SMART Performance Management of SA's UN Climate Change Commitments

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Abstract

The verdict is that South Africa is not on track for a 1.5°C world. To achieve the Paris Commitment, South Africa needs to reduce its emissions to below 360 MtCO2e by 2030; to below 231 MtCO2e by 2050. In the next two decades (2020-2040), the global community will experience titanic shifts in the energy, transportation, buildings, industry, agricultural and land use sectors of the economy. To track the progress toward the achievement of the national commitments, one would have to measure performance on climate change mitigation and adaptability strategies according to International Standards. The International Standard Organization is yet to pronounce on a specific international standard on carbon emission management. A study is in progress to make a new and original contribution as part contribution to the global body of knowledge in performance management of carbon emissions. The paper presents a SMART performance management system, one that is Specific, Measurable, Achievable, Realistic and Timely. The idea is to define the SMART key performance indicators that could be incorporated into selected and existing international standards; such that a full case study using South African data; including adaptability and resilience especially in terms of the projected future times, could be developed.

Keywords
SMART Performance Management, Climate Change, Global Warming, Sustainability, Adaptation, Resilience

1. Introduction

In accordance with decision 1/CP.19 and 1/CP.20 of the Conference of the Parties to the United Nations Framework on Climate Change, South Africa's Department of Environmental Affairs (2011, 2016, 2017, 2019) tabled its intended nationally determined contribution (INDC) such that it will embark on bending the curve of South Africa's GHG emissions towards a peak, plateau and decline trajectory range. South Africa aspires for a low-carbon economy whilst it notes that an inclusive and just transition requires time. South Africa is investing in accelerated energy efficiency and reduced emissions intensity programs across the entire economy and is embarking on a full transformation of its energy sector. South Africa has plans to replace the inefficient fleet of ageing coal-fired power plants with clean and high efficiency technology that includes renewable and clean nuclear energy. In a presentation to the Portfolio Committee on Environmental Affairs (SA Parliament, 2016), Figure 1 illustrates the bend from business as usual to that of full compliance to the Paris Agreement, as presented by Eskom, the National Electricity Utility of South Africa.

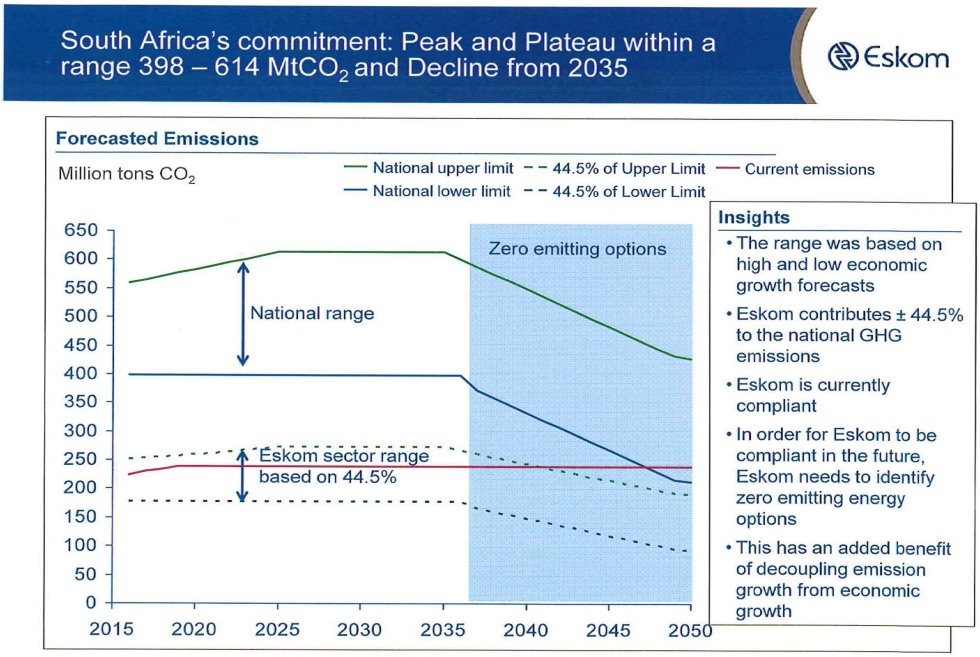

Figure 1 : South Africa's INDC Committeement to the Paris Agreement with Observations from Eskom as Presented to the Parliamentary Portfolio Committee on Environmental Affairs, Oct 2016.

