

Carbon Budget Methodology Document

A Guideline to Implementating the Tiered Methodological Approach

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Department: Forestry, Fisheries and the Environment **REPUBLIC OF SOUTH AFRICA**

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1. GLOSSARY OF TERMS

A number of terms are used frequently in this document, many of which may be closely related. A quick-reference guide is useful to avoid confusion.

Carbon Budget: A greenhouse gas (GHG) emissions allowance/assigned amount allocated to a company over a defined time period. The term "carbon" in carbon budget is shorthand for all the GHGs accounted for in the latest South African national GHG inventory (2017).

Emissions: are the release of greenhouse gases/and/or their precursors into the atmosphere over a specified area and period of time.

Emissions Source: Emission sources are defined as means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere (see 4.4 below)

Fugitive Emissions: Emissions that are not emitted through an intentional release through stack or vent. This can include leaks from industrial plant and pipelines.

Process Emissions: means greenhouse gas emissions other than combustion emissions occurring: (a) during use of specific substances (b) as a result of intentional and unintentional reactions between substances or their; transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and (c) the formation of substances for use as product or feedstock.

Activity/ Activities: Human activity resulting in emissions or removals taking place during a given period of time. Fossil fuel combustion in boilers, metal smelting, land management, clinker production, lime and fertilizer use and waste generation are examples of emissions generating activities. Aforestation and reforestation are examples of carbon removal activities.

Facility: Premises where activities identified in Annexure 1 of the National Greenhouse Gas Reporting Regulations (See 4.1 below) are being undertaken

Carbon Budget Methodology: Defined processes and data sources used to calculate and allocate carbon budgets. Three methodologies are proposed (see Section 6 below) in a tiered system.

Mitigation Plan: A formal, approved plan of action listing initiatives and interventions at a company level that will result in the mitigation of emissions in order to meet the assigned carbon budget.

2. INTRODUCTION

South Africa is a signatory to the Paris Agreement, a legally binding international treaty on climate change, which was adopted by 196 parties at the 21st Conference of Parties in Paris on 12 December 2015 and entered into force on 4 November 2016. The primary of the goal of the Agreement is to limit global warming to below 2°C when compared to pre-industrial levels, with the ideal limit being 1.5 °C.

As a signatory, South Africa is obligated to submit a Nationally Determined Contribution (NDC) which provides a breakdown of post-2020 climate actions that define how the nation intends to meet its mitigation obligations. South Africa submitted its first Intended NDC (INDC) in September 2015 which became the first NDC in November 2016.

Carbon Budgets have been identified as one of three primary mitigation measures forming critical components of the South African mitigation system (the others being Sectoral Emissions Targets and Carbon Tax). Both Carbon Budgets and SET's are proposed to assist South Africa in meeting its absolute reduction targets.

In simplified terms, a Carbon Budget is a greenhouse gas (GHG) emissions allowance allocated to a company over a defined time period. South Africa is not unique in its adoption of Carbon Budgets as a mechanism to drive emissions reductions. A number of countries have implemented budgets, either as part of local and/or international Emissions Trading Schemes (ETS, or 'cap and trade') frameworks (both mandatory and voluntary), or as a standalone mitigation initiative. Currently, there are 31 ETS's implemented globally, covering the Americas, Oceana, the European Union and Asia regions.

Typically, budget allocation processes in countries with established cap and trade mechanisms have increased in stringency over time. For example, Kazakhstan initially implemented a grandfathering approach during the first Phase of its national ETS (2013) and by Phase 3 (2018-2020) had gradually introduced limited product-level benchmarking¹. In Australia too, the main industrial sector policy governing emissons

¹ CAP (2020). Emissions Trading Worldwide: Status Report 2020. Berlin: International Carbon Action Partnership

(the 'Safeguard Mechanism' of the Emission Reduction Fund (ERF)) is in the process of transitioning from historical to output-based using benchmarks².

