REPORT

POTENTIAL ALIGNMENT BETWEEN THE PROPOSED SOUTH AFRICAN CARBON OFFSET TRADING SCHEME AND THE CARBON BUDGET APPROACH

SEPTEMBER 2014

EXECUTIVE SUMMARY

This report forms part of the project to investigate the feasibility of a carbon offset trading scheme in South Africa. The analysis presented in this report shows that there is potential for alignment of the proposed carbon offset trading scheme under consideration by National Treasury and the Carbon Budgeting approach required by the National Climate Change Response Paper (NCCRP).

The alignment is however hampered by the fact that participants in the current debate do not use the terminology in a consistent and agreed way. It is essential that a common understanding of, for instance, the concept *Carbon Budget* be reached.

This analysis further found that most of the elements required for the practical implementation of a fully aligned Carbon Budgeting system and Mix of Measures (including the carbon tax and carbon offset scheme) are already in place. These include the country's technical infrastructure and the legislative framework on which the draft regulations mentioned in this report are based.

However it was found that there are alignment problems and issues with respect to certain aspects of the structures that are currently under development. These issues relate mostly to the lack of common use of terminology and a disconnection between the current debate and the adopted standards for greenhouse gas accounting and reporting.

This analysis finds that the carbon offset mechanism, as part of the bigger carbon tax design, can easily be aligned with the Carbon Budgeting approach. The alignment is on condition that the Carbon Budgeting system being developed by Department of Environmental Affairs (DEA) returns to the principles already embedded in the adopted ISO standards and the NCCRP. It is necessary that both the carbon tax design (including the design of the offset system) and the Carbon Budgeting system be aligned with the existing infrastructure. This will ensure full alignment of the whole system.

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1 INTRODUCTION

This report describes the findings of an analysis conducted into how the proposed carbon offset trading system can be used within the context of a Carbon Budget approach. It forms part of a larger project to investigate the design of a South African carbon offset trading system, and is funded by the British High Commission in Pretoria.

The proposed carbon offset trading system forms part of the announced carbon tax due to be implemented at the beginning of 2016.

This report has a strong focus on the impact of the developing national GHG management system on the private sector of South Africa. The private sector will be most impacted by carbon tax and thus the carbon offset scheme. The report is presented within the context of the public debate on the developing South African GHG regulatory framework as it stands in August 2014. It should be read and interpreted within this context.

1.1 "DERO system"

The public debate around the development of SA's national GHG management system increasingly refers to the developing Carbon Budgeting system as the "DERO system". The Carbon Budget approach and the Desired Emission Reduction Outcomes (DEROs) are described in the National Climate Change Response White Paper[1] (NCCRP). The NCCRP also describes that a Mix of Measures should be implemented in order to achieve the desired outcomes.

Promethium Carbon's interpretation of the intent of the NCCRP is shown in Figure 1. We have considered carbon tax and carbon offset trading to be a part of the Mix of Measures.

[1]Department of Environmental Affairs, 2011

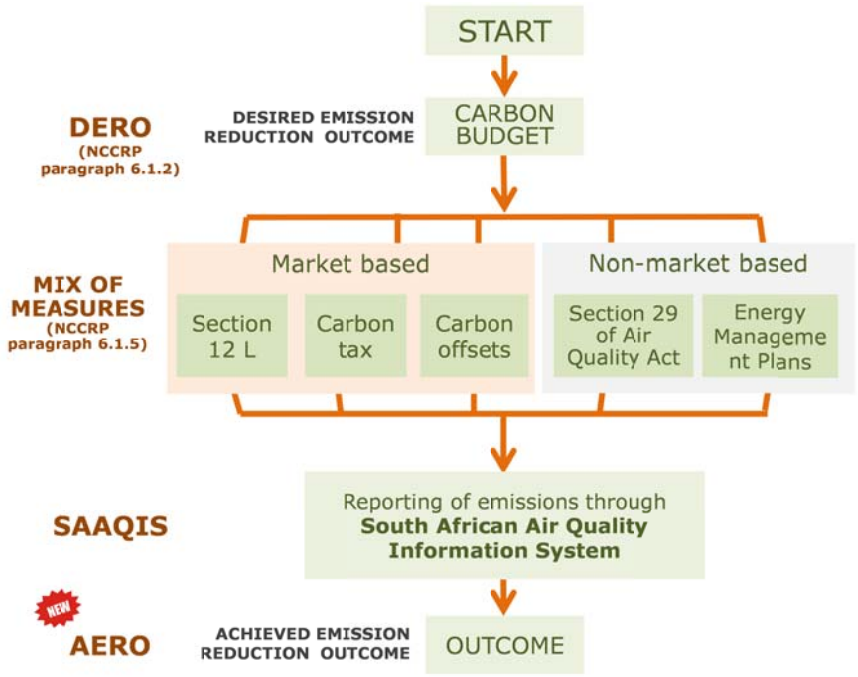


Figure 1: Desired Emission Reduction Outcome and the Mix of Measures

The following aspects have been identified as fundamental and need to be addressed in order for an offset scheme to be implemented as part of a Carbon Budgeting approach:

1. A common and consistent understanding of the terms used in the proposed regulations need to be agreed on;
2. Appropriate accounting mechanisms need to be put in place to provide a common accounting platform for all components of the Mix of Measures;
3. An appropriate reporting structure and format needs to be used;
4. The principles and goals of offset trading need to be aligned with the DEROs and the other components of the Mix of Measures.

1.2 Offsets within the Context of the Desired Outcome

A carbon offset trading system is viewed by both Government and the private sector as an important tool to achieve the desired GHG emission reduction outcomes. The implementation of the proposed offset scheme will contribute to the desired outcomes by:

- Providing companies with GHG mitigation obligations access to least cost mitigation options: This is important as it will lessen the economic impact of the mitigation obligation on carbon taxable companies.

- Strengthening the green economy on a wider base of supply: The threshold for most mitigation actions in the Mix of Measures is set by the NCCRP at 100,000 tons CO_2e as either direct emissions or as electricity indirect emissions. This number is significantly higher than the threshold set in most other countries and will result in a limited number of companies being included inside the regulatory net. The implementation of an offset scheme will prove an effective way of broadening the impact base of the regulatory measures contemplated in the Mix of Measures. It will do so by allowing companies that fall below the threshold to contribute offsets into the regulatory net. It is important to keep in mind that the NCCRP considers offsets to be applicable to the carbon tax as well as the Carbon Budget approach. Full alignment between the carbon offset scheme and the Carbon Budget approach will have to be developed in ways that the carbon offsets can be used to meet obligations under both the proposed Pollution Prevention Plans and the Energy Management Plans.

- Safeguarding the economy from the potential negative effects of another burden on business: Money spent in the economy can either be an expense (burden on the economy) or it can be spent as a capital investment (positive impact for the investor and therefore the economy). Mitigation actions can be implemented as either of the two. In some cases mitigation actions may result in simply buying more expensive fuel such as the switch from coal to natural gas as a fuel source. Such an intervention is simply a cost on the economy and represents a burden with limited future benefits, other than mitigation. An investment in a biomass fired power plant however constitutes an investment with significant potential benefits for the economy. These benefits lie in the creation of a new green industry with associated job creation and green growth. The successful implementation of a carbon offset scheme will stimulate green growth by giving companies that fall outside of the regulatory net access to potential economy benefit created by the GHG regulatory regime.

- Aligning the implementation of a carbon pricing regime with international developments: The implementation of the proposed GHG regulatory regime will impose a cost on the South African economy. Cost increases within an economy reduce the international competitiveness of the country. It is imperative that South Africa's economy remains internationally competitive and that the implementation of the GHG regulations contributes to that economy rather than detracting therefrom. The introduction of the proposed carbon offset scheme is an important component to allow the economy to benefit from the GHG regulations rather than to suffer due to its implementation.

- Reducing the administrative burden for business and government: The offset scheme should be designed to reduce the administrative burden for business and government as far as possible while contributing to the Carbon Budget approach. For that reason Promethium

Carbon in its report 'Carbon Trading in South Africa[2], stresses the importance of using existing infrastructure where possible. The above mentioned report concludes that for the implementation of a carbon tax offset scheme in South Africa in the short term, limited infrastructure development is required by:

- Using internationally recognized carbon credit standards;
- Making use of existing national or international trading registries;
- Making use of the existing market for trading, clearing and settlement of offsets;
- Appointing the South African Designated National Authority as chair of the custodian committee of the SA eligibility rules;
- Using accredited auditors (using ISO 14065 accreditation which is locally available through SANAS since 2013).

By utilizing existing infrastructure where possible, the offset scheme, and therefore any aspect of the Mix of Measures designed to achieve the desired outcome, will reduce the administrative burden on business and government.

- Ensuring a single, economy-wide, carbon price: The implementation of a successful carbon offset scheme will support the development of a single, economy-wide, carbon price. Such a price will support the achievement of the desired outcomes under the Carbon Budgeting approach.

[2] Promethium Carbon, March 2014

2 Terminology and Definition Issues

Promethium Carbon has been involved in the public discussion around the DERO process and is acutely aware that there is a lack of common understanding of many of the terms used in the discussion. We have witnessed parties to this discussion failing to agree on issues because they attach different meanings to the terms used. In order to prevent this report from being misunderstood, we have included this list of definitions to highlight how we interpret some of the terms. These definitions form the basis on which the reader should interpret this report.

- **Budget:** The Oxford dictionary defines a budget as *an estimate of income and expenditure for a set period of time.* This report uses the word budget consistently with the definition in the Oxford dictionary.

  This report further assumes that the use of the word budget does not imply a mandatory limit that may not be exceeded. Such a restriction would constitute a budgetary constraint rather than a budget.

- **Carbon Budget:** In respect of the above definition, a Carbon Budget is an estimate of the emissions of greenhouse gases for a country, sector, subsector or entity for a set period of time. This Carbon Budget would reflect a detailed forecast of the emissions associated with the medium and long term strategy of sector, sub-sector or entity. Understanding the emissions sources and volumes contained in a Carbon Budget will assist in drafting appropriate economic and other instruments resulting in a useful range of Mix of Measures. The setting of a Carbon Budget does not constitute a constraint or a mandatory level of emissions that may not be exceeded – see Emissions Cap below.

  The NCCRP states that the purpose of a Carbon Budget is to provide for flexibility and least-cost mechanisms for companies. This is intended for companies in relevant sectors and/or sub-sectors. The Carbon Budget is to facilitate the deployment of a range of economic instruments to support the system of desired emissions reduction outcomes.