South Africa's emission is presently in the 500 – 600 MtCO2e range. The verdict is that South Africa is not on track for a 1.5°C world. To achieve the Paris Commitment, South Africa needs to reduce its emissions to below 360 MtCO2e by 2030; to below 231 MtCO2e by 2050. The global aspiration is that all human activity must embrace the move towards the ideal of zero carbon emissions. Zero emissions of CO2 in the second half of the century is necessary to avoid even greater environmental impacts that will be beyond the capability of adaptation.

South Africa has defined six goals for adaptation as part of its global responsibility as per Article 2 of the Convention; as further codified in the UNFCCC as a temperature goal. Goal 1 is to develop a National Adaptation Plan and to start its implementation in the period 2020 to 2025 and onto period 2025 to 2030. Goal 2 is to account for climate change considerations in the national development, sub national and sector policy framework. Goal 3 is to build institutional capacity for adaptation. Goal 4 is to develop an early warning vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas. Goal 5 is to develop a framework for vulnerability and adaptation and goal 6 is to communicate the gains in adaptation and educational awareness. Each of the goals are integrated into the National Development Plan (2012) of the country.

To track the progress toward the achievement of the national commitments, one would have to measure performance on climate change mitigation and adaptability strategies according to International Standards. The International Standard Organization is yet to pronounce on a specific international standard on carbon emission management. The work in progress at the University of Johannesburg is to make a new and original contribution to the global body of knowledge in the performance management of carbon emissions. The approach adopted is to employ a SMART performance management system, one that is Specific, Measurable, Achievable, Realistic and Timely; based on the classic theory of performance management.

2. Literature Review

Aguinis (2005) defined performance management as a process of ensuring that set of activities and outputs meets an organization's goals in an effective and efficient manner. It can also be defined as a **continuous process** of identifying, measuring and developing performance in organizations by **linking each individual's performance** and objectives to the organization's overall mission and goals. For the purpose of this paper the second definition will be adopted with emphasis on continuous process and the link to the mission and goals; namely:

i. Continuous process. Performance management is ongoing. It involves a never ending process of setting goals and objectives, observing performance, and giving and receiving ongoing feedback
ii. Link to mission and goals. Performance management requires that activities and outputs are congruent with the set goals.

It is important to consider how performance is measured and how it will be communicated to different stakeholders.

2.1 Performance Management System

Performance management process is a systematic process of managing and monitoring the performance against key performance parameters or goals. Global Goal feed into performance planning to ensure that performance aligns with the overall strategy.

Figure 2 : The Classic Performance Management Process from Aguinis (2005)

2.2 Performance Management Principles

According to Aguinis (2005), performance management principles provide guidance on the characteristics of effective and efficient performance management, communicating its value and explaining its intention and purpose. They are the foundation for managing performance and should be considered when establishing performance management framework and processes. Aguinius (2005) recommends the following elements for effective performance management:

i. "Achieving strategic clarity – holistic picture of strategy, i.e. aims, outcomes, enablers of performance and focus critical issues to produce results
ii. Collect meaningful performance indicators – relevant and meaningful indicators linked directly to the strategic objectives
iii. Best available information, i.e. good information to supports critical decision-making
iv. Inclusive, i.e. all stakeholders knows what are the objectives and why. Performance management an integral part of the organization's daily routines taking human and cultural factors into consideration
v. Ensuring alignment and integration, i.e. guides and aligns all processes - such as budgeting, performance reporting, the management of projects and programs and the management of risks; Risk and performance indicators are closely aligned - performance indicators allow organizations to understand whether they are delivering the designated performance levels, and risk indicators allow organizations to understand the risks of not being able to deliver performance.
vi. Reporting and communicating performance information appropriately, i.e. correct formats for different audiences to complement, contextualize and provide meaningful interpretation
vii. Dedicating resources and time, devotes adequate time and resources to performance;
viii. Creating a positive learning culture, performance information and 'contextualized' or customized feedback be proactively provided to everyone to make better-informed decisions, and to take actions that positively affect future performance;
ix. Keeping the system dynamic, performance management strategy developed and refined as per strategy and objectives
x. Continual improvement"

2.3 Performance Management Framework

Performance management framework assists in integrating performance management into significant activities and functions. The effectiveness of performance management depends on its integration into the governance of the organization, including decision-making. Framework encompasses:

- integrating,
- designing,
- implementing,
- evaluating and
- improving risk management across the organization

2.3.1 Critical Success Factors for Performance Management

Critical success factors are those few things that must go well to ensure success for the risk management, and, therefore, they represent those areas that must be given special and continual attention to bring about high performance. Table 1 illustrates the Critical Success Factors for Performance Management.