South Africa intends to follow a similarly trajectory in order to accommodate the significant variability in processes, infrastructure and data availability between the various economic sectors making up the economy. Ultimately, the Department of Forestry, Fisheries and the Environment (DFFE) will require that all sectors adopt product-level benchmarks in the calculation of their carbon budgets. However, it is acknowledged that this transition will need to be phased.

This document will set out the scope of mandatory carbon budget implementation and will also detail methodological frameworks which will be used to calculate and allocate company-level carbon budgets for the first mandatory phase and beyond. It will also provide clarity on practical considerations such as methodology selection, data requirements, reporting and administration.

² World Bank (2020). Developing Benchmarks for carbon budgets: An example from Australia

3. JOURNEY TO MANDATORY CARBON BUDGETS

DFFE have adopted a phased approach to the implementation of carbon budgets to date. Following the promulgation of the National Pollution Plan Regulations, DFFE embarked on a voluntary carbon budget submission whereby companies were invited to submit carbon budget for review and and approval, incentivised by the Carbon Tax allowance of 5%. This voluntary phase ("Phase I") applied to the time period 2016-2020.

Phase I was successful with 58 Companies submitting carbon budget applications. 45 Companies were allocated carbon budgets for Phase I (2016 to 2020) and 13 companies did not complete the process. All carbon budgets for the 2016 to 2020 period accounted for 338 MT CO₂e (annualised), or 66% of the total country GHG emissions (2015 Greenhouse Gas Inventory puts total national emissions at approximately 512 MT CO₂e). However, when comparing this contribution against carbon budget-relevant sectors of the GHG Inventory, it accounts for 89% of emissions.

Phase I submissions were closed on 31 December 2020. However, in order to ensure continuity, a Transition Period was agreed and gazetted by the Minister (22 October 2020), running from January 2021 to December 2022. There are two primary objectives for this 2 year period, namely:

- Phase I extension: Voluntary budgets will continue to be accepted during the Transition Period (5% carbon budget allowance applicable).
- Phase II carbon budget methodology allocation and preparation: The Transition Period will also be used to decide appropriate budget allocation methodologies through an extensive process of engagement with industry and mining stakeholders. These will be piloted and the outcomes will inform the first 5-year mandatory allocation period commencing in January 2022.

The timeline to date, including current status and looking forward to the first mandatory allocation phase, is presented in **Error! Reference source not found.** overleaf.

Figure 1: Carbon budget development timeline

Phase I - Voluntary			Trar Pe	nsition riod	Phas	Phase II - Mandatory					
Ran f Volur No pr 5% ta	rom Jan 2016 Itary submissi rescriptive buo x allowance g	-Dec 2020 on dget methoo ranted for v	iology oluntary sul	bmissions	 Run: 202: Pha: exte Pha: meti final pilot 	s from Jan L – Dec 2022 se I nsion se II sector hodologies ised and sed	• Run • Mar Cha legi: • Agri	s from Jan 2 ndatory subi nge Act for 1 slated criteri eed budget i	1023 – Dec 2 mission in te those entitie ia methodolog	2027 erms of Clim es meeting gies	ate
2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

4. SCOPE

4.1. Applicable Statutory Frameworks

A number of pieces of legislation are relevant to the implementation and management of carbon budgets.

- National Climate Change Act (in consultation, hereafter referred to as 'the Act'): The implementation of Carbon Budgets are guided by the National Carbon Budgets and Mitigation Plans regulations (hereafter referred to as 'the Regulations' of the Act. In addition, the Act makes provision for mitigation plans in fulfilment of carbon budget obligations. In the event of any conflict between a provision of the Act and other legislation specifically relating to climate change, the Act prevails.
- National Carbon Budgets And Mitigation Plans Regulations (in consultation, hereafter referred to as 'the Regulations'): the Regulations will define procedural and administrative requirements with respect to carbon budgets and mitigation plans provided for in the Act above. Mandatory allocation of carbon budgets will be governed by activity. These activities, along with the Regulations themselves, will be communicated by the Minister via Government Gazette
- National GHG Reporting Regulations (2017, hereafter referred to as the 'GHG Reporting Regulations'): The calculation and disclosure of emissions data is guided by the Gases Included
- National Pollution Plan Regulations (2017, hereafter referred to as 'PPP regulations'): Mitigation plans disclosed as part of PPP submissions will align to those mandated by the Act.

