold is included; this threshold is aimed at having emissions reported for 90 percent of the emissions from each source category as a minimum.</p>
<p><i>What</i> to report:</p> <ul style="list-style-type: none"> Stable data category A 	5 and 6 and Annexure 2	N/A	<p>Each category A data provider must register by filling out the administrative information (including a unique identifier, address(es), contact person, and installations with their respective IPCC codes) as defined in annexure 2. Any updates or changes in this information can be included in the registry, as prescribed in regulation 6.</p> <p>This registration provides the system with data that are not frequently changed (“stable”).</p>
<p><i>What</i> to report:</p> <ul style="list-style-type: none"> Variable, data category A 	7 and 8 annexure 3	Section 12–43	<p>These Regulations provide the format in which the annual data must be reported. It includes identifiers for the data provider and all installations defined in the registration as well as data relating to the annual emissions of the installations.</p> <p>The Technical Guidelines provides details on the methodologies to be used for activities that should be reported on.</p>
<p><i>Who</i> must report?</p>	4(1)	Chapters 5 and 6	<p>The Regulations define two types of entities with reporting obligations:</p> <ul style="list-style-type: none"> Category A: in general, industrial facilities/sites/installations with operators who are obliged to report on their GHG emissions; Category B: in general, government-associated educational and/or research institutes, (including statistical offices) that may have relevant data on GHG emissions. <p>These two categories cover the majority of entities holding data relevant for the estimation of South Africa’s GHG emissions and removals.</p>
	5	Chapters 5 and 6	Category A data providers must register in the NAEIS ^c system.
<p><i>When</i> are submissions due</p>	7(1)	N/A	Emissions in year Y must be reported on or before April 30 of year Y+1.
<p><i>Where</i> to report</p>	7(1)	N/A	The emission data must be reported electronically—by uploading them to the NAEIS system.
<p><i>How</i> to report:</p> <ul style="list-style-type: none"> Methods 	10 (1)	Sections 12—43	Regulation 10 provides the legal link to the Technical Guidelines. It requires that always a reporting method be used that is included in these Technical Guidelines, in other words, any emissions estimate based on a method <i>not</i> included in the Technical Guidelines will <i>not</i> be accepted.
<p><i>How</i> to report:</p> <ul style="list-style-type: none"> Improving methods 	10 (2) and 10 (3)	N/A	If data providers feel that the methods in the Technical Guidelines are no longer valid for their processes, they can propose updates or additions to those guidelines. As soon as proposed new methods have been accepted by the competent authority, they become part of the Technical Guidelines and may henceforth be applied by all data providers.

Good practice issue	Implemented in		Comment
	Regulations (# ^a)	Technical Guidelines (section ^b)	
<i>How to report:</i> <ul style="list-style-type: none"> • Format 	Annexure 3	N/A	Specific format for reporting under Category A.
<i>Acceptance procedure</i>	11	N/A	Specifies the mechanism to be used by the competent authority for its review of submitted data, within a limited time frame.
<i>Shift toward higher-tier^d methods</i>	Regulation 15	N/A	<p>Since at the time of implementation only the Technical Guidelines in the IPCC Tier 1 methods had been completed, facilities that are required to report using higher tiers do not always have a method at their disposal. Therefore, the Regulations include a 5-year transitional period, during which those data providers are allowed to use lower-tier methods.</p> <p>After 5 years from the date of promulgation of the regulations, GHG emissions from certain activities (as specified in annexure 1) will have to be quantified using higher-tier methods.</p> <p>This approach allows the quickest possible <i>complete</i> reporting of GHG data, thereby minimizing any gaps due to missing data. Moreover, it facilitates the gradual transition to higher-quality data, as the reporting entities build up their experience and learn to collect <i>more detailed and accurate data</i> for their GHG emissions estimates. In sum, this approach allows policy makers to <i>immediately</i> obtain complete reports—be it containing cruder but still useful data—and over time start obtaining reports with progressively refined data.</p>

Note: GHG = greenhouse gas; IPCC = Intergovernmental Panel on Climate Change; n/a = not applicable; NAEIS = South African National Atmospheric Emission Inventory System.

a. The numbering of the regulations is from the version of early February 2016.

b. The section numbering is taken from the final draft of March 11, 2016.

c. The NAEIS (South African National Atmospheric Emission Inventory System) refers to the Internet-based emissions reporting system that is a component of the South African Air Quality Information System.

d. A tier refers to a method used for determining GHG emissions as defined by the *IPCC Guidelines for National Greenhouse Gas Inventories 2006*.