  The NCCRP required that Carbon Budgets be drawn up for identified sectors, subsectors and companies above certain thresholds within 2 years from the publication of the NCCRP (by October 2013). The Carbon Budgets should be reviewed on a 2 year cycle.

  This report uses the term Carbon Budget to refer to the detailed statement of expected flows of greenhouse gases from sectors, sub-sectors and companies and per source of emissions. In the same way as which a cash flow budget is a detailed forecast of all sources and uses of cash in a business, a Carbon Budget is a detailed forecast of the GHG inventory.

- **Desired Emission Reduction Outcome (DERO):** We interpret the term desired emission reduction outcome to refer to the level of emission reduction the country wants to achieve based on what is being set for the Carbon Budget. Whereas the Carbon Budget is a detailed estimate of the emissions for a period of time, the desired outcome is the ideal that the country wants (desires) to achieve. The process of arriving at a Carbon Budget would therefore be to set the target, then use the target to define the desired outcome (DERO), and then draw up an expected outcome (the Carbon Budget). This process can be seen in Figure 2 below.

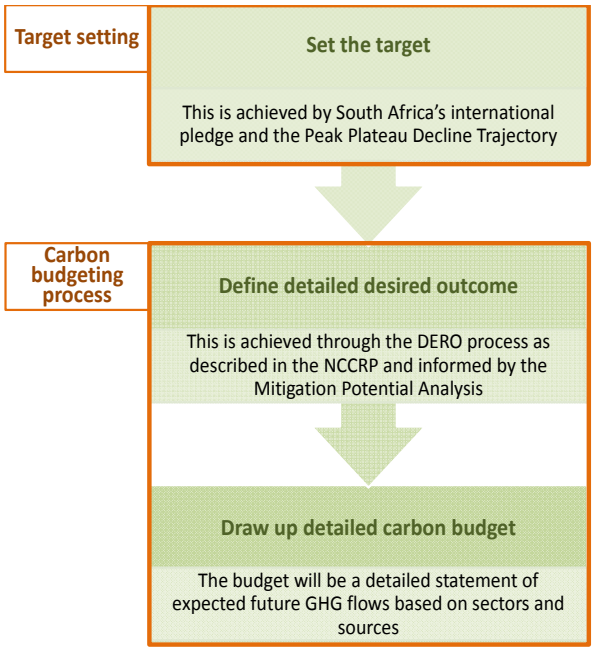


Figure 2: Targets, DEROs and Budgets

- **Emissions cap:** An emissions cap is a mandatory limit to emissions that may not be exceeded. Emissions caps are used in emission management systems in countries with absolute emission reduction commitments like the European Emissions Trading Scheme (EU ETS). In the event that an entity exceeds such a cap, it has to provide offsets to mitigate the amount of emissions exceeded or pay a penalty. The Australian Direct Action Plan (that will replace the cancelled carbon tax system) is expected to have an emissions cap.

There seems to be confusion in the current South African debate on the implications of instituting a Carbon Budget. The effects thereof are misinterpreted as being equivalent to instituting an emissions cap. This report does not consider the implementation of a Carbon Budget to mean that a *de-facto* emissions cap has been implemented. Figure 3 below demonstrates the differences between the two approaches.

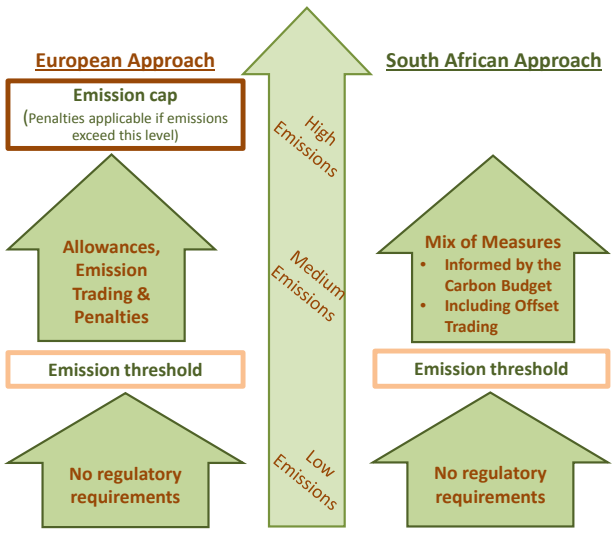


Figure 3: Thresholds, Budgets and Caps

- **Emission Target –** The word target is commonly used in greenhouse gas mitigation planning. Although the term has not been used in South African Government literature on the topic to date, we introduce it here as the

international literature on target setting is relevant to the topics covered by this report. We use the word target in this report as a way of defining what the level of desire in the desired emission reduction outcome is. The South African target should be informed by the existing knowledge base including the Long Term Mitigation Scenarios and the Mitigation Potential Analysis.

- **Emissions threshold:** The NCCRP specifies emissions thresholds as the limits at which certain regulatory interventions such as mandatory reporting will become applicable. The NCCRP lists such a threshold as either 100,000 tons CO_2e per year of direct emissions or 100,000 tons CO_2e per year of electricity indirect emissions, as being the level above which companies will have to do mandatory reporting of their GHG's.

- **Schemes or programs** – In some cases carbon offset schemes such as the CDM (Clean Development Mechanism) and VCS (Verified Carbon Standard) are referred to as "methodologies". The VCS Program Guide is one example.

- **Standards** – Every scheme or program is based on a specific standard which provides the relevant principles and requirements. These are the obligations that participants and projects must meet during the project cycle. For CDM the standard is the Validation and Verification Standard. For the VCS the VCS Standard sets out all specific requirements for developing projects. The VCS standard uses as its core the requirements set out in ISO 14064 Part 2, ISO 14064 Part 3 and ISO 14065. South Africa has adopted the whole series of greenhouse gas ISO standards, including the ISO 14064 series (part 1, 2 and 3) for the quantification of GHG emissions as well as ISO 14065 for GHG auditors. The standards are updated and revised through the SABS (South African Bureau of Standards) technical committees as per the ISO consultative process.

3 Existing and Developing Landscape

The South African GHG regulatory landscape has been in development for a number of years. This landscape covers the infrastructure required to implement the requirements of the NCCRP and the National Development Plan.

3.1 Existing South African Technical Infrastructure

3.1.1 National GHG Accounting

South Africa is using the IPCC 2006 Guidelines for the calculation of the National Inventory. This is in line with the requirements for international reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

National inventories are the total emissions within the geographical boundaries of a country. These inventories help countries quantify, track and communicate trends in GHG emissions that result from domestic activities. These inventories are critical components of international reporting and climate change diplomacy.

Most national GHG inventories are collated following the Intergovernmental Panel on Climate Change (IPCC) guidelines for national GHG inventories. This is the most effective approach to obtain a national inventory as it uses generation and production data from the large electricity producers and liquid fuel suppliers to estimate the consumption data, instead of sourcing information from a large number of electricity or liquid fuel consumers. The national inventory is then dependent on the collection of specific process emission data as well as emissions from the waste and agricultural sector to complete the inventory. Any national inventory is therefore a top down approach gathering high level data from the minimum number of data custodians. The inventory is reported every four years to the UNFCCC as part of an international commitment as National Communications.

From 2014 South Africa was required to start the four yearly National Communications additionally also a biennial update report with information on the national inventory. This is in accordance with Decision 2/CP17 of the UNFCCC Durban Outcomes. The South African inventory is collated in accordance with IPCC 2006 guideline under four broad sectoral scopes, Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU), and Waste.

3.1.2 Corporate GHG Accounting

In South Africa the technical infrastructure is housed in the Department of Trade and Industry and is comprised of the National Metrology Institute of South Africa (NMISA), South African Bureau of Standards (SABS), National Regulator for Compulsory Specifications (NRCS), and South African National Accreditation System (SANAS). The Industrial Policy

Action Plan 2013 – 2016 (IPAP) lists NMISA, SABS, SANAS, NRCS as the lead agencies for South Africa's transition to a green economy.

The SABS adopted the ISO series of Greenhouse Gas Standards in 2006 for use within South Africa. There is a formal process in place under the local technical committees to revise, update and maintain these standards. These standards are sufficient for the current requirements and work envisaged by the Department of Environmental Affairs.

South Africa has adopted GHG accounting standards, as described below:

- **SANS/ISO 14064-1:2006 Greenhouse gases - Part 1**:
  Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals;

- **SANS/ISO 14064-2:2006 Greenhouse gases - Part 2**:
  Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements;

- **SANS/ISO 14064-3:2006 Greenhouse gases - Part 3**:
  Specification with guidance for the validation and verification of greenhouse gas assertions;

- **SANS/ISO 14065**:
  Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition.

- **SANS/ISO 50001**:
  Energy Management – Requirements for energy management systems.

- **SANS/ISO 17021**:
  Conformity assessment — Requirements for bodies providing audit and certification of management systems

The following alignment between the existing infrastructure and the developing regulatory landscape is in place:

- The need for GHG standards is recognised in the NCCRP, which requires that the *regulatory measures include renewable energy and energy efficiency targets complemented by appropriate standards*.

- The Carbon Offset Paper of April 2014 requires the accreditation of auditors and verifiers. This accreditation is in place with SANAS being able to accredit greenhouse gas verifiers in terms of SANS ISO 14065 since 2013.

There is however little evidence that further alignment is in place as the draft reporting regulations do not make any reference to the existing infrastructure.

3.2 Corporate GHG Reporting

The Department of Environmental Affairs aims at implementing a mandatory corporate GHG reporting system in South Africa. It is stipulated in the NCCRP that, *reporting of emissions data will be made mandatory for entities (companies and installations) that emit* (either) *more than 0.1 Mt of GHGs annually* ***or*** *that consume electricity which results in more than 0.1 Mt of emissions from the electricity sector.*

The purpose of the mandatory reporting will be to inform the planning, execution and evaluation of the actions required by the NCCRP and the National Development Plan (NDP).

The NCCRP stipulates that this information should be uploaded into a web based emissions inventory system. The South African Air Quality Information System (SAAQIS) provides a common platform for managing air quality information in South Africa. This can be seen as part of the reporting process in Figure 4 below.