4.2. Gases

As per the GHG Reporting Regulations, gases to be considered for carbon budgets are: Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Hydroflourocarbons (HFC's), Perflourocarbons (PFC's), Sulphur Hexaflouride (SF₆) and Nitorgen Triflouride (NF₃).

4.3. Listed Activities

Budgets will cover all activities as defined in forthcoming Act. These will include direct emissions (Scope 1) such as stationary combustion emissions from heat or energy generation, process emissions and fugitive emissions. A notable exlusion is emissions from mobile road transport. A breakdown of emissions sources is provided in **Error! Reference source not found.** below.

4.4. Emissions Sources

Emissions sources defined for mandatory inclusion in carbon budget accounting are highlighted in Table 1 below for each Commitment Period. Commitment Periods are defined and discussed in Section 7 of this document.

Source Description	Coverage	Implications for the Carbon Budget: Commitment Period 1	Applicability rule for Commitment Period 2 and Commitment Period 3
Stationary Combustion Civil aviation Domestic navigation Fugitive Emissions Industrial Processes and Product Use	Mandatory	Emission source forms part of Carbon Budget accounting	Accounting of this emission source forms part of Carbon Budget accounting
Road Transportation Agriculture Forestry and Land Use Waste	Voluntary	Once elected, emission source forms part of accounting for Carbon Budgets	If included in Commitment Period 1, emission source remains part of accounting for Carbon Budgets in Commitment Period

Table 1: Emissions sources for inclusion in carbon budgets

Source Description	Coverage	Implications for the Carbon Budget: Commitment Period 1	Applicability rule for Commitment Period 2 and Commitment Period 3
			2 and Commitment
			Period 3
Scope 2 sources Scope 3 sources	Voluntary	If elected, emission source will not form part of Carbon Budget accounting	If elected, emission source will not form part of Carbon Budget accounting.
		Emission savings from scope 2/3 related activities are reported as memo items	Emission savings from scope 2/3 related activities are reported as memo items

4.5. Thresholds

Mandatory allocation is governed by activity, thus thresholds are not strictly relevant. It may however be necessary to apply thresholds within sectors where multiple entities conduct the same or similar activities and produce the same product. In these cases, the threshold applied must satisfy both materiality requirements and inclusivity, functioning as an equity principle. It is determined that where applicable, a universal 30kt/annum CO2e threshold will apply. Sector companies exceeding this must be allocated a carbon budget.

4.6. Operational Boundaries

Budgets will be allocated at a company level. The principle of operational control will apply, as per the GHG Reporting Regulations:

"A data provider has operational control over another company if it, or one of its subsidiaries, has the full authority to introduce and implement its operating policies at the company".

With reference to the above, it is also critical that the entity defined as a data provider for the purposes of reporting in terms of the GHG Reporting Regulations is the same as the entity that is allocated a carbon budget and assigned a mitigation plan.

Figure 2: Operational boundary variability

There is no 'one size fits all' approach to determining an operational boundary:

- **Company A:** Centralised control, with six manufacturing sites, each employing similar processes and producing a limited range of products, reporting as a single entity
- **Company B:** Group structure with decentralized control, consisting of a multitude of diverse businesses across numerous sectors, reporting as a single entity

The companies above need to consider how the determination of total company emissions best reflects the company's actual power of control

Note that a change to the company structure or operations (e.g. merging, expanding, selling of assets) can only be accounted for if it has been formally signed by the board. A review of the budget is to be requested once the change is formally agreed upon and evidence of this can be provided to the Department of Forestry, Fisheries and the Environment (DFFE).

A request should be made if the change results in an increase or decrease in annual emissions of 5% or more. Any amendments will be subject to verification in terms of the Carbon Budget Verification Standard before approval is granted.