2.2 Regulations in Support of GHG Emission and Other Relevant Policies

In parallel with the development of the (Reporting) Regulations, South Africa is developing a series of legislative mechanisms (collectively known as the “Industry Mitigation System”) that are closely related to actions associated with *energy security* (renewables and energy efficiency), and GHG and air pollution emissions from industry. In addition, a considerable amount of legislation has already been implemented to address air quality (table 2). South Africa’s Regulations have been developed such that data provided in accordance with the GHG Reporting Regulations are also useful for formulating and facilitating these and other new policy-related mechanisms.

Table 2 clearly shows the central role of the GHG Reporting Regulations for many of these elements, including South Africa’s climate change mitigation policies. Data to be collected under the new Regulations will serve as the core data for all policy processes that use data on GHG emissions from major *industrial sources* (category A data providers) and government-associated entities with data on GHG emissions (category B data providers).

TABLE 2. Elements of the Country's Industry Mitigation System

System Element ^a	Legal basis	Role	System for reporting	Data format
National GHG Inventory	GHG Reporting Regulations	Quantification of GHG emissions to support policy making and M&E	NAEIS	Direct emissions by IPCC activity (mass-units)
Carbon budgets	Voluntary MRV: GHG Reporting Regulations	Emission limits in absolute terms	NAEIS	Direct emissions by IPCC activity (mass-basis)
Carbon tax	Carbon tax legislation MRV: GHG Reporting Regulations	Direct emissions in absolute terms	NAEIS	Direct emissions by IPCC activity
Carbon Offset Scheme (COS)	Carbon offset regulations MRV: GHG Reporting Regulations	Emission savings from COS- approved activities	Carbon Offset-registry	Emissions Savings by IPCC activity
Atmospheric emission licensing	AQA, section 21	Verification of taxable activities Compliance: validation of assertions submitted in the PPPs	SNAEL	Direct emissions (concentration of pollutants) Physical attributes
Pollution Prevention Plans (PPPs)	PPP regulations MRV: GHG Reporting Regulations	Emission savings for PPP- stipulated IPCC activities	Climate Change Monitoring and Evaluation System	Emissions Savings by IPCC activity
Central energy database – Department of Energy	Energy reporting regulations: Activity data reported under GHG Reporting Regulations	Energy consumption from all listed sectors of the economy (supply and demand side)	Central Energy Database	Energy Consumption data
Vessels under Pressure Register – Department of Labour	Equipment under pressure regulations (OHSACT)	Verification of stationary combustion installation (e.g., boilers)	Vessels Under Pressure Installation Registry (VUPIR)	Record of installation and their physical attributes
Energy Management Plans	Energy reporting regulations	Validation of emission savings associated with energy management activities reported in PPPs	Central Energy Database	Energy savings expressed in energy units

Note: AQA = Air Quality Act; COS = Carbon Offset Scheme; IPCC = Intergovernmental Panel on Climate Change; M&E = Monitoring and Evaluation; MRV = Measurement, Reporting and Verification; NAEIS = National Atmospheric Emissions Inventory System; PPP = Pollution Prevention Plan; SNAEL = System for National Atmospheric Emission Licensing; n/a = not available.

a. Taken from a presentation by DEA (Jongikhaya Witi: Greenhouse Gas Emissions Reporting as an Instrument to Support Industry-Targeted Mitigation System).

As the data collected through the provisions of the Regulations closely follow the approaches used by UNFCCC and IPCC, the data retain a good level of international transparency through the use of common nomenclature, definitions, and descriptions. The use of IPCC approaches also enables the IPCC's TCCCA principles for the recording and reporting of GHG emissions—transparency, consistency, completeness, comparability, and accuracy (see table 3 of appendix A)—to be applied. The TCCCA principles are widely used to ensure the quality of GHG data.

With respect to the World Resources Institute (WRI) Greenhouse Gas Protocol, the data collected in line with these new Regulations can also be used in calculating scope 2 and scope 3 emissions because they will be readily available from the annual reports of other industries (power and heat plants, etc.) to derive country-specific factors used to calculate *indirect* emissions from each plant's use of power and other resources.

2.3 Process for Developing the Regulations

2.3.1 First draft of the Regulations

The Department of Environmental Affairs (DEA), led by a competent and experienced expert in national MRV, prepared a draft of the new Regulations and had it submitted to the minister for review. In parallel with the ministerial review, consultation workshops were held (in line with South African legal practice) to gather feedback and provide informed revisions to the draft following its ministerial review.

To take advantage of the extensive international experience and trust in the scientific approaches under the Intergovernmental Panel on Climate Change (IPCC), DEA prioritized a strong link to the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006 Guidelines³). At this point in time, there was no draft yet for the accompanying Technical Guidelines. However, it was made clear that the methods to be used to estimate emissions reported under the Regulations would have to be consistent with these international 2006 IPCC guidelines. The draft Regulations explicitly refer to the latter Guidelines and link them to a country-specific Technical Guidelines document that is consistent with those IPCC guidelines. The Technical Guidelines document was developed later, to provide the clarity and detail needed for the selection of methods, data sources, and assumptions applicable in South Africa and for reporting under the Regulations.