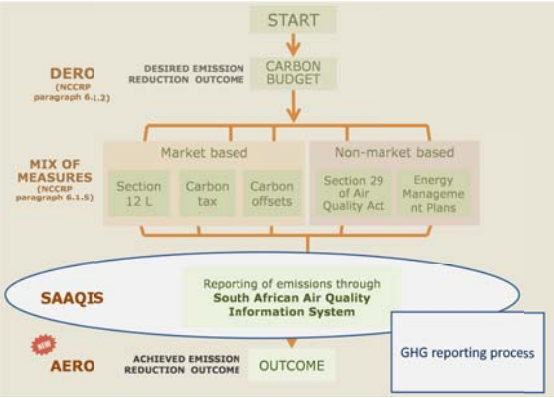


Figure 4: GHG Accounting and Reporting

Draft regulations covering greenhouse gas reporting have been published on a number of occasions:

- **Regulation 142 in terms of the National Energy Act (34/2008)**: This regulation was published on 24 February 2012. It stipulates that companies must report *greenhouse gases and related gaseous particles emitted as a result of the data provider's economic activities and processes* to the Minister of Energy, if he/ she so requires.

- **Notices 171 and 172 of the Government Gazette**: These notices were published on 14 March 2014. They contain draft regulation to declare greenhouse gases as priority pollutants in terms of Section 29 of the Air Quality Act and place a reporting burden on companies in specific sectors with more than 100,000 tons CO_2e annual emissions. They also require the submission of mandatory pollution prevention plans for such companies.

- **Notices 572 of the Government Gazette**: This notice was published in the Government Gazette on 18 July 2014. This draft regulation requires companies in specified sectors to report emissions that form part of the Emission Inventory to report such emissions into the National Atmospheric Emission Inventory System (NAEIS). Although DEA has stated that GHGs will not be covered by this regulation, the Emission Inventory is defined to include *total emissions for one or more specific greenhouse gases.*

No mention is made in any of the above notices and regulation this of the required accounting standards.

3.3 GHG Target setting and Desired Emission Reduction Outcomes

South Africa's target setting process has been informed by the Long Term Mitigation Scenarios (LTMS) study of 2007. The LTMS culminated in the pledge made by the country at COP 15 in Copenhagen in December 2009. This pledge amounted to a conditional commitment to reduce emissions by 34% below business as usual by 2020 and 42% by 2025.

An attempt has been made to define this pledge more accurately in the document ***Defining South Africa's Peak, Plateau and Decline Greenhouse Gas Emission Trajectory*** (PPD) published in June 2011. The PPD is used as the basis for target setting in the NCCRP. This initial step is highlighted in Figure 5.

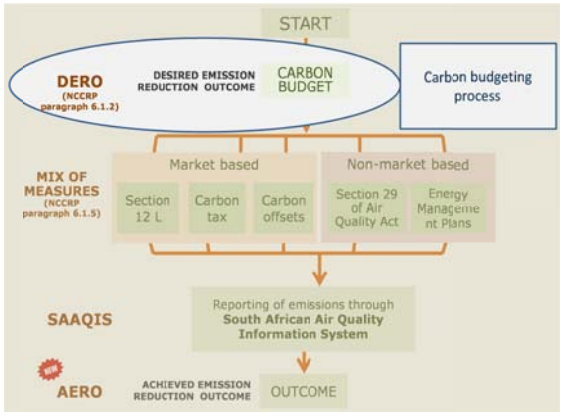


Figure 5: GHG target setting, desired outcomes and budgeting

It is important to note that the LTMS has material errors and deficiancies. Caution should therefore be applied when utilising the results of the study.

Figure 6 shows the LTMS emission scenarios and Figure 7 the Peak, Plateau, Decline trajectory for South Africa. The width of the bands in the graph indicates the high level of uncertainty with regard to business as usual emission projections and therefore progress against emission reduction targets.

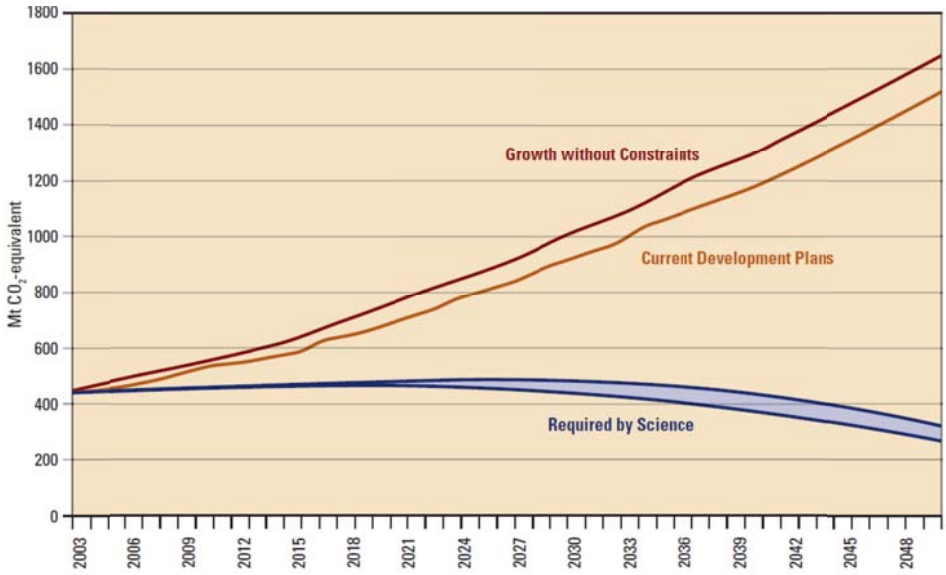


Figure 6: LTMS emission Scenarios

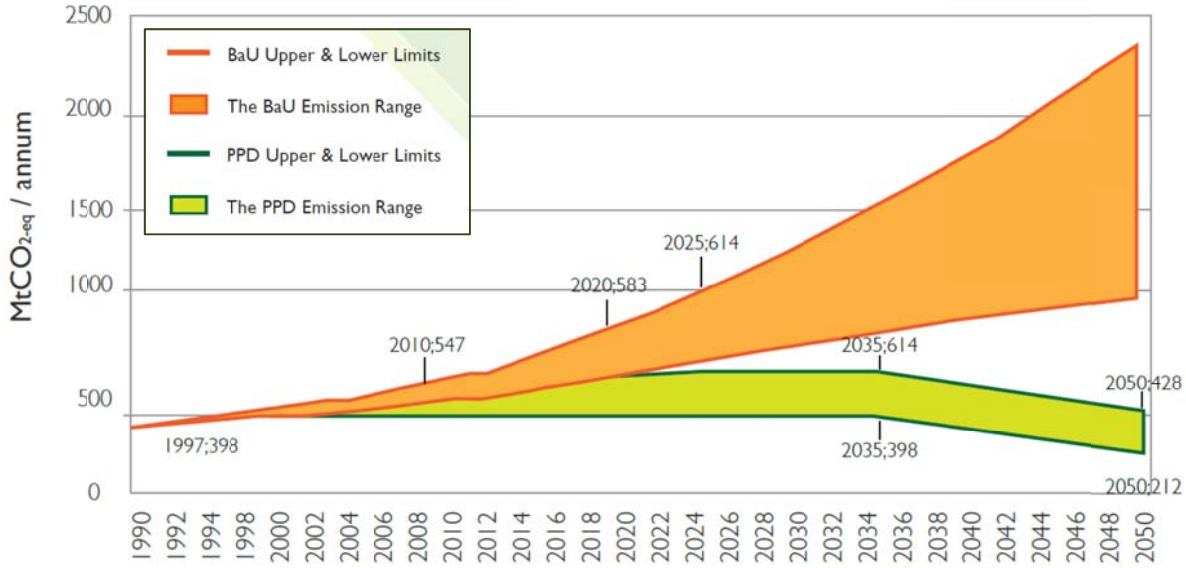


Figure 7: South Africa's desired climate change mitigation outcome

The challenge in using the PPD as a planning tool for the actions required by the NCCRP is that the band of uncertainty is bigger than the potential interventions in any given sector[3].

[3] In addition there are questions on the relevance of the upper limit lines due to errors in the LTMS.

The proposed offset scheme has the potential to reduce South Africa's national inventory by up to 5%. The potential impact of the offset scheme within the context of the PPD is illustrated in Figure 8.

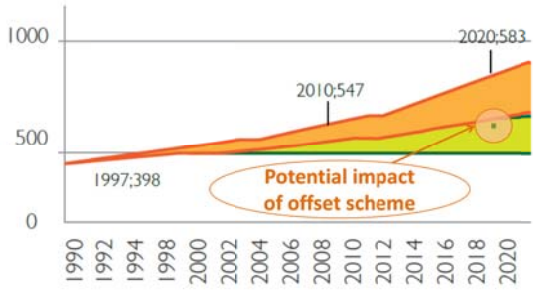


Figure 8: Potential Impact of the offset scheme within the context of the PPD

3.4 Mix of Measures for the Mitigation of Emissions

The NCCRP provides for the mitigation of greenhouse gas emissions in South Africa to be achieved through a Mix of Measures. This is seen in Figure 9 below.

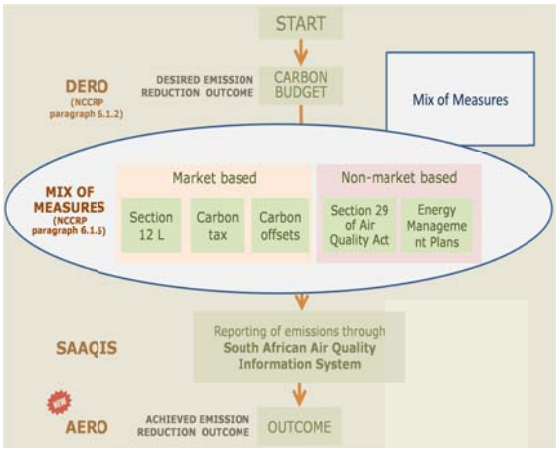


Figure 9: Mix of Measures

The document envisages a *mix of economic instruments, including market-based instruments such as carbon taxes and emissions trading schemes, and incentives, complemented by appropriate regulatory policy measures* (that) *are essential* (for) *driving and facilitating mitigation efforts and creating incentives for mitigation actions across a wide range of key economic sectors.*

The following measures have been announced to date:

- **Carbon Tax**: Details of the carbon tax have been announced in the Carbon Tax Discussion Paper of December 2010 and in the Carbon Tax Policy Paper of May 2013.

- **Carbon Offsets**: The carbon offset scheme was announced as part of the carbon tax discussion and policy papers. This was followed up by a discussion paper in April 2014.