Critical success factors	Impact
Leadership and political commitment	• Strong Policy direction and leadership
Effective, accountable and development oriented institutions, efficient and strong bureaucracy	• Clear Roles, responsibilities and governance processes

A results-based approach with concrete targets that are measurable and can be tracked, monitored and reported regularly	• Enable oversight and sharing information with key stakeholders • The ability to identify, contextualize, and align with the provided direction • Improved performance
Revitalizing strategic planning and ensuring effective interface among national plans, regional initiatives and Agenda 2030.	• Integrated global, continental, regional and national planning based on series of short, medium and long term time horizons is vital for sound economic management, the pursuit of holistic and integrated development
Making Agenda 2030 an integral part of all activities	• Every initiative impacts positively to the management of Climate Change
Revitalizing strategic planning and ensuring effective interface among national plans, regional initiatives and Agenda 2030.	• Coordinated, interlinked and seamless execution
Quality assurance of processes at all levels	• To improve decision-making
Adequate intelligence information	• The ability to identify, contextualize, and present all related processes
Availability of competent skills	• Retention of essential skills
Effective engagement and participation of all stakeholders in the conception, design, implementation and monitoring and evaluation of Agenda 2030	• Effective engagement on strategy, planning, and response capabilities • Broad engagement with key role players when managing performance to improve the quality, accuracy, validity, and completeness
Benchmarking	• Comparing processes and performance measures to global best and best practices.
Effective governance process	• Performance-based decision-making to ensure objectives are achieved
Flexible	• The System dynamic must be must be developed and refined as per strategy and objectives
Quality assurance of processes at all levels, for example, data integrity , peer reviews	• To improve decision-making
Regular reporting	• Enable oversight and sharing information with key stakeholders
Performance Management policy and related support documents	• The ability to identify, contextualize, and align with the provided direction
Adequate intelligence information	• The ability to identify, contextualize, and present all related processes
Availability of competent skills	• Retention of essential skills
Stakeholder engagement and communication	• Effective engagement on strategy, planning, and response capabilities • Broad engagement with key role players when managing performance to improve the quality, accuracy, validity, and completeness
Identification of Key Performance Indicators (KPI) and implementation	• KPIs should be early warning signals of performance to ensure that objectives are achieved

of tracking process	• Improved performance

Table 1 : Critical Success Factors for Performance Management

2.3.2 Performance Measurement Key Performance Indicators

Performance Measurement System is a method of assessing progress towards meeting targets or goals. It includes a set of indicators that can be monitored over time to provide feedback on achieving success. It must meet the needs and priorities of the users and decision makers responsible for Climate Change.
Too often performance measurement systems are driven by what is available rather what is needed. In most cases the shortcomings are three-folds, i.e.:

i. Leadership view is not as commonly understood as it appears at far sight
ii. Even when tracking intangibles, they only look at how much they have, not at how those intangibles are used, i.e. they only look at the input not the output
iii. Compromises are made so that the measures are not used to properly reflect the underlying key success factors

Performance measurement system tells leadership whether targets and its related strategies are being achieved or if they need to be revised. To build an effective performance measurement system requires a systematic definition of the goals and strategies. Systematic approach ensures that goals and strategies for most important aspects of Climate Change are taken into consideration.
Performance measurement system is used to translate broad strategies and vision into tactical objectives for which Key Performance Indicators (KPI) can be established. For the performance measurement system to be functional the following must be determined:

i. Clear goals
ii. Subsequent strategies for carrying out those targets
iii. A set of indicators that reveal progress towards those targets
iv. A set of standards/targets for each indicator
v. Reporting within the organization