5. APPLYING FOR A CARBON BUDGET

The Climate Change Act will require the promulgation of National Carbon Budgets And Mitigation Plans Regulations (herewith referred to as 'the Regulations') which will define the application process (these are currently in development and will be communicated via Government Gazette). Applicants conducting listed activities defined in the the Regulations (see also 4.5 above) will be required to apply for a Carbon Budget.

For each Carbon Budget period, the application process must commence 12 months before the beginning of the next five-year allocation period. For example, applications for the first mandatory allocation phase (January 2023 - December 2027) will need to be lodged by end-January 2022. Applications are to be lodged in the format defined by the Regulations, to be communicated by DFFE.

A key feature of the application, over and above contextual and administrative information, is disclosure of the following:

- A description of processes, per facility, that will generate emissions and clearly identify the activities/processes attributable to greenhouse gas emissions;
- A draft mitigation plan describing mitigation measures that each facility will be implementing to produce the desired emissions reduction against baseline over the carbon budget period.

Once the carbon budget application is received, the Department must, in writing, acknowledge the receipt of the application within 30 working days and approve, or revert with feedback. Following approval, the process to calculate and allocate a carbon budget is initiated.

6. ALLOCATING A CARBON BUDGET – THE TIERED APPROACH

DFFE will ultimately require that all sectors utilise product-level benchmarks in the calculation of their carbon budgets in subsequent carbon Budget Commitment periods.

However, it is also acknowledged that, for the first mandatory implementation phase (commitment period), a flexible approach to allocation methodologies is required to allow for the significant variability in processes, data collection, emissions estimations and benchmarking stringency between the various economic sectors. In order to accommodate this variability, DFFE has developed a tiered methodological approach (see Figure 3 below).

Figure 3: Tiered approach to carbon budget allocation methodologies

The approach is structured to leverage existing data and identified mitigation potential and provides 3 methodology options, each of differing stringency.

The process to allocate the first phase of mandatory carbon budgets commenced on 1 January 2021 and will run to December 2022. During this period, the capacity of each sector³ will be assessed through a comprehensive engagement process, with the assistance of independent third party expertise. Based on the outcomes, a

³ Sectors are defined in Annexure A to this document

methodological approach will be selected, piloted and assigned for each sector, for the first mandatory phase.

In summary, the methodological tiers are defined as follows:

- Bottom Tier Fixed Target: Budgets are sector-wide fixed reductions
- Middle Tier Mitigation Potential: Budget is underpinned by the mitigation potential assessed in the mitigation model
- **Highest Tier Benchmarking:** Budget is/are benchmark intensity/intensities, determined at a company level but underpinned by performance data at facility level

6.1. Bottom Tier - Fixed Targets

Carbon budgets are set by allocating a share of GHG emissions space to industry and mining from the GHG emissions target. That space is then divided up between individual industry and mining companies. This method does not consider emissions reduction potentials or the context of each sector or company and can thus be considered 'top-down'.

The basis of this approach is the definition of the share of national emissions allocated to industry and mining. This can be readily estimated using the MPA. The MPA contains input data from 2000 to 2015 and projection of emissions to 2050. The share of emissions is estimated by dividing the modelled industry and mining GHG emissions by the economy-wide emissions number (industry and mining GHG emissions are the sum of the fuel combustion and process emissions of all relevant sectors).

It is important to note that the industry and mining share of emissions may vary year on year depending on the contribution in relation to the remainder of the economy, which includes transport, buildings, waste, AFOLU and other non-industry and mining energy use emissions. A number of approaches are available to estimate share using MPA output, including:

- Historical share (2015-2019, 2020 Is not a representative year)
- Current share to end-2019 (assuming no emissions reductions since 2015)

• Share at the beginning of the first mandatory carbon budget cycle (assuming no emissions reduction since 2015)

An average of these approaches is deemed to be the most equitable.

In order to determine the total industry and mining budget the percentage contribution to total is multiplied by the national GHG emissons target, or NDC.