- **Section 12 L of the Income Tax Act:** This allows for companies to get a tax relief based on the implementation of energy savings initiatives. It was legislated in January 2009 and came into force in December 2012.

- **Pollution Prevention Plans**: Draft regulation for the implementation of mandatory submission of pollution prevention plans in terms of Section 29 of the Air Quality Act was published on 14 March 2014.

- **Energy Management Plans**: The Department of Energy has announced that it will publish regulations for the mandatory submission of Energy Management Plans.

3.5 Mitigation Potential Analysis

The Mitigation Potential Analysis (MPA) was concluded by the DEA at the end of 2013. This project was mandated by the NCCRP and gives a detailed analysis of the marginal abatement costs of most identified mitigation actions in South Africa. Although the final report has not yet been published by the DEA, the draft report was subjected to wide public consultation. The information from the MPA used in this report was taken from the latest draft report available for public consultation.

4 Challenges In Aligning the Offset Scheme with the Developing Landscape

There are a number of issues to be addressed in the current developing landscape if alignment between the proposed offset scheme and the Carbon Budgeting process is to be achieved.

4.1 Greenhouse Gas Accounting

The documents published by Government on the developing GHG management landscape are silent about the GHG accounting standards appropriate for corporate reporting. A number of public statements have however been made with respect to the issue. The analysis in this report is based on these public statements.

The most important issue to address is that the South African Government seems to be of the opinion that the GHG management system can be developed at a company level using only the IPCC Guidelines as a standard. Limited recognition is given to the fact that gaps exist between the issues covered by the IPCC and the requirements for corporate GHG accounting.

Figure 10 below shows how emissions from a company, country and offset project are interlinked. It also shows the relationship between the standards and methodologies to each other.

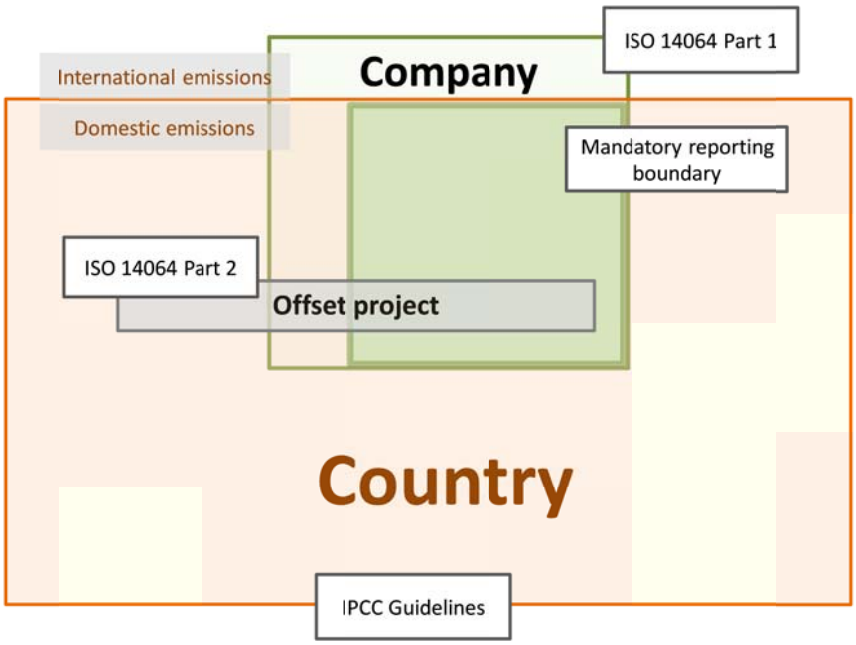


Figure 10: Suite of GHG accounting guidelines and standards

Different standards, guidelines and methodologies may be applied for calculating GHG emissions depending on the system boundary being considered.

At a country level, all greenhouse gas emissions that originate from within the borders of a country are known as domestic emissions and those outside of the specified country are referred to as international emissions. The IPCC has specific guidelines as to how country emissions need to be accounted for.

A company may have facilities in more than one country. This means that a company will have to account for both domestic and international emissions. The SANS/ISO 14064 Part 1 standard is specific to GHG accounting for companies. This standard stipulates principles and requirements at an organizational level for quantification and reporting of greenhouse gas (GHG) emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organization's GHG inventory. SANS/ISO 14064 also references the Greenhouse Gas Protocol, a Corporate Standard providing more detailed guidance on the calculation of a company's carbon footprint. The GHG Protocol provides guidance in more detail and is used by many companies to measure and track their greenhouse gas emissions.

Offset projects may have impacts on emissions outside the boundary of the company that owns and implements them. Offset methodologies have even stricter and more complicated boundary setting requirements than corporate carbon footprint standards. These provisions for the determination of project boundaries are very detailed and accurate and need to be audited when a project is implemented. The

alignment of project methodologies with corporate GHG standards and the IPCC assures that there is no conflict between these different levels of GHG estimation and reporting. The SANS/ISO 14064 Part 2 standard is specific to greenhouse gas accounting of offset projects.

The DEA proposes that IPCC guidelines should be used exclusively as the methodology to quantify the greenhouse gas emissions at a company level. However there are potentially a number of issues with using this methodology to quantify a company's carbon footprint.

Table 1 below shows the different areas of focus between the IPCC and SANS/ISO 14064.

Table 1: Alignment of IPCC (2006) Guidelines with SANS/ISO 14064

GHG Accounting Parameter	**IPCC (2006) Guidelines**	**SANS/ISO 14064**
Emission factors	Provides detailed guidance and extensive data tables	Requires reference to "recognised origin". IPCC emission factors are widely used in the application of the standard
GHG estimation methodologies	Provides detailed guidance and calculation methods for Tiered approach	Requires calculation using emission factors and activity data consistent with IPCC methodologies
Boundary setting	Differentiates between domestic and international emissions. No guidance on corporate boundary setting.	Detailed guidance on corporate boundary setting is provided.
Consolidation of corporate GHG accounts	No guidance	Guidance on consolidation of emissions from facility to corporate and group level in ISO 14064 Part 1 Annex A (with reference to the GHG Protocol).
Provision for Energy Indirect Emissions	No provision	Requires quantification of energy indirect emissions.

The IPCC mentions the relationship the guidelines have to an entity- or project level estimates: '*The Guidelines are intended to help prepare national inventories of emissions by sources and removals by sinks. Nonetheless, the Guidelines* ***can also be relevant*** *for estimating actual emissions or removals at the entity or project level.*'

The IPCC guidelines are relevant to entities in the following manner:

- Emission Factors: a collection of emission factors and other parameters to assist users in finding the most appropriate emission factors;

- Technical: The IPCC provides scientific and technical advice on specific questions related to those inventory methods and practices that are contained in these reports, or at the request of the UNFCCC in accordance with established IPCC procedures;

- Calculation Methodology: multiplying activity data with emission factors is an approach which can also be applied by organizations.

The IPCC guidelines do however not address the following issues that are essential to corporate inventories:

- Consolidation of operations/ facilities up to corporate and group level;
- Quantification of energy indirect emissions.

Informed linkages between corporate and national GHG inventories can help improve the quality and accuracy of both inventories. These linkages will thereby enhance the value for decision makers both in business and government. High quality activity data from corporate reporting programs can be aggregated for meaningful comparisons or calibrations of national GHG data. A good example was the recent work on the South African grid emission factor and the fugitive emissions associated with South African coal. However, care should be taken with respect to the following:

- **Emissions data definition and coverage can differ**. Aggregated emissions data from corporate reporting programs will differ from the emissions totals in the national inventory if not all the sectors and emitters are covered under the mandatory reporting. Valid comparisons can be made for sectors where direct emissions from all entities are included e.g. all fossil fuel based power generators.

- **Calculation methods and emission factors** might not be the same. Reported emission totals depend on the method selected and the emission factors used in the calculation. Both methods and emission factors can differ, even for the same activity. For example a company might measure emissions and use company specific laboratory results for the calculations, while the national inventory may use default emission factors provided by the IPCC or a national average factor based in a representative sample in the country (e.g. coal calorific values).

- **Reporting classification**. A corporate inventory classifies emissions from multiple sources such as fossil fuel combustion and industrial processes under scopes of direct, energy indirect and other indirect categories. National inventories categorise emissions largely by emission source e.g. fossil fuel combustion across all sectors (e.g. cement, iron and steel and aluminium) Similarly industrial process emissions are aggregated and reported in a single category though totals are often available for process emissions from major

emitting industries (e.g. iron and steel, cement).

4.2 Boundary differences between accounting and reporting

Accounting is concerned with the timely and accurate recording of GHG emissions, providing useful management information, and properly reporting such information for various user needs. Thus depending on the intended user, different reporting boundaries may be utilized. The reporting boundary can be different from the accounting boundary. This is depicted in Figure 10 above.

Accounting policies and procedures are established to provide guidance and control for a variety of reports for all internal and external needs. Reporting (which is the output of GHG data) is used for both internal and external purposes. Internal reports are reports used within the company, by both management and other designated personnel. External reports may be required for corporate reports, for use by Government departments such the DEA or the Department of Energy (DOE), or for corporate reporting such as JSE listing requirements. Informed linkages between National Inventory and mandatory reporting Corporate Inventories are shown in Figure 11.

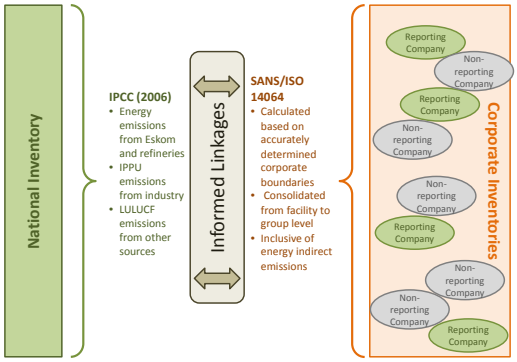


Figure 11: Informed linkages between National Inventory and mandatory reporting Corporate Inventories

It is important to note that the reporting boundaries for different internal and external reports may and will differ, depending on the purpose and users of the report. Very few reports will contain the full data set generated by the complete carbon footprint calculation. Most reports will contain only a sub-set of this data. The implication of this is that limitations placed on the data requirements for mandatory reporting must not impact on the integrity of the carbon footprint calculation, which should always be done according to a recognised standard.

Although there may be gaps in the reporting requirements of the offset scheme and mandatory reporting, both these systems must be consistent with the calculation of the carbon footprint.