2.3.2 Consultation workshops

On The following two workshops were organized in Pretoria, on August 4, 2015, and August 5, 2015, respectively:

- A workshop with representatives of various ministries and government departments;
- A workshop with non-governmental actors: industry and, as planned, NGOs; the latter did not participate.

Workshop with government representatives. This workshop was attended by representatives of DEA (climate change and air quality experts), the Treasury, the Department of Energy, the Department of Agriculture, Forestry and Fishing, and the Department of Science and Technology. Although DEA had sent out invitations to many governmental institutions, relatively few people attended. There was no representation from the Statistical Office or the Department of Trade and

³ See *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>).

Industry, for example. Given their respective responsibilities to further harmonize the Regulations and reach consensus within the government, while minimizing the Regulations' burden on businesses, it would have been beneficial for both these departments to attend the workshop and contribute to the discussions.

The workshop had the following objectives:

- Engage all relevant agencies by helping to explore opportunities and minimize risks for policy making and social and economic prosperity;
- Address cross-governmental objectives as well as those of specific agencies;
- Maintain a constructive/collaborative tone—avoid confrontation;
- Maintain consistent and continuous interactions with all relevant agencies.

An important issue on the agenda was the need to streamline different reporting obligations to reduce the burden on businesses from air pollution regulation, budgets, and environmental taxation.

The participants were well aware of the need to harmonize and streamline the various reporting obligations. Discussions were held in a collegial atmosphere and clearly aimed at reaching the common objectives of drafting efficient legislation that would minimize the burden on industry and government.

Workshop with industry and NGOs. This workshop was attended by representatives of a wide range of industrial branches, among others, refining; coal and other mining (platinum, gold); the printing industry; and pulp and paper. Those sectors that make a significant contribution to South Africa's emissions and removals had been invited. Invites had targeted industries' environmental specialists and those involved with environmental compliance. Unfortunately, not a single NGO attended, even though NGOs that focus on environmental protection had been invited. This workshop was organized in line with governmental practice in South Africa—relevant non-governmental actors are given the opportunity to comment on proposed legislation, once it has been published in draft in the Official Gazette, and invited to participate in a workshop to this end.

Industry representatives attended the workshop with apprehension and concern at the perceived high levels of effort needed to meet these new obligations. As a consequence, industry representatives express their concerns to government officials about the development of the Regulations. Government agencies, in turn, expected industry and NGOs to strongly oppose or at least criticize the draft Regulations.

The industries represented generally expressed three major concerns, as outlined below:

- Some sectors that are unlikely to be affected by the Regulations were also present. These included the pulp and paper industry (mainly concerned about LULUCF-related⁴ emissions) and the printing industry. Uncertainties on the contents of the Technical Guidelines and on how the thresholds had been determined made these industry representatives a bit cautious.

⁴ LULUCF = Land Use, Land-Use Change and Forestry.

The caution was around commitment to burdensome and complex reporting and/or reporting of data considered confidential. Both the international team and representatives of DEA provided guidance on how the thresholds had been set and how sources and sinks of GHG emissions were going to be handled in the Regulations. They clearly indicated that the thresholds were intended to ensure that the bulk (90%) of the emissions from the different relevant IPCC source categories would be covered by the reporting requirement. This is quite similar to how this is arranged in other countries, including the European Union Member States. The printing industry was concerned that many small installations would be adversely affected. However, it was highlighted that not many of these businesses would have installations in use with a capacity above the threshold, preliminarily set at 10 MW(th).

- The Technical Guidelines were not yet available. This made it difficult for industries to assess the level of effort required to comply with the (draft) Regulations. This was a valid point and a good lesson for others—it may be more effective to consult on the full policy at once, including any detailed guidelines, so that industry is better placed to assess the likely impact and provide well-informed input to the policy development process.
- The draft Regulations should be consistent with other (existing) legislation, especially the carbon tax and the carbon budget.

DEA indicated that they aimed to have both the updated Regulations and the Technical Guidelines available by the end of 2015, with a view to having the reporting obligations in place by 2016. Both harmonization between different legislative instruments and the issue of thresholds were to be further developed and discussed by the relevant departments to ensure that the reporting burden to industry would be acceptable.

Several remarks were made by industry on the “tiered” approach (see appendix B). It was clarified that only those facilities or companies that run at least one activity from the list of specified IPCC source categories with a capacity above the threshold would need to apply different levels of detail and accuracy (tier methods), depending on the importance of those activities. It was also explained that a Tier 2 (medium complexity) method does not involve much more effort than a Tier 1 (basic) method: the only addition is that the data provider needs to add some of its own understanding of the technical details of the processes within the company to decrease the estimate uncertainty. Based on those specific insights, the company will apply technology-specific emissions factors. A Tier 3 method (the most complex method) is not mandatory for any source category, but if data are available to support a Tier 3 approach, the company is welcome to apply this method, subject to prior approval by the competent authority.