To allocate this share of emissions further, the emissions allocated to the industry and mining sector can be distributed across all companies. It is worth noting that although a uniform distribution of emissions (i.e, a fixed percentage) may be desirable from an administration perspective, a fixed percentage may be disadvantageous for large companies within a sector (2% reduction for a large producer and emitter can have vastly different implications compared to a small operator). The sum of all the company carbon budgets would equal the total emissions space allocated to the industry and mining sectors, which in turn is calibrated to the NDC.

A process flow summarising the descriptive above is provided in Figure 4 below.

Figure 4: Process flow – Fixed Targets Allocation Approach

A worked example is provided in

Figure 5 overleaf:

Figure 5: Worked example – Bottom Tier: Fixed Targets approach

It was determined that the national GHG emissions space for industry and mining is 70% of a national total of 500 MT CO2e, equating to 375 MT CO2e (Note: Values are for illustration pruposes only). Following a period of engagement, South Africa sets an emissions reduction target of 1.5% for the first 5 year period based on an adjusted assessment of mitigation potential. This equates to 5.63 MT CO2e. 100% of industry and mining emissions are shared proportionally between 8 companies. A uniform fixed reduction target (budget) would be calculated as follows:

Company	Proportion of National Emissions Total	Total Emissions (MT)	1.5% Target	Carbon budget (MT)
Company A	60%	225.00	3.38	221.63
Company B	20%	75.00	1.13	73.88
Company C	8%	30.00	0.45	29.55
Company D	5%	18.75	0.28	18.47
Company E	2%	7.50	0.11	7.39
Company F	2%	7.50	0.11	7.39
Company G	2%	7.50	0.11	7.39
Company H	1%	3.75	0.06	3.69
	100%	375	5.625	369.375

6.1. Middle Tier - Mitigation Potential

In this approach, modelled mitigation potential obtained from the Mitigation Potential Analysis (MPA) model is used as guidance for the allocation of carbon budgets.

The mitigation model includes a stakeholder based assessment of what emissions reductions are possible per economic sector. Only the industry and mining sectors

are considered. The latest inputs from stakeholders was in 2018 and 2019 when the Mitigation Potential Analysis (MPA) was last updated by DFFE.

The mitigation potential analysis outputs allow for a thorough assessment of industry and mining sectors. They allow us to understand the quantitative limits to emissions reductions in the 2023 to 2027 time period as well as the context around the quantitative assessment of emissions reduction potential.

The MPA can be used as a guide to identify the emissions reductions that will be assigned to companies. It is however, not company specific. Thus the applicability of each mitigation measure identified in the model will be assessed individually as companies within each sector may use different technologies, material inputs and may already have implemented identified mitigation meaures. In the latter case, alternate measures may require evaluation.

Each company will receive an emissions reduction assignment that is specific to their own context. If, for example, 2 out of the 3 interventions identified in the MPA for that specific sector are relevant to the company then the emissions reductions assigned to the company are based on the potential emissions reductions of these 2 interventions.

Although the MPA does look at specific interventions and technologies this method does not specifically link an emissions reduction assignment to an intervention or technology. No interventions are prescribed to companies. The MPA only is used as a basis to assign an emissions reduction, but the company can elect to use whatever mitigation intervention it chooses to achieve the assigned reduction. The stringency process is used to assess the extent to which the identified mitigation interventions are helping with the overall carbon budget allocation objective. A process of engagement will be initiated to ensure that company budgets align with the quantum of mitigation measures identified.

A process flow summarising the descriptive above is provided in Figure 6 below.

Figure 6: Process flow – Mitigation Potential Approach

A worked example is provided in Figure 7 overleaf.

For the **Cement Sector**, the mitigation analysis has identified 5 measures to reduce direct emissions in the sector. This sector is comprised of 2 companies, **Company A** and **Company B**. The emissions of this sector is **1 925 000 t CO2e**.