4.3 Carbon Budgeting and Target Setting

Target setting in a national GHG management system needs to be prepared within the context of the availability of regulatory levers and incentives existing to Government. The proposed offset scheme forms an important part of this suite of instruments. It is therefore important to analyse the impact the offset trading system can have on targets and the target setting process and vice versa.

South Africa voluntarily pledged to reduce greenhouse gas emissions. The challenge faced by Government in using the PPD as target for the South African economy is that the uncertainty range in both the baseline, and Business as Usual (BaU) case, is greater than the required mitigation interventions. It is therefore impossible to use the PPD as a reference metric for the measurement of the effectiveness of the offset scheme. The DEA is currently trying to overcome this issue by basing planning action on the midpoint between the upper and lower bounds of the PPD range. The lack of accuracy in this approach does however present significant risks to the integrity of the planning system as it is not scientifically thorough.

It is suggested to revise the inventory and adjust the PPD range for budgetary purposes.

Example 1 – *Consider the hypothetical situation where a country's 2020 National Greenhouse Gas Inventory is calculated at 500 $MtCO_2$ and the offset mechanism is planned to deliver a 5% emission reduction.*

If the target of the emission reduction is achieved, the national inventory by 2020 will be 475 $MtCO_2e$. The BaU emission range for 2020 provided in the PPD however stretches from 615 $MtCO_2e$ to 883 $MtCO_2e$.

Therefore the impact of the offset program is not visible within the uncertainty range of the PPD.

The implication of this uncertainty is that the potential emission reduction achieved by a regulatory tool such as the offset mechanism may be significantly smaller than the uncertainty range in the target. This will mean that the efficiency of the offset mechanism cannot be ascertained and the integrity of the system becomes questionable. This is illustrated in Example 1 in the Text Box.

The problems highlighted in Example 1 above can be solved by using an appropriate target setting and target reporting methodology.

The available target setting approaches are:

- **Absolute targets** have been committed to by Annex I countries as part of the Kyoto protocol commitment. This target limits economic growth and raises concerns about fairness. The implementation of such a target by developing (non-Annex I) countries has been prevented. This option is therefore not relevant for South Africa. The collapse of the European carbon market is a direct result of the inability of this type of target setting to accommodate unexpected movements in the level of economic activity in the region covered by the targets. The use of an offset scheme within a system based on absolute targets is extremely risky as the whole offset market can be devastated by small movements in the economy due to external influences.

- **An absolute reduction against a moving target** is what is currently committed to by South Africa as part of the Copenhagen Pledge and in the PPD. Actual greenhouse gas inventories will be compared to a projected 'business as usual' trajectory. The business as usual trajectory allows for increased emissions due to economic growth which therefore is not as restrictive. The uncertainty related to business as usual projections however makes it difficult, if not impossible, to accurately account for progress made against the target. The implementation of an offset scheme within a system based on absolute reduction against a moving target is risky because the true impact of the offset scheme can never be ascertained. It will therefore be difficult to measure and evaluate the effectiveness of the offset scheme.

- **Intensity targets** can be used on a country and a company level. China announced a target whereby they will reduce the carbon intensity defined as the GHG emissions per US$ of GDP of the economy over time. This approach overcomes many of the problems listed with absolute targets. However it seems to be met with resistance in the international community. For example China is looking at introducing absolute emission reduction targets at a national level in their next 5 year plan. This approach can also work on a company level. There are however some problems if this approach is to be used as a planning tool for a system that incorporates an offset scheme. The biggest difficultly is the magnitude of impact of the offset scheme when seen in the context of the uncertainty in the system.

  The use of intensity targets in the context of an offset scheme presents a challenge in that the impact of the offset scheme cannot be directly measured on the GHG intensity of the country. The link between the offset scheme as intervention tool and the target metric becomes an indirect one. The emission reduction activities impact on the national inventory and the impact on the target is only seen when the intensity is calculated.

- **Reduction against Actual Baseline.** This approach has first been introduced

in the document 'Mitigation Goals Accounting and Reporting Standard' (2013) which is currently in development by the Greenhouse Gas Protocol (GHG Protocol) and the World Resources Institute (WRI). It is consistent with the approach to use "wedges" for planning mitigation action in the LTMS.

The concept of an actual benchmark or baseline uses two sets of data:

- The first set of data is the actual emissions of the country calculated using IPCC guidelines or of an entity using SANS/ISO standard. This is calculated using SANS/ISO Standard 14064 Part 1. This data set is referred to as the 'ex-post baseline' in the document under development by the GHG Protocol and WRI, but will in this report referred to as the '*actual baseline without interventions*'.

- The second set of data consists of emission reduction activities. The origin of this data is the information on emission reductions initiatives that have been implemented. It can be sourced from a variety of schemes such as the Eskom DSM, M&V reports, CDM verification reports, or Section 12L applications. In some cases, this data can be verified according to ISO14064 Part 2.

The actual baseline without interventions is then the sum of the actual emissions and the emission reduction activities. This represents the situation that would have existed if the emission reduction activities were not implemented. This data set is referred to as the 'ex-post policy' in the document under development by the GHG Protocol and the WRI, but will in this report referred to as the '*actual emissions*'.

Figure 12 below shows the use of the 'actual emissions' concept applied to an evaluation of the effectiveness of the actions taken by mining companies under the Energy Accord of 2005.

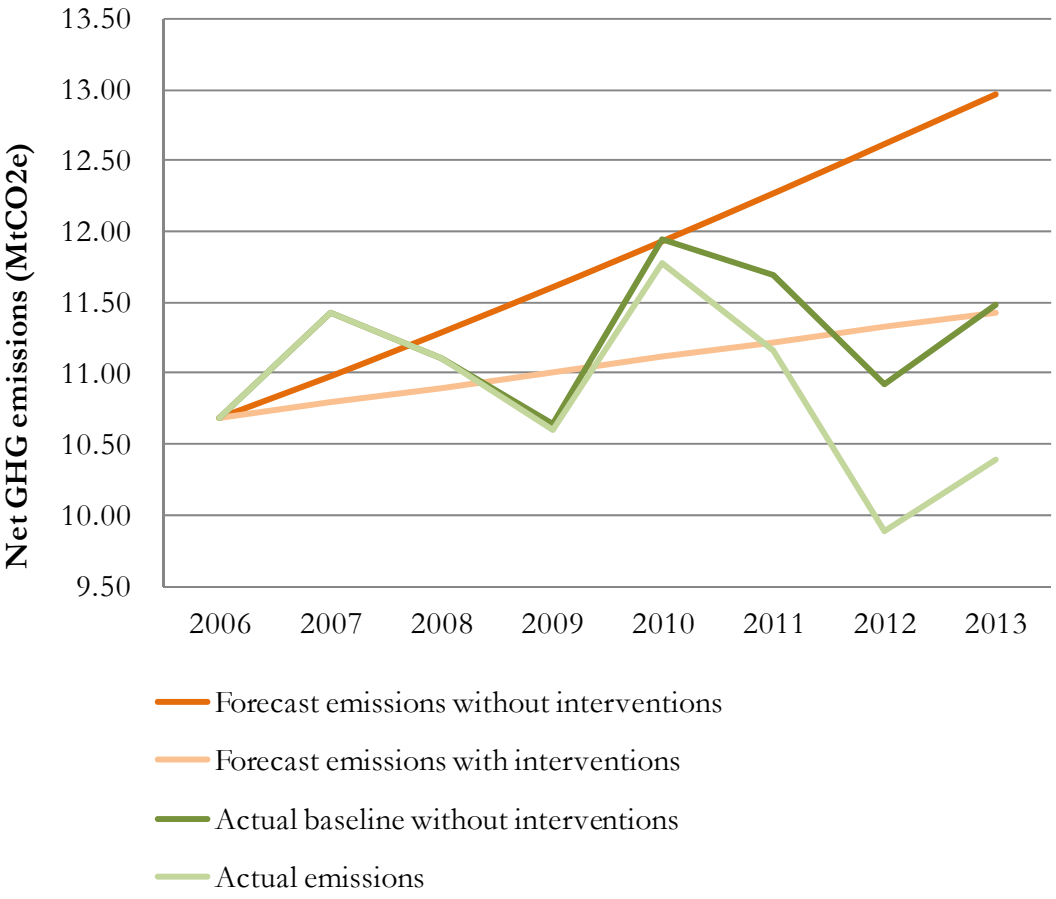


Figure 12: 'Actual emissions' approach applied to a subsector of the South African mining industry (Promethium Carbon study)

It can be seen in Figure 12 that, in the absence of the construction of the *actual baseline without interventions*, it would appear that the *actual emissions* are significantly lower than the *forecast emissions without interventions*. Comparing the *actual emissions* with the *forecast emissions with interventions* however show less of a reduction. It is therefore clear that the use of the *forecast emissions with interventions* gives a far more accurate indication of the actual emission reduction achieved.

There can be a direct link between the offset scheme and the DERO or Carbon Budget process if this approach is used. This is illustrated in Figure 14 below where the interventions in the Carbon Budget are taken as being those listed above. This shows that there can be a direct alignment between the carbon offset scheme and the Carbon Budget within a DERO system on a sectoral level. A similar analysis can be done on the national level as is illustrated in the figure 13 below.

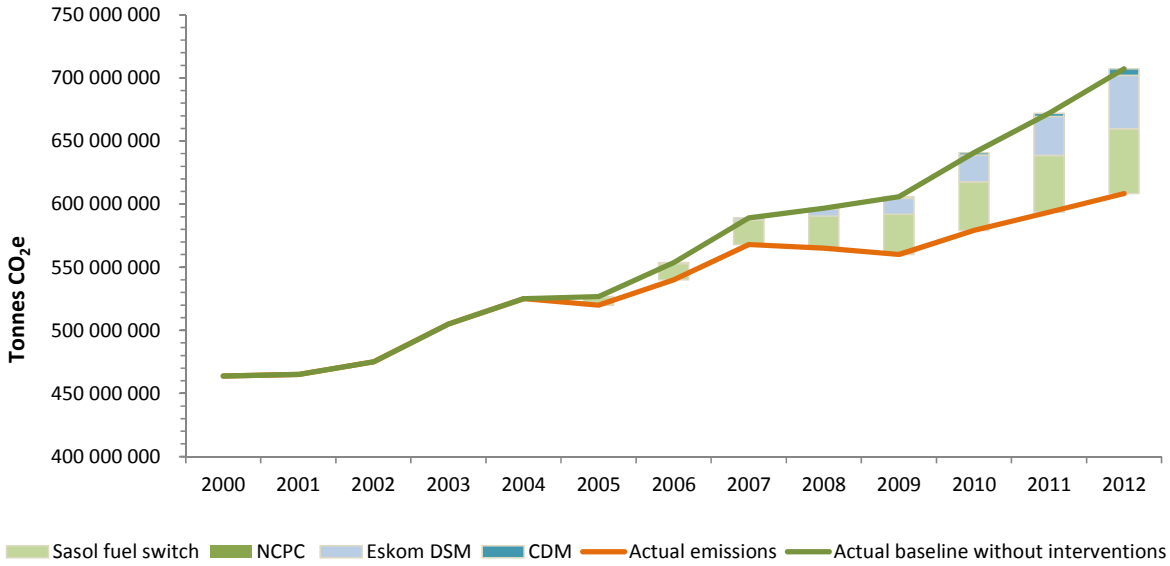


Figure 13: South Africa's National Inventory with Actual Emissions and Actual baseline

Table 2 below summarises the potential for alignment of the proposed carbon offset scheme with the different target setting approaches.