For a number of industry representatives, the distinction between the *WRI GHG Reporting Protocol* and the *2006 IPCC approach* was initially unclear. It was explained that the former could have a broad scope—more specifically, scope 1 (direct emissions), scope 2 (emissions associated with the generation of electricity and heat consumed); and scope 3 (upstream emissions associated with the production of consumed products and staff travel)—while the new Regulations, based on *IPCC 2006*, would address *direct* emissions sources only, similarly to *GHG Reporting Protocol* scope 1. This exercise was important because it prepared organizations for the type of GHG emissions-related activity data needed for reporting.

The workshop helped increase industry's understanding of the purpose of the new Regulations and clarified the different roles of and perspectives on data in policy-oriented processes.

It is advisable to make available more complete technical guidance in similar situations in the future so that non-governmental actors can come to this type of workshops well prepared.

2.3.3 Refinement of the Regulations

Following the workshops, the Regulations were further refined by Aether and DEA, in consultation with DEA's legal and legislative support experts. These refinements yielded a revised version that addressed the comments and concerns from the workshop and could compliment (as an update) the version already submitted for ministerial approval.

2.3.4 Development of the Technical Guidelines

Following the workshops, DEA (supported by the World Bank) also launched a project to develop Technical Guidelines. The availability of technical guidance was of crucial importance for both government officials and non-governmental actors in understanding the implications of the Regulations under development. Initial drafts of these Guidelines were not consistent with the objectives of the Regulations as they attempted to follow international reporting guidelines for companies (WRI Greenhouse Gas Protocol⁵) more closely than the IPCC approach.

Although the methods in the *WRI Greenhouse Gas Protocol* are fully consistent with the *IPCC Guidelines*, reporting under this Protocol is not consistent with the IPCC Guidelines because the Protocol requires reporting of scope 2 and scope 3 emissions (see above for explanation). When applied to a national reporting system, including scope 2 and 3 would entail double counting since, for instance, the emissions resulting from the use of electric power would also be reported by the power plants based on their fuel combustion.

After several iterations, the Technical Guidelines were finalized in-house by DEA staff and Aether, taking advantage of their strong links to the IPCC and UNFCCC good practice processes. The *IPCC Guidelines* provided useful reference material from which to derive a more country-specific set of methods in the technical guidance. As the *IPCC Guidelines* were designed to be applicable at the *national* level and cover different geographical situations, they could not be used directly and substitute for country-specific technical guidance. The Technical Guidance provided unambiguous guidance specific to South Africa's situation and data availability, with the *IPCC Guidelines* as a reference.

⁵ For more information, see the World Resources Institute Greenhouse Gas Protocol (<http://www.ghgprotocol.org/>).

3. Lessons Learned

This chapter presents the key lessons learned while developing and implementing these Regulations.

3.1 Use the Regulations to Establish a “National System” Approach

This National System concept exists in developed national GHG MRV systems. The National System comprises the institutional arrangements, experts, tools, data, and stakeholders required to regularly and sustainably produce GHG estimates to an agreed minimum level of quality and in a way that allows them to be continuously improved. The National System approach should drive facility- and regional level data flows to ensure a sufficiently large volume of good-quality data is available for related policy and other (e.g., business) decision making. The National System ensures a sustainable environment for regular updates of a national picture of GHG trends that is reliable. Through the use of international (IPCC) guidance, it provides a strong basis for data gathering and estimation. The National System provides a reliable, unbiased source of information that does not overestimate or underestimate. Moreover, it provides context and completeness for choosing the most appropriate policies and measures; setting thresholds for facility/company reporting and establishing taxation; and creating permit and budget mechanisms to reduce emissions. The quality criteria required for national emissions inventory reporting (see appendix A) also serve as the overarching criteria for subnational data gathering and reporting (e.g., through these Regulations) and provide a high level of credibility and confidence with any other actor from government, industry, NGOs, and the general public.

Many companies, including companies in South Africa, apply the WRI GHG Protocol⁶ corporate standards in their environmental and sustainability reports. The methods to be applied under the Regulations are fully compatible with those used in scope 1 of the GHG Protocol. While scope 2 and 3 need to be managed differently, they always require the sharing of estimates calculated and reported using scope 1 (e.g., if we have an accurate estimate of the emissions from electricity production, we can give electricity users help in estimating scope 2 electricity “emissions”).