- Waste Heat Recovery: results in an emissions reduction of 1% over the 2023 to 2027 time period
- Improved Process Control: results in an emissions reduction of 0.15% over the 2023 to 2027 time period
- Fuel Switch (coal to waste): results in an emissions reduction of 2% over the 2023 to 2027 time period
- **Reduction of Clinker content**: results in an emissions reduction of 0.3% over the 2023 to 2027 time period

Company A: Baseline emissions for 2023 to 2027 are projected to be: 675 000 t CO2e. This company can implement:

- Improved Process Control (0.15% emissions reduction)
- Fuel Switch- coal to waste (2% emissions reduction)

Company A will be assigned an emission reduction of **2.15%, or 14 513 t CO2e** against baseline emissions. Their carbon budget will be: **660 488 t CO2e** for 2023 to 2027.

Company B: Baseline emissions for 2023 to 2027 are projected to be: 1 250 000 t CO2e. This company can implement:

- Waste Heat Recovery (1% emissions reductions)
- Improved Process Control: (0.15% emissions reductions)
- Fuel Switch (coal to waste): (2% emissions reductions)
- Reduction of Clinker content: (0.3% emissions reductions)
- They will be assigned an emissions reduction of **1.45%**, or **18 125 t CO2e** from their baseline emissions. Their carbon budget will be: **1 231 875 t CO2e**

6.2. Highest Tier - Product-Level Benchmarks

In this approach, company carbon budgets are based on a specific performance level of emissions per unit output of a specified product.

Operating philosophies and approaches differ markedly between industrial and mining setor companies, leading to different emissions intensities per unit production. Factors that impact emission intensities include types of fuels used, efficiency of fuel use, manufacturing and mining processes, technologies used in the operations, input materials used and techniques used to manage waste gases.

It is possible to assess the above factors to understand and quantify the possible optimal emissions intensity. This is then used to set a benchmark for a given sector company to achieve.

In its simplest form, the emissions intensities of existing companies are compared against one another. If multiple companies are comparable, a benchmark can be set based on the emissions performance of these companies. To be comparable the company's activity will have to satisy the following conditions:

- Fall within the same IPCC category (see Annexure 1 of the Greenhouse Gas Reporting Regulations)
- Manufacture or generate the same product.

These emissions intensities may also be referred to as Implied Emissions Factors and will be sourced from emissions and production data input into the SAGERS system.

Emissions intensities are expressed as:

CO2e / Amount of production

Carbon budgets are then calculated using projected production values:

Carbon Budget = Forecasted Production * Benchmark Intensity

Single companies producing multiple products or with multiple emissions generation activities will need to set benchmarks per IPCC subcategory. For example, considering the cement sector, benchmarks would be set for subcategories 1A2f and 2A1. A company carbon budget would therefore possibly be comprised of multiple benchmarks that reflect all the industrial and/or mining activities they participate in. If a company mines coal and produces zinc, for example, the relevant benchmarks included in their carbon budget will be 1A1cii and 1B1a for their coal mining activity and 1A2b and 2C6 for their zinc production activity.

A process flow defining the various steps to allocating a carbin budget using a benchmarking approach is provided in Figure 8 below.

Figure 8: Process flow – Benchmarking Approach

In certain cases it may be vastly complex and time consuming to link emissions with a unit of product. This may arise when there are no, or very few comparable companies within a sector or when the production processes are complex, consisting of many nuanced sub-processes, each with its own by-products and emissions. In these instances, a fall-back approach can be used. This assesses emissions per unit heat generated, per fuel consumed and per reductant used (process emissions).

In addition to the type of benchmark, the method used to determine respective benchmarks must also allow for flexibility. It is acknowledged that there is variability in the robustness and completeness of datasets relevant to carbon budgets between sector companies. There are variety of ways in which benchmarks can be established, with varying stringency:

- The best performing emissions intensity of existing companies per activity could be elected to be the benchmark that all companies should achieve by end of the carbon budget period;
- An adjustment of the best performing emissions intensity of existing companies per activity could be elected to be the benchmark that all companies should achieve by end of the carbon budget period (for example, 95% of the best emissions intensity);

- The average of the emissions intensities of the existing companies per IPCC activity could be elected to be the benchmark that all companies should achieve by end of the carbon budget period;
- The average of 50% of data points around the weighted-median emissions intensity per product could be elected to be the benchmark that all companies should achieve by end of the carbon budget period;

A worked example utilising the weighted-median emissions intensity per product approach is provided in Figure 9 overleaf.