Table 2: Alignment of target setting approach with offset scheme

Target setting Approach	Alignment with potential carbon offset scheme
Absolute target	The European experiment has shown that this system is too insensitive to external economic shocks and this puts the offset scheme on risk. External shocks have caused the carbon price in Europe to plummet to the extent that the European Union allocated units are currently trading at below 25% of peak market prices and CERs are traded very closed to zero. No good alignment.
Absolute reduction against a moving target	This approach is used in the current PPD on which the South African planning is based. The uncertainty in the system is however much higher than the potential impact of individual interventions. This uncertainty, and the lack of a mechanism to accurately handle it, makes this approach unworkable in the context of an offset scheme. No good alignment.
Intensity targets	This approach could work in relation to an offset scheme, but there is not direct link between the intervention and the target. Limited alignment.

Target setting Approach	Alignment with potential carbon offset scheme
Reduction against Actual Baseline	This approach offers a workable solution that overcomes the uncertainty issues related to the PPD approach and offers a direct link between the budget and the intervention.

The figure below shows how the Actual Baseline approach can be used in a Carbon Budgeting system:

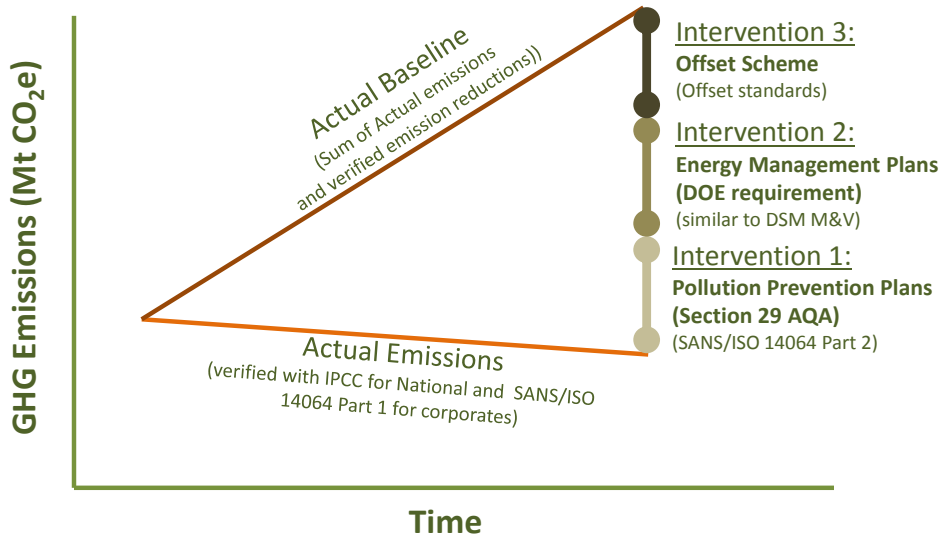


Figure 14: Example of how Actual Baseline approach can be used in DERO process

This analysis shows that the best alignment between the offset scheme can be made if the DERO and Carbon Budgeting approach is based on the Actual Emission approach to target setting.

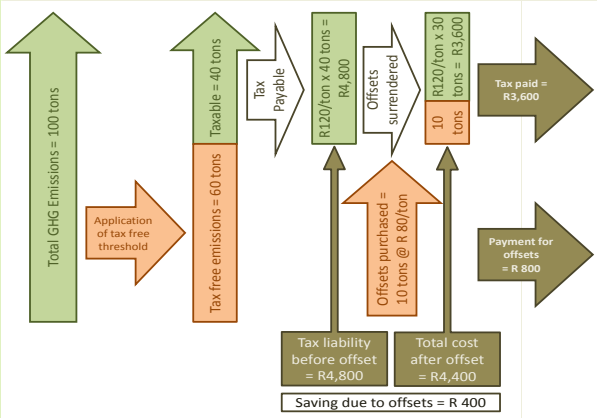
4.4 Carbon Tax

4.4.1 Marginal Cost Impact of Tax Structure

The current design of carbon tax, as expressed in the May 2013 Carbon Tax Policy Paper allows for the creation of a marginal cost of carbon. The cost is higher than the average cost of carbon to the economy and to a company through the introduction of 2 mechanisms. The first is the Z-factor that is described in detail below. The second is the offset trading scheme.

Although it is not explicitly stated in either the Carbon Tax Policy Paper or in the Carbon Offset Paper, it is implied that the value of an offset will be similar to the absolute value of the carbon tax; i.e. R120 per ton escalating at 10% per year. This is illustrated in Example 2 below.

Example 2 – The role and impact of offsets is demonstrated in the figure below. In this example a company emitting 100 tons CO_2e has a carbon tax liability of R4,800 after taking the tax free threshold of 60% into consideration. The company now buys 10 tons of CO_2e offsets at a price of R80 per ton, and thereby reduces its tax liability to R3,600. The overall saving due to the purchase is R400, which represents 8.3% of the original tax liability.



The fact that the tax design does not explicitly state that the offsets will be valued at the absolute value of the tax, R120 per ton CO_2e, creates uncertainties that need to be addressed in the carbon tax design. One possible way to address this issue would be to set absolute targets below which a company will not pay any carbon tax.

4.4.2 Carbon Tax Benchmarking Z-factor

National Treasury has committed itself in a number of public consultations to reward early movers in the climate change mitigation arena. One of the tools provided for in the Carbon Tax Policy Paper that can achieve this is the "Z-factor". This mechanism allows companies that improve their performance over time to increase the 60% tax free threshold.

The Z-factor measures the carbon efficiency of a company against a baseline. This baseline was set as an industry benchmark in the Carbon Tax Policy Paper. We submitted comment on the Policy Paper to the effect that our experience has shown that setting industry benchmarks in South Africa will be unworkable. Example 3 gives an example of the practical problems associated with the implementation of industry benchmarks in South Africa.

Promethium Carbon evaluated the impact of the carbon tax liability for large emitters. This was on the basis that certain interventions could reduce a company's carbon tax liability under the offset scheme, or by utilising the Z-factor based on a company specific Actual Baseline. The impact of the two schemes is comparable, with minor differences resulting from project specific details.

Alignment of the offset scheme and the Z-factor could therefore open the options for National Treasury to allow specific interventions inside the carbon tax net to be used in mitigating a company's tax liability with either carbon offsets or the Z-factor.

Example 3 – The sectoral benchmark for the coal mining sector is set at a hypothetical intensity benchmark of 5tCO_2 per tonne of coal mined. Based on the average current emission intensity of coal mining and the energy efficiency interventions identified, a benchmark which declines with 2% per year is developed.

Company X implements all interventions to achieve the yearly 2% emission reduction. The fact that the mine is becoming deeper with time however increases the emission intensity with 4%. Though the company has taken appropriate action, circumstances outside of their control has made them non-compliant with the set target against the sectoral benchmark.

4.4.3 Pollution Prevention Plans

The NCCRP makes provision for offsets to be used with the context of a Carbon Budgeting approach through the words: "*the possible use of emissions offset or emission reduction trading mechanisms for those relevant sectors, sub-sectors, companies or entities where a Carbon Budget approach has been selected.*"

As the main non-market mechanisms under consideration at the moment seems to be the Section 29 Pollution Prevention Plans (PPP) and the Energy Management Plans (EMP) of the DOE, some thought needs to be given to the alignment between these mechanisms.

The biggest challenge lies in the fact that the offset mechanism is a market based mechanism that places a price on carbon whereas the PPPs and EMPs are more traditional command and control mechanisms.

In theory a company should be able to buy in offsets to achieve the targets set in its PPP and EMP if the offsets can be bought cheaper than emission reduction initiatives implemented within the boundaries of the company. It is therefore important that both the PPPs and the EMPs be structured to allow companies access to least cost mitigation options through the use of offsets.

4.4.4 Energy Management Plans

The Department of Energy has announced that it will publish regulations for the mandatory submission of Energy Management Plans. Even though most of the details are still unknown, it seems that energy management plans will, for most companies, focus mainly on electricity indirect emissions. This is because electricity is the most important energy carrier for modern industry. Discussions with DEA and the DOE also create the impression that the DEA considers energy management plans as a way to influence behaviour in the management of indirect emissions. The DOE considers this issue to fall outside of the scope of direct control of the DEA.

If alignment of the energy management plans with the Mix of Measures is to be achieved, it is essential that full accounting of energy indirect emissions should be implemented. Other issues that will impact on the alignment of this intervention with the other components of the Mix of Measures are the threshold for reporting and the regulatory "stick" to be used if companies do not comply:

- Threshold: The NCCRP puts the threshold for action on GHG emissions as being 100,000 tons of CO_2e per year as *either* direct (Scope 1) *or* electricity indirect (part of Scope 2) emissions. In the developing discussion, the threshold is taken by the DEA as being 100,000 tons of direct emissions but the DOE has indicated that the threshold for the submission of energy management plans will be specified in kWhs per year. This will create a disconnect between the two interventions as the emission factors vary between different energy carriers and the emission factors of specific energy carriers (such as electricity) varies per year. Good alignment between the measures will require that a consistent approach towards the threshold be taken.

- Regulatory "stick": To date no indication of the regulatory implications on non-compliance with the energy management plans have been given. This is in contrast to the pollution prevention plans for which the Air Quality Act providers actions that Government can take in the event with non-compliance with the Act. Alignment of the measures within the Mix of Measures will require a consistent approach in the treatment of non-compliant companies.