An effective performance management system will greatly depends on the indicators/metrics used to define the performance form a number of perspectives. There is large number of Climate Change potential performance Indicators. A key element of effective performance measurement system is to focus only on the most important indicators. Indicators can provide crucial guidance for decision making. They can translate scientific knowledge into manageable units of information that can facilitate the decision making process. They can help to measure and calibrate progress towards achievement of Climate Change objectives. They can provide early warnings, sound alarm in time to prevent economic, social and environmental damage. They are also important tools to communicate ideas, thoughts and values. Generally there are two types of indicators, those describing the physical state of the climate system and its historical development, sometimes called lagging indicators, and those looking at future impact, risk and adaptation, called leading indicators. Indicators should meet the following criteria:

i. Relevance: each should be a clear, understandable indicator of global climate change, which has broad impact for a range of audiences. Some indicators will also have national and regional values;
ii. Representativeness: indicators as a package should provide a representative picture of changes to the Earth system related to climate change;
iii. Traceability: should be calculated using an internationally agreed (and published) method;
iv. Timeliness: should be calculated regularly (at least annually) with a short lag between the end of the period and publishing the data;
v. Limited number: to allow clear, concise communication

2.3.3 Key Performance Data Management

The main goal of data management is to preserve, capture and provide access to data by decision makers, planners and researchers. It is critically that both current and historical climate information is managed in a systematic and comprehensive manner. Data must be properly stored, managed, quality-controlled and readily accessible in an easy-to-use forms.

2.3.4 Performance Assessment

"*Performance Assessment is an overall process of identification areas, performance analysis and performance evaluation*" (Aguinis, 2005). Performance Assessment is conducted systematically, iteratively and collaboratively, drawing knowledge and views of stakeholders. The following are performance assessment principles:

i. The objective need to be specified with sufficient clarity to enable the identification and assessment of risks relating to objectives.
ii. The identified risks to the achievement of objectives across all levels and analyses risks as a basis for determining how the risks should be managed.
iii. The potential for misrepresentations in assessing performance to the achievement of objectives.
iv. The changes that could significantly impact the system of control needs to be identified and assessed

2.3.5 Performance Mapping

Performance mapping builds on the institution's vision and provide a well-defined path way to the future. It helps to move focus from individual performance measure analysis to a broader and integrated goal structure and enable the allocation of resources to address that specific performance.

The objectives of performance mapping are as follows:

i. Identify performance measures and how they are interconnected;
ii. Provide a mechanism to develop a robust performance management strategy;
iii. Compare and evaluate current performance handling and aid in selecting appropriate strategies;
iv. Show the remainders of risks after all risk mitigation strategies have been put in place; and
v. Communicate performance management strategy to both management and employees.

2.3.6 Performance Reporting and Review

According to Shad Muhammad K. and Lai Fong-Woon (2015), reporting of climate change performance will assist in alerting all stakeholders to trends towards the achievement of the objectives. KPI needs to be integrated into strategic and operational decisions. It should form integral part of governance and enhance dialogue with all stakeholders and support all involved in meeting their responsibilities. The frequency of reporting needs to be agreed upon. When reporting the following should be considered:

i. Differing stakeholders and their specific information needs
ii. Cost, frequency and timeliness of reporting
iii. Method of reporting
iv. Relevance of information to objectives and decision making

This will provide insight and information to stakeholders of any performance risks that could potentially hinder the achievement of the objectives and strategy. One approach could be the use of a dashboard. A dashboard is a graphical user interface which provides glance views of relevant key performance indicators (KPIs) to a particular objective or process. It shows a progress summary to a particular objective. Table 2 provides an example of a dashboard.

Key Performance Indicator	What is acceptable?
Key Performance Indicator 1	
Key Performance Indicator 2	

Key Performance Indicator 3		
Key Performance Indicator 4		
Key Performance Indicator 5		
Key Performance Indicator 6		
What is acceptable?	**What is tolerable?**	**What is unacceptable?**

Table 2 : Example of a Dashboard

Dashboards will allow leaders from various sectors of the society to monitor the sector contribution to achievement of climate change goals. The benefits are:

i. Visual presentation of KPIs
ii. Identify and correct negative trends
iii. Generate detailed reports showing new trends
iv. Help to make informed decisions
v. Align strategies and goals
vi. Gain total visibility of all systems
vii. Quick identification of outliers and correlations