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Figure 9: Worked example – Highest Tier: Benchmarking approach

5 companies make up a sector: **A**, **B**, **C**, **D**, **E**. Each company has a single facility, producing the same product. Emissions and production data available for 2 years – 2018 and 2019. Thus **10 facility-year data points** are available.

- Calculate emissions per product intensity data for each facility
- Rank each facility by production
- Utilise production weighted median to determine benchmark average emissions intensity
- Calculate average emissions intensity of facilities around the median. Use ~50% of values around the median (and >2 facilities)

Rank	Company	tCO2e/t product	Production tonnes	Total Production %
1	А	0.63	214 315	3.4%
2	D	0.78	504 914	8.0%
3	A	0.75	546 778	8.7%
4	D	0.73	555 669	8.8%
5	E	0.79	582 407	9.2%
6	В	0.68	658 444	10.4%
7	С	0.76	764 154	12.1%
8	E	0.68	766 114	12.1%
9	в	0.64	794 611	12.6%
10	С	0.8	919 315	14.6%

	- and c	Unit
p (percentile)	50%	
n (sample size)	10	
Rank = p(n+1)	5.5	
Interpolated 50th percentile	620 426	tonnes
Average Emissions Intensity	0.74	tCO2e/t product

6.3. Allocating methodologies

DFFE has placed product-level benchmarking at the top of the methodological hierarchy based on an assessment of both what is possible in the South African context (utilising data available through existing reporting and disclosure mechanisms) and an assessment of global best practice. As highlighted in Section 1 above (Introduction), many countries have transitioned from a less stringent, topdown approach to a more stringent and flexible bottom-up approach over time.

In the South African context, the selection of product-level benchmarking as the top tier has been informed by an evaluation of each proposed methodology against the following principles:

- **Feasibility**: This principle refers to the question of practical implementation based on the availability of data, technology and expertise in the South African context.
- Fairness: This principle assesses whether companies are not unfairly prejudiced through implementation of a given methodology. For example, the use of a methodology may not allow for the consideration of company mitigation efforts to date.
- Equality: All companies should be treated as equally as possible in the carbon budget allocation process
- **Robustness**: This principle assesses whether the carbon budget is accurate and measurable.
- Effectiveness: this principle assesses whether the selected methodology results in certain emissions reductions .
- Flexibility: The selected methodology needs to be flexible should the national emissions target (NDC) be amended over time. The selected methodology must also be administratively efficient in the event of future change.
- Alignment with the Policy Objectives: This principle assesses whether the selected methodology compliments and supports other national and sectoral policy objectives

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• **Competitiveness**: The selected methodology should not adversely impact local and global competitiveness

Product-level benchmarking is ultimately advantageous in that it stands up to scrutiny in terms of the principles highlighted above. Prodcut-level benchmarking places less reliance of the establishment of equitable and uniform emissions baselines, itself a complex process. Benchmarks speak directly to production process and efficiency as opposed to absolute emissions and thus ensure that baselines to not go out of date. In this way they also do away with the need for frequent adjustments, should production and/or emissions profiles increase materially within any given budget allocation period. Finally, they provide a means for new entrants to be accommodated easily and allow for growth.

With the above in mind, DFFE will allow for some degree of flexibility in the allocation of methodologies. However, for the first allocation period (2023-2027), sector companies may provide evidence to justify a move to a higher or lower tier relative to other companies conducting the same activity.

Responsibility for the determination of appropriate sector methodology (-ies) for the first allocation phase, as well as budget calculation/ determination, will fall to a third party resource that will be made available by the Department. This resource will both provide capacity and expertise to mining and industry and will ensure that independence is maintained. The resource will be available during the transition period to ensure that companies are prepared for