4.4.5 Section 12 L of the Income Tax Act

The Carbon Offsets Paper states in paragraph 67 that projects that receive benefits from Energy Efficiency Tax Incentives (Section 12 L of the Income Tax Act) will not be eligible to generate carbon offsets. A detailed analysis of the potential impact however shows that this incentive suffers from a number of drawbacks. The first is that the economic benefit received from the incentive is limited due to the fact that the baseline is being reset every year. This means that projects will receive economic benefit for only one year after project implementation. In most cases the projects that can significantly impact on GHG emissions require significantly more support than this. The second problem lies in the low value of the benefit received. There is another problem in the implementation of the scheme that lies in the significant administrative overhead related to the application for the tax benefit in relation to the economic benefit achieved.

The exclusion of projects that apply for Section 12L benefit from the carbon tax offset scheme removes the possibility of layering of incentives to achieve the desired outcomes. Layering of different incentives is a strong regulatory tool that can be used to good effect if the required transition to a low carbon economy is to be achieved.

5 ALIGNMENT WITH THE CARBON TAX

Even though the proposed offset scheme forms part of the carbon tax design, it is important to consider the alignment of the offset scheme with the intent of the carbon tax to ensure that there is consistency in the approach. The table below analyses the offset scheme against the objectives of the carbon tax as stipulated in the NCCRP.

Table 3: Carbon tax requirements (NCCRP para 10.7.1)

Objective	Requirement for carbon tax	Impact of offset scheme
Tax rate should be equivalent to the marginal external damage costs of GHGs	Many economic studies have estimated the marginal external damage costs of GHG emissions to be significantly higher than the proposed level of R120 per ton CO_2e[4]. It is for this reason that the tax is introduced at a low level escalated at a modest rate, with potential rapid escalation after 2020.	The carbon tax should price carbon into the economy without damaging the competitive ability of the national economy. This can best be achieved by allowing companies access to least cost mitigation options. The carbon offset scheme is the best way to give companies access to least cost mitigation options.
Technical and administrative feasibility	The carbon tax design takes cognisance of the fact that SARS is a financial institution and not a GHG technical expert.	The proposed offset scheme allows for the technical expertise required to operate the offset scheme to be built within DEA and the private sector.
Distributional implications	Due to administrative limitations, the carbon tax will only be implemented in a small part of the economy and be bound by the sectors covered by the tax. The tax will also be bound by the emission threshold under which companies will not be liable to pay the tax.	The proposed offset scheme will enable mitigation options in companies that fall outside the carbon tax net to be implemented as a direct result of the implementation of the carbon tax.

[4] See, for example, Stern, The Structure of Economic Modelling of the Potential Impacts of Climate Change: Grafting Gross Underestimation of Risk onto Already Narrow Science Models, Journal of Economic Literature 2013, 51(3), 838–859

Objective	Requirement for carbon tax	Impact of offset scheme
Competitiveness	The carbon tax could potentially have significant impacts on the competitiveness of South African companies.	The proposed offset scheme will give companies access to least cost mitigation options. This will help to mitigate the impact of the tax on the competitiveness of South African companies.
A phased implementation of the tax towards comprehensive coverage of all economic sectors	The carbon tax will initially be limited in scope with respect to both the industries covered and the size of the businesses.	The proposed offset scheme will allow mitigation actions to be implemented in companies operating outside of the initial carbon tax net. This will lead to a wide coverage of the impacts of carbon tax in the economy.
The minimisation of the potential regressive impacts on the poor and the protection of the competitiveness of key industries	The carbon tax could potentially impact on the poor and harm the competitiveness of key industries.	The revenue generated by the proposed offset scheme can be accessed by poor communities. This is especially true for land based projects. Key industries can be protected from some of the impacts of the carbon tax by accessing least cost mitigation options through the offset scheme.
Relief measures, if any, will be considered by these will be regarded as being minimal and temporary	The carbon tax design calls for relief measures for trade exposure and process emissions.	The offset scheme should form a permanent part of the tax design and not be seen as temporary as is the case with the other relief measures.

6 POTENTIAL FOR BETTER ALIGNMENT

The analysis above highlighted some of the issues with respect to the potential alignment of the carbon offsets scheme with the Carbon Budget approach. A number of issues have been identified that can aid in the alignment.

6.1 Alignment Inventory and Reporting Boundaries

If South Africa is to develop a mature, coherent GHG management system, it needs to happen from a solid foundation. This can only happen if a corporate GHG accounting system addresses all issues and fills all gaps in a progressive way. The combination of the IPCC with the SANS ISO 14064 can achieve this objective.

There are many practical limitations to what companies can and cannot report when it comes to mandatory GHG reporting. Figure 15 illustrates an example of differing GHG inventory and mandatory reporting boundaries.

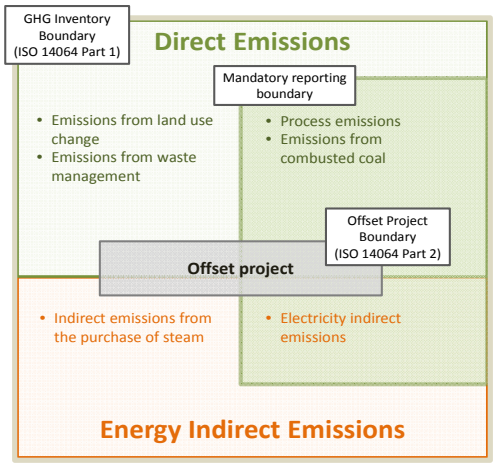


Figure 15: Example of differing GHG inventory and mandatory reporting boundaries

To date there has not been a clear distinction in the public debate between the definition of the carbon footprint (or GHG inventory) of a company and the company's reporting obligations. It is important to note what the differences between these two concepts are, and that limitations in GHG reporting should not impact on the integrity of the carbon footprint standards and calculation methodologies. The GHG reporting boundaries can change over time as the national regulations are updated.

In practice, the specific mandatory GHG reporting boundary for a specific timeframe, such as the next 5 years, can be smaller than the overall GHG inventory. There can be a number of reasons for such a provision. One reason could be that certain methodologies are uncertain (e.g. soil carbon) or that the burden of quantifying and reporting may exceed the benefit or that government is not going to use the information in this period (focusing on the low hanging fruit first).

6.2 Non accounting of energy indirect emissions

The DEA's DERO project team mandated with the development of the DERO system stated categorically at the kick-off meeting that electricity indirect emissions will not be considered in this project. The discussion has however moved on and the inclusion of electricity indirect emissions is now being considered.

GHG emissions are calculated as the product of activity data and emission factors. There are very few cases where the activity data and emission factors are under the control of the same entity. In practice these two components of the emission calculation are almost always controlled by different entities. The design of the emission management system in the country must be cognisant of this fact.

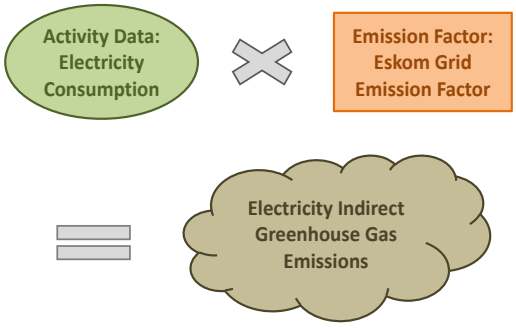


Figure 16: Calculation of electricity indirect emissions

With regard to the emissions from electricity, Eskom has control over the emission factor but no control over the use of electricity, which constitutes the activity data. The companies that consume the electricity have full control over the activity data. The short term reality of electricity emissions in SA is that we have more opportunities to reduce electricity emissions by reducing the consumption (activity data) rather than what we have in reducing the grid emission factor. A system that focusses only on the emission factor part *(as is proposed in the system where only Scope 1 emissions are considered*) will sterilise the system from scope 2 interventions designed to reduce electricity consumption.

Failure to include electricity indirect emissions in the development of South Africa's integrated GHG management system will have the following consequences:

- If the electricity indirect emissions are excluded, the system will address only the one half of the emission equation i.e. the emission factor. This will thereby exclude the biggest single opportunity for emission reduction which is reduction of electricity consumption. Attempts to address the reduction of electricity

consumption through a standalone Energy Management Plan administered by the DoE will sacrifice the opportunities for integrated GHG management and thereby reduce the efficiency of the system, leading to a bigger burden on the country.

- The relief mechanisms designed into the carbon tax will become unfruitful because many companies have limited direct emissions and they do not have access to the relief mechanisms for energy indirect emissions.

- The carbon offset scheme, which has the potential to be one of the most important measures in reducing emissions, will decline if energy indirect emissions cannot be offset (keep in mind that Eskom has huge barriers to the use of offsets through the regulatory structure of electricity pricing).

The Mitigation Potential Analysis (MPA) prepared by the DEA in 2013 quantifies (within the constraints faced by the project) the potential for GHG mitigation in South Africa. The analysis shows that between 40% and 50% of all potential mitigation actions in South Africa relates to interventions that will impact on energy indirect emissions. See figure 17.

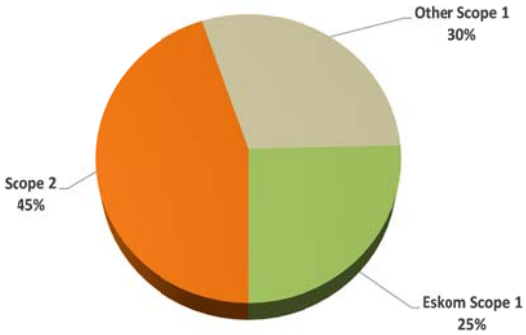


Figure 17: Mitigation potential in South Africa

If the accounting for and reporting of these emissions do not form a central part of the system, these mitigation actions will largely be lost.

The SANS/ISO 14064 Part 1 requires the energy indirect emissions must be quantified if an entity's carbon footprint is being calculated. The option to calculate the energy indirect emissions is not optional as is the case with other indirect emissions. This approach is also (as an example) followed by the UK who has made public disclosure of a company's footprint mandatory for companies listed on the London Stock Exchange.

The NCCRP requires that *reporting of emissions data will be made mandatory for entities (companies and installations) that emit* (either) *more than 0.1 Mt of GHGs annually* ***or*** *that consume electricity which results in more than 0.1 Mt of emissions from the electricity sector.* This implies that companies must report on their electricity indirect emissions in order for this requirement to be fulfilled. (Note that this requirement triggers the need for reporting on either direct or electricity indirect emissions and not on the sum of the direct and electricity indirect emissions.)