In short, by requiring good-quality data based on consistent methods, the Regulations provide a solid foundation for a strong National System and all emissions-related policy instruments that in some way or other affect individual facilities and installations.

3.2 Separating Procedural “Regulations” from Methods for Estimating GHGs Based on “Technical Guidelines”

Similar to national reporting under the United Nations Framework Convention on Climate Change (UNFCCC), the South African approach has been to include only *procedural* guidance in the Regulations themselves. This defines the what, when, how, and by whom data must be reported:

⁶ Ibid.

- *What* is to be reported? This will include, in the case of emission inventories, the types of greenhouse gas (GHG), the source categories and, as far as relevant, any thresholds below which reporting is not required
- *Who* is required to report and to whom?
- *When* are the reports due? This includes deadlines and reporting frequency.
- *How* to report? Clear guidance must be given on
 - a. *Methodology* to be used for estimating emissions (separate Technical Guidelines)
 - b. *Format* to be used for reporting. A prescribed format, preferably digital, will greatly reduce efforts at both the submitting and receiving end of the reporting procedures.

This procedural guidance defines the legal obligations and minimum standards (with reference to an accompanying set of Technical Guidelines) as well as the provisions to update the guidance, as new processes are implemented in facilities and/or new and better estimation methods become available.

The reason for separating procedural and Technical Guidelines is that, as long as the Regulations contain appropriate rules for updating the Technical Guidelines, it is much simpler to update the latter—as no complicated legislative decision process is required—when new technologies emerge and new measurements become available.

3.3 Complete and Continuous Improvement in Reporting through Technical Guidelines Outside of the Regulations

South Africa developed Technical Guidelines to accompany the Regulations, which allowed quick and complete reporting from the get-go but also requires continuous improvement.

South Africa's Regulations and Technical Guidelines also allow different tiered approaches to be used, depending on the importance of a given sector in *national* total emissions. The Regulations require the use of higher-tier methods for source categories that are expected to be key categories at the national level and lower-tier methods for less important sources (and reporting based on the lower-tier methods to be used benefiting from a grace period).

Complete: The Technical Guidelines provide, as a minimum, an approach (method) for estimating GHGs for all required categories (types of facility/activity). A complete set of methods for all required categories has been included by adapting or referencing the relevant Tier 1 methods and technology- (or facility-)specific (tier 2 and higher) methods in the *2006 IPCC Guidelines*. It also includes any relevant and valid methods proposed by industry or others and accepted by the competent authority for application in South Africa.

Continuous improvement: The Technical Guidelines are open and updatable to facilitate improvements in estimation methods. If a company would like to use a new method that is not yet incorporated in the Technical Guidelines, it can propose such a method be included in the Technical Guidelines before actually applying it and submitting estimates based on its use (to avoid

iterative review processes interfering with the reporting process). To enable this, the procedural guidance (the Regulations) includes:

- A transitional period (of 5 years), allowing industry to apply the simplest (Tier 1) methods early on for all processes, while allowing up to 5 years to adopt more complex estimation methods.
- A procedure (Regulation 11(2) and 11(3)) for proposing, reviewing, and accepting improved (higher-tier) estimation methods, which are incorporated into the Technical Guidelines upon their acceptance.

Once a new estimation method has been included in the Technical Guidelines, this method also becomes available to other facilities that deem the new method likewise applicable to their own processes. In this case, these reporting entities will need to explain transparently why they believe the new method is better at representing their emissions than the method they currently use. The competent authority can also mandate that facilities with relevant processes move to the new higher-tiered method if appropriate. However, the notice period for this has not been determined yet.

The Regulations require data providers to use higher tiers for all their installations that have capacities above the respective thresholds (as indicated in annexure 1 of the Regulation). If such a method is not available, the data providers can use the transitional period of 5 years to develop a higher-tier estimation method and present it to the competent authority for approval. Once a higher-tier method is accepted and included in the Technical Guidelines, the competent authority will no longer accept any emissions estimate derived from a tier 1 default method. This approach drives the improvement of the methods used in South Africa to a level that is acceptable in terms of transparency, consistency, comparability, completeness, and accuracy (TCCCA) for any purpose.

Box 1 highlights the key guidelines when considering higher-tier estimates using continuous emissions monitoring.

BOX 1. Continuous Emissions Monitoring

IPCC 2006 Guidelines, volume 2, page 1.8, states that "Continuous emissions monitoring (CEM) of flue gases is generally not justified for accurate measurement of CO₂ emissions only (because of the comparatively high cost) but could be undertaken particularly when monitors are installed for measurement of other pollutants such as SO₂ or NO_x. Continuous emissions monitoring is particularly useful for combustion of solid fuels where it is more difficult to measure fuel flow rates, or when fuels are highly variable, or fuel analysis is otherwise expensive. Direct measurement of fuel flow, especially for gaseous or liquid fuels, using quality assured fuel flow meters may improve the accuracy of CO₂ emission calculations for sectors using these fuel flow meters. When considering using measurement data, it is good practice to assess the representativeness of the sample and suitability of measurement method. The best measurement methods are those that have been developed by official standards organisations and field-tested to determine their operational characteristics."