3. Integrating SMART into Existing ISO Standards for Climate Change Performance Measurement and reporting

The proposed SMART performance management system is Specific, Measurable, Achievable, Realistic and Timely. The idea is to define the SMART key performance indicators that could be incorporated into selected and existing international standards. Governments are increasingly being asked to document or show progress and measure performance on climate change to improve their accountability to the public and to provide information useful for making decision. Climate change actions require the development of Performance Measurement, Reporting and Verification, as well as Monitoring and Evaluation instruments. These provide transparency and certainty to actions, whilst guaranteeing environmental integrity, comparability, consistence, transparency and data accuracy. The previous will allow evaluating and giving feedback to the formulation of climate change policies, whilst also encouraging their efficiency and impact. Particularly, correctly and efficiently using budgetary, international, public, and private resources will impact directly the achievement of the adaptation and mitigation national policy objectives.

Measurement and reporting of climate change performance will assist in alerting all stakeholders to trends towards the achievement of the objectives. It will help to track the effort to combat climate change and demonstrate accountability by responsible people. It will also help enhance transparency in international climate politics and enables the comparability of climate protection efforts and progress thereof. This is important for leveraging continued support for adaptation initiatives, and for demonstrating that taxpayer and investor funding has been spent wisely. This can help to ensure ongoing support for actions and any further funding that may be required.

This will reduce the likelihood of the risks occurring and provide insight and information to stakeholders of any risks that could potentially hinder the achievement of the objectives and strategy. An integral part of data sourcing, processing and management will be industrial revolution 4.0 driven; the study will present a functional specification of internet of things, big data, and data analytics, block chain management of carbon taxes and credits and performance monitoring and management. It plays an important role in three aspects of adaptation.

i. Tracking the performance of activities undertaken during the development of an adaptation plan (e.g. stakeholder engagement activities).
ii. Tracking pre-identified risk thresholds/trigger levels which identify when new adaptation actions should be undertaken.

iii. Determining whether planned outputs and outcomes from adaptation actions have been achieved.

The frequency of data collection and reporting of performance needs to be agreed. When measuring and reporting the following should be considered:

i. Availability of data
ii. Sources of data
iii. Data integrity

3.1 Stakeholder Engagement

Climate change programs operate within a complex landscape which involves many different stakeholders with diverging objectives. These stakeholders need to be engaged through several engagement channels. Jainendrakumar (2016) defined stakeholder as *"persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively*". They need to be engaged through all steps of risk management process. This will assist in understanding risk, the basis on which decisions are made and reasons for particular actions. This will promote awareness, understanding of risk and also in obtaining feedback information to support decision making. Stakeholder engagement aim to:

i. Bring different areas of expertise together for each step of the risk management process
ii. Ensure that different views are appropriately considered when defining criteria and evaluating risks
iii. Provide sufficient information to facilitate risk oversight and decision making
iv. Build the sense of inclusiveness and ownership amongst all affected stakeholders

3.2 The SMART Performance Conceptual Framework

The proposed conceptual framework, shown in figure 3, acts as the guide to manage climate change performance.