Alignment of the mandatory reporting requirements with the existing South African infrastructure and with the NCCRP therefore requires that energy indirect emissions must be included in the reporting boundary.

6.3 Carbon Budgeting and Target Setting: The Z-Factor

Alignment of the Z-Factor and the carbon offset scheme can be achieved if the Z-factor is calculated on a company level benchmark. Such a system will be practical and easy to implement if the Actual Baseline approach is being used on a company level. The Z-factor can work very well if companies are assessed against their own historic performance using the Actual Baseline approach as described above.

Practically, the Actual Baseline Approach can be applied to the Carbon Tax Policy Paper formula to calculate the Z factor:

$Z = Y / X$

Where;

- X is the average measured and verified carbon intensity (including both Scope 1 and Scope 2 emissions) of a firm's output;
- Y is the agreed benchmark carbon emissions intensity (including both Scope 1 and Scope 2 emissions) for the sector.

As per the proposed Actual Baseline Approach calculation, the Z factor will be calculated as follows:

- $X = AE$;
- $Y = (AE + \Sigma ER)$.

Where:

- AE is the Company's Emission Inventory consisting of the Actual Emissions in year x;
- ΣER are the total Emission Reductions achieved by the company in year x.

Note that whereas the Z-factor formula presented in the Policy Paper is based on emission intensity, this approach works for both emission intensity as well as absolute emissions.

Therefore the Z-factor can now be calculated as

$Z = (AE + \Sigma ER)/AE$

In this way, the company's emission performance is measured against an internal benchmark. This removes the need for baselines and benchmarks based on historic performance on facility, sub-sector and sector level. Promethium Carbon has used this approach successfully at company level, sector level (see Figure 14 above) and national level (see Figure 13 above).

6.4 Setting an Absolute Tax Free Threshold

The current carbon tax design calls for a tax free threshold set as a percentage of total emissions. The proposed level of the threshold is 60% of a company's direct (Scope 1) emissions. If this tax free threshold can be set as an absolute emission threshold, then the uncertainty about the marginal value of carbon can be removed.

The mechanics of setting the threshold for each company will have to be determined based on a company's historic performance, the emission reduction potential and the marginal abatement cost of each company.

The potential impact of a move from a percentage based threshold to an absolute threshold was modelled as part of this project. The results indicated in the figure 18 show that the marginal benefit in reducing emissions for a company is consistently low at R48 per ton. As the primary motivation for the carbon tax is to change behaviour, the implementation of such a system will cause the carbon tax to fall short of its intended design purpose.

The marginal benefit of GHG mitigation achieved by a company starts off at R120 per ton if a Z-factor is introduced. The benefit however declines rapidly if a cap is placed on the Z-factor. The implementation of such as system will create a small window of opportunity for companies to use a limited scope high marginal abatement benefit to implement emission reduction activities.

This benefit will however not stimulate the level of behaviour change that is (should be) the objective of the carbon tax design.

The marginal benefit achieved by a company implementing emission reduction activities stays at R120 per ton CO_2e up to the level where the company has no carbon tax obligation for two options:

- In the cases where the Z-factor is uncapped; and
- where the tax free threshold is set as an absolute value

These two options are the only ones that achieve the stated objectives of the carbon tax which is to stimulate behaviour change to a level where South Africa's international GHG emission pledge can be honoured.

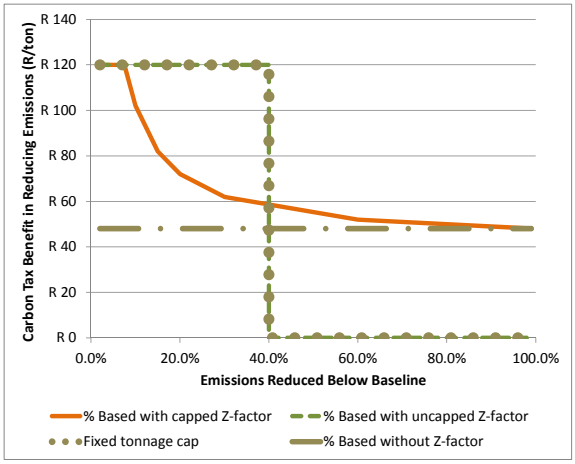


Figure 18: Carbon Tax Benefit in Emission Reductions

Figure 18 shows the carbon tax benefit in emission reductions, and figure 19 below shows the carbon tax obligation of a company with direct emissions of 1 million tons CO_2e per year that does not have access to any relief mechanisms.

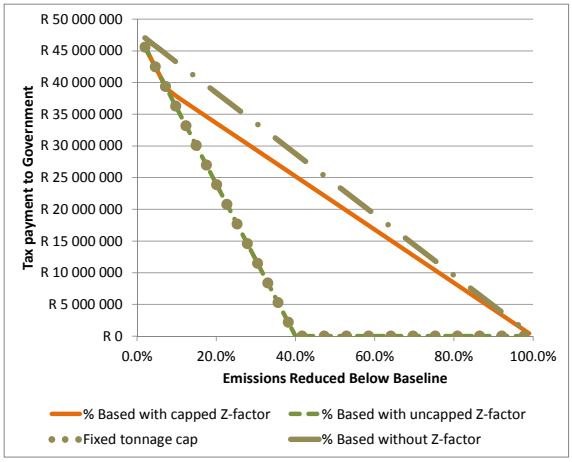


Figure 19: Tax payments for Company with Emissions of 1 million tonnes per year

6.5 Mix of Measures Alignment

A graphical representation of how the Carbon Budgeting, or DERO, process fits together in the NCCRP has been presented above. The system however needs a feedback loop in order to align the Mix of Measures and send the correct signals into the economy.

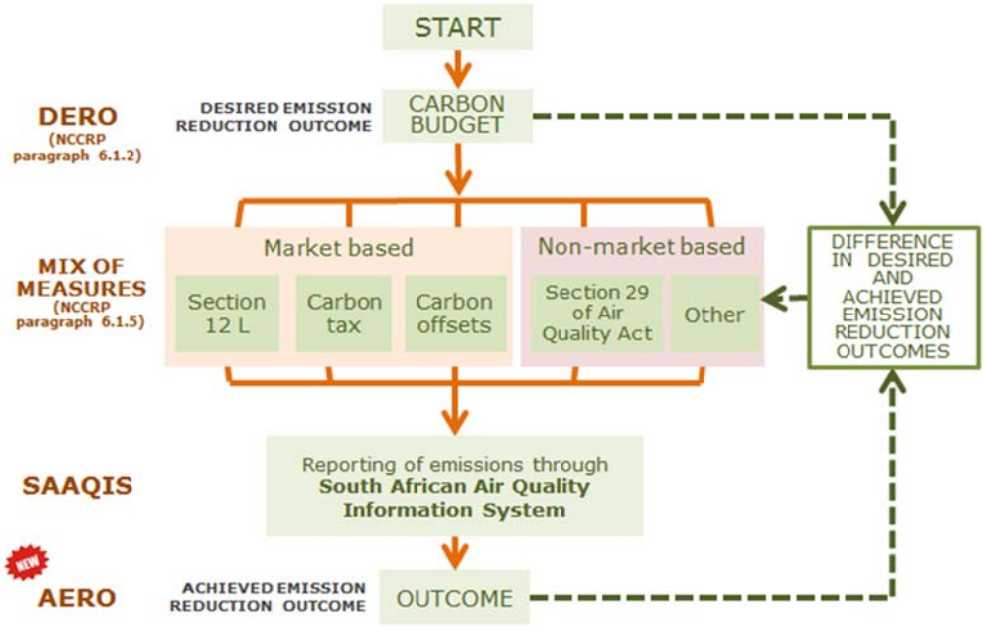


Figure 20: Feedback loop in the DERO process

The Mix of Measures required to meet the DEROs is made up of both market based and non-market based methods. The market based measures would include the carbon tax, carbon offsets and section 12 L of the Air Quality Act. These measures should provide a financial incentive for organisations to reduce GHG emissions. The non-market based measures such as section 29 of the Air Quality Act should provide different incentives however also result in organizations reducing their GHG emissions.

The consolidation of the GHG emission reductions attained by the Mix of Measures should ideally feed into the South African Air Quality Information System (SAAQIS). It is essential to be able to quantify what is achieved by the Mix of Measures so that it can be verified that the Carbon Budget is being adhered to.

The outcome of the amalgamation of emission reductions can be termed as Achieved Emission Reduction Outcomes (AEROs). These are the resultant emission reductions after the Mix of Measures have been implemented.

Promethium Carbon's perception is that the introduction of the concept of Achieved Emission Reduction Outcomes will enable Government to measure the differential

between the desired outcome and the achieved outcome, thereby allowing for the creation of a feedback mechanism as illustrated in the above diagram. The difference between the DEROs and the AEROs should ideally control the set-point of the Mix of Measures. This closed loop system monitors the system output (AEROs) through the SAAQIS and feeds the data back, in order to adjust the control (Mix of Measures), in this way creating a dynamic system to achieve and maintain the desired system output (DEROs). The concept of creating a feedback loop means that the achieved impact of the Mix of Measures will be clear and that any adjustment to the Mix of Measures, such as changes in the level of the carbon tax, will be based on actual results.

7 CONCLUSION

The evaluation presented in this report highlights the following key issues:

There is potential for alignment between the proposed carbon offset trading scheme and the Carbon Budgeting approach.

Most of the elements required for the practical implementation of a fully aligned Carbon Budgeting system and Mix of Measures (including the carbon tax and carbon offset scheme) are already in place.

The successful alignment of these systems is dependent on the foundation that is currently under development.

A key contributor to the foundation consists of a common understanding of the terminology used. This includes a unified understanding of the term Carbon Budget; understanding the differences between GHG accounting and reporting and the boundaries encompassed by various standards.

Practical constraints in the developing South African regulatory system will in the short term dictate that there will be a distinction between the boundaries of the GHG inventory of an entity and that of the mandatory reporting requirements. This difference should be recognised and accommodated in the system. The confusion in the current debate with respect to the consolidation of corporate GHG accounts should be clarified with reference to the already adopted SANS/ISO standard.

If the design of the Carbon Budgeting system would return to the principles already embedded in the adopted ISO standards and the NCCRP, better alignment is anticipated. **It is further essential** that both the carbon tax design (including the design of the offset system) and the Carbon Budgeting system be aligned with the existing infrastructure.

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Promethium Carbon
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