IPCC 2006 Volume 2, page 2.13, also says that "Continuous emissions monitoring requires attention to quality assurance and quality control. This includes certification of the monitoring system, re-certification after any changes in the system, and assurance of continuous operation. For CO₂ measurements, data from CEM systems can be compared with emissions estimates based on fuel flows."

The role of the Technical Guidelines is to clearly inform each individual reporting entity on the methods to be used, thereby minimizing the ambiguity or misunderstanding between the reporting industry and the competent authority. It will be the responsibility of the latter to ensure that the approved estimation method do not have a built-in bias toward overestimation or underestimation. It is critical that while the reporting system is being implemented (e.g., over the first 5–6 years), the competent authority has the necessary skills and capacity to meet the demands for reviewing new method proposals.

3.4 Base the Technical Guidelines on the IPCC Guidelines

The scope of South Africa's Technical Guidelines and Regulations is based on internationally agreed IPCC guidance and on direct emissions. The IPCC provides internationally accepted methodologies known as the 2006 IPCC Guidelines⁷ (hereafter called "*IPCC Guidelines*") and adopted by the Parties to the UNFCCC.

South Africa's Technical Guidelines and Regulations are aligned with the IPCC definitions of direct emitting activities and territorial boundaries—they consider only the direct emissions from sources within the South African territory and according to the IPCC nomenclature. The methods listed in the *WRI GHG Protocol (Company Reporting Guidelines)* for individual source categories are also based on the *IPCC Guidelines*. However, they provide flexibility for reporting entities in defining different boundaries—limiting coverage to scope 1 direct emissions (and similarly to national reporting under UNFCCC) and/or extending coverage to include electricity consumption (scope 2) or full supply and production chain–related emissions/removals (scope 3).

South Africa has decided to base the Regulations and emissions reporting on direct emissions, consistent with the IPCC approach. Doing so simplifies reporting and makes outputs from facilities consistent with national commitments for reporting to the UNFCCC.

3.5 Focus Regulations on Working toward Simple, Single Reporting Mechanisms for All Reporting Entities

Over the course of the development of South Africa's Regulations it became clear that the governmental and non-governmental actors wanted to ensure that the same data would be used for different policy processes within the country. The South African Regulations worked on harmonizing company/business reporting and supporting the development of a transparent and robust national system for GHG and air pollution data flow. The Regulations have been structured in a way that integrates data flows for GHGs with existing reporting activities and data flows (e.g., air pollution, taxation, energy saving regulations, national statistics data gathering). They focus on enabling organizations to report only once to meet many different requirements by adopting the more generic IPCC nomenclature and approach, which is also consistent with the Air Quality Act (AQA) provisions. This has started to be reflected in South Africa's Industry Mitigation System (table 3).

⁷ 2006 IPCC Guidelines for National Greenhouse Gas Inventories (<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>).

The Regulations can be seen to provide the governance structure for an overarching GHG data flow—providing sufficient flexibility to support several, continuously evolving policies, which explicitly includes market mechanisms. Moreover, the data submitted under these Regulations are not tied to any particular policy instrument but enable any instrument to be developed, and monitored, and evaluated using the data collected in accordance with the Regulations. This legislation thus provides a stable platform for the adoption or discontinuation of any “mechanism” (often transient short- to medium- term government policies).

3.6 Engage Stakeholders Early On

To develop acceptable regulations that provide an overarching data flow for many policy instruments requires a carefully coordinated program for stakeholder engagement. Relevant stakeholders include (representatives of) different government ministries and directorates, the industry (as the intended data providers and NGOs (as representatives of the general public). An important step in developing the relevant legislation was the two workshops held in August 2015 (see section 2.2). These workshops—organized by DEA—succeeded in enhancing understanding and in finding common ground between the different governmental institutions relevant to the use of GHG emissions data on the one hand and between governmental and non-governmental actors on the other hand.

Given the fact that not a single NGO attended the workshop, it is worth emphasizing the value of this type of workshop in finding a common understanding of the quality of emissions data. As in the case of industry and government, it may be difficult to establish sufficient mutual trust between different types of stakeholders. At the beginning of the workshop, the participants were somewhat reluctant to accept and understand the different interests of government and industry. Industry representatives tend to see legislation as something that is always counter to the interests of industry, while government representatives feel that they are always opposed by industry. NGOs and other stakeholders may share a similar feeling. These misunderstandings need to be overcome by having experienced and respected experts present the facts and creating a forum for open discussion of issues and problems. The workshops were instrumental in this regard.

Future activities should also focus on engaging better with NGOs, based on more concerted efforts to reach them—in the process highlighting the areas where their contributions would be particularly valuable and identifying areas where they could influence the outcomes to help improve transparency.

Building trust between the various stakeholders in an early stage of policy development is crucial, while also recognizing that their main interests may not always coincide. Moreover, the government may have to do a better job at explaining why such specific (emissions-related) legislation is necessary and try to ensure that the legislation adopted will not excessively burden the industry, the environment, and the general public.

The Regulations established a platform for dialogue between the industry and government that facilitates the incorporation of improved estimation methods. In fact, these provisions have already

resulted in proposals regarding improved, nationwide or facility-specific methods for inclusion in the Technical Guidelines. This underlines the validity of the approach chosen and clearly offers an opportunity to increase the quality of the data submitted to the system.

3.7 Manage Confidentiality

Another key element for a successful reporting process is recognition of confidentiality. The data to be reported by the entities, especially those that are needed to ensure transparency, might at least in part be sensitive information, revealing commercially important information to any competitors. For this and similar reasons, entities might want to keep their information confidential. The Regulations therefore include provisions that will ensure sufficient care at the competent authority that data that are provided as confidential, remain confidential and will not be kept forever, not be published in any form or provided to anybody not bound to confidentiality rules.

3.8 Data Quality and Continuous Improvement

One important issue for GHG emissions data to be used under a range of policy processes is the concept of data quality. Under these Regulations, the competent authority is tasked with verifying the data submitted. This approach has been chosen so that the competent authority can build up experience and capacity while measuring methods and emissions reporting are being established. Following a number of reporting rounds (to allow for improved reporting and emissions estimates of sufficient quality) and once verification systems have been firmly established, South Africa will consider implementing third-party independent verification processes to reduce the burden on the competent authority.

The competent authority is responsible for reviewing the quality of the reported data (Regulation 11(1)). This particular regulation provides a mechanism for the competent authority to review the submission within a limited time frame; if the competent authority is unable to meet this deadline, the emissions data submitted are automatically approved. Thus, it puts a clear onus on the competent authority to function effectively. However, this regulation also includes provisions for the competent authority to have access to the relevant archives kept by the reporter.

The competent authority may accept proposals for improvements to the Technical Guidelines that entail improvements to the accuracy of estimates (Regulation 11(2) and 11(3)). Regulation 11(2) makes it possible to propose a new, better (technology-specific) emissions estimation method for any activity that is to be included in the annual reporting. Regulation 11(3) requires the competent authority to review this proposed method and respond to the data provider within 30 days from the date of submission (the report is deemed accepted if nothing is heard from the competent authority within that period).

DEA has already been approached by industries eager to propose higher-tier methods, more specifically, "better" methods than the tier 1 methods from the *IPCC 2006 Guidelines*. This indicates that the procedures envisaged in the proposed legislation are already working. In fact, the keenness

to improve on the methods currently used may have an importance that extends beyond the country's national borders, as South Africa could offer the international GHG emissions estimation community additional understanding and support. The Technical Guidelines accompanying the Regulations could also be transformed into a helpful resource for other countries.

Annex A.

Quality Criteria under the IPCC

The quality criteria of TCCCA (Transparency, Completeness, Consistency, Comparability, and Accuracy), as defined in the *IPCC Guidelines*, are key to ensuring credible, unbiased estimation and reporting. These quality criteria are equally applicable to all levels of emissions reporting. Although they have been developed to support good practice in national inventories, the same quality attributes support credibility for all affected actors (reporting facilities, competent authorities, and the general public) and equality between different companies in any emissions reporting legislation.

TABLE 3. TCCCA Quality Criteria for Emissions Inventory Estimation

Transparency	This means that the assumptions and methodologies used for an inventory are clearly explained to facilitate replication and assessment of the inventory by users of the reported information. The transparency of inventories is fundamental to the success of the process for the communication and consideration of information.
Consistency	This means that an inventory is internally consistent in all its elements with inventories of other years. An inventory is consistent if the same methodologies are used for the base and all subsequent years, and if consistent data sets are used to estimate emissions or removals from sources or sinks. Under certain circumstances, an inventory using different methodologies for different years can still be considered consistent if emissions have been recalculated in a transparent manner, in accordance with the IPCC good practice guidance.
Comparability	This means that estimates of emissions and removals reported by Parties in their inventories are comparable.
Completeness	This means that an inventory covers all sources and sinks, as well as all gases, included in the <i>IPCC Guidelines</i> , as well as other existing relevant source/sink categories that are specific to individual Parties and, therefore, may not be included in the <i>IPCC Guidelines</i> . Completeness also means full geographic coverage of sources and sinks of a given Party.
Accuracy	This is a relative measure of the exactness of an emission or removal estimate. Estimates should be accurate in the sense that they are neither systematically lower nor higher than actual emissions or removals, to the extent this can be determined, and that uncertainties are reduced as far as practicable.

Source: UNFCCC Resource Guide for Preparing the National Communications of Non-Annex I Parties; Module 3 National Greenhouse Gas Inventories (http://unfccc.int/resource/docs/publications/09_resource_guide3.pdf).

Annex B.

Tiered Approaches according to the IPCC

The *2006 IPCC Guidelines* are designed for national GHG estimation. However, they are also applicable and relevant as a basis for facility-level estimation. The *IPCC Guidelines* provide a tiered approach that can in essence be described as follows:

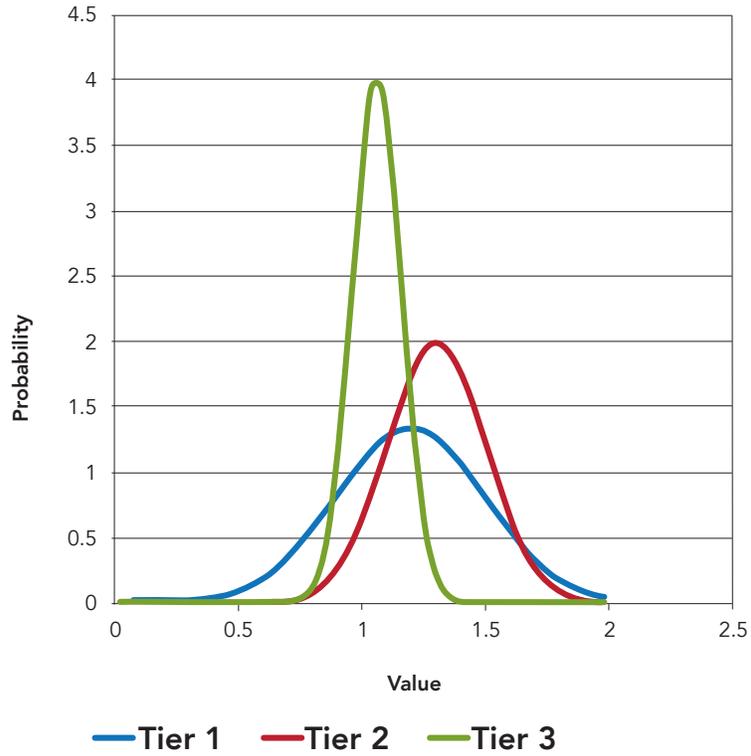
- **Tier 1** is a simple method at the level of each individual source category (and, where relevant, fuel) using readily available activity data, generally derived from national or international statistics and so-called tier 1 default emission factors (EFs), providing a linear relation between the activity rate and the emission of a specific greenhouse gas (GHG). A tier 1 method does not require any additional data or information; it could be seen as a method everybody can apply when no better method is available. Tier 1 methods are provided in the *IPCC Guidelines* for all categories where GHG emissions must be included in the national inventory. Therefore, the full set of tier 1 methods provides a complete set of emission estimation methods that may be used if no additional information is available.
- **Tier 2** is an improved tier 1 method, where additional information on the technologies and practices for a specific emissions source is used to generate technology-specific (sometimes also called country-specific) EFs. In tier 2, the activity within a source could also be distributed over different technologies, each with its own, specific EFs, resulting in more detailed calculations. Tier 2 methods therefore require additional information, but yield better estimates. For many source categories, the *IPCC 2006 Guidelines* provide tier 2 EFs for specific technologies and practices. IPCC tier 2 EFs are in no way complete or claiming to be complete.
- **Tier 3** is any method going beyond tier 2. It may include direct measurements, detailed process modelling, or a similar method.

The IPCC methods do not refer to the level of aggregation of emissions. However, the tier 1 default EFs provide *globally averaged* relations between activity rates and the resulting emissions. In higher tiers, information is added that provides *specific* EFs for specific technologies and practices. These country-specific EFs may in some cases only approximate technology- and practice-specific EFs covering all types of processes actually used in the country. Most of the *IPCC Guidelines* therefore describe technology- specific EFs rather than country-specific EFs, as the former are more widely applicable than the latter would be.

Figure 2 provides a schematic representation of the relations between the three tiers. Generally one would expect a higher tier to use an EF that lies within the uncertainty range of a lower tier, and

to show a lower uncertainty (that is, a narrower probability distribution). This expectation reflects the overall understanding that a higher tier is “better” than a lower tier.

FIGURE 2. Schematic Representation of the Quality of Different Tiers of Emissions Estimation Methods for a Hypothetical Case





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