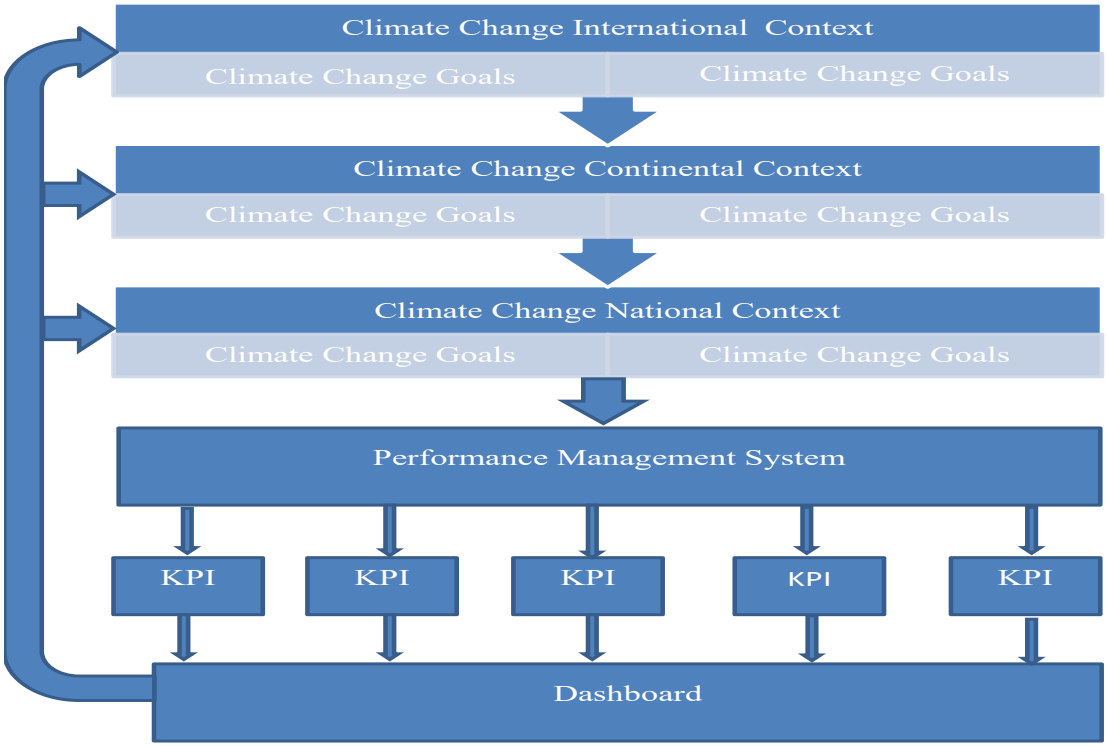

Figure 3: A Conceptual Performance Framework

3.3 Nationally Determined Contribution

South Africa like any developing country is facings climate change challenge with overriding priorities of poverty and inequality. Addressing both these priorities require creating decent employment, sustainable economic development, improving basic education, health and social welfare and many other basic needs. With all these priories South Africa is facing challenges of energy shortages that is heavily dependent on coal and liquid fuels, with inefficient coal fired power station nearing their end of life. NDC needs to be understood in this context. Table 3 illustrates the South Africa's Intended National Determined Contribution submitted to the UNFCCC in September 2015. It covers adaptation and mitigation as well as finance and investment requirements.

Mitigation	• The M-INDC takes the form of a peak, plateau and decline GHG emissions trajectory range starting in 2020, with emissions by 2025 and 2030 in a range between 398 and 614 MtCO2e.
Adaptation	• Goal 1: Develop and operationalise a National Adaptation Plan • Goal 2: Mainstream climate considerations in national development at all government levels • Goal 3: Build the necessary institutional capacity for climate change response planning and implementation • Goal 4: Develop an early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas • Goal 5: Develop a vulnerability assessment and adaptation needs framework by 2020 • Goal 6: Communicate past investments in adaptation for education and awareness and for international recognition
Finance and investment requirements	• Indicative scales of finance and investment are required for both adaptation and mitigation • Key programmes that will have to be scaled up

Table 3: South Africa's Intended Nationally Determined Contribution (INDC)

In October 2019, RSA cabinet approved Integrated Resource Plan (IRP 2019). The plan marks a major shift in energy policy away from coal towards renewables, which is remarkable for a coal-dominated country like South Africa. The IRP maybe sufficient for South Africa to reach the upper end of the target range for GHG emissions in 2030 contained in its Nationally Determined contribution (NDC) to the Paris climate agreement. According to CAT, Implementing the IRP2019 will enable South Africa to achieve its 2030 NDC target. However Climate Action Tracker (CAT) continues to rate South Africa "Highly insufficient" based on the upper end of the NDC range. They expect that South Africa's GHG emissions in 2020 will be 9% to 11% lower than 2019 due to an unprecedented slowdown of domestic economic activity and international trade.

4. Conclusion and Recommendations

The development of a climate change performance management framework based on ISO 31000 has commenced. The complexity of climate change requires a multifaceted approach. The proposed framework will need to be internationally acceptable, be standardized in data collection, analysis, measurement and reporting and have measurable impacts on national economic growth, and performance management strategies. Climate change is equivalent to poverty; it is man-made. The exercise of measuring and reporting is to cease on GHG emissions as emanating from human activity of industrialization and mass production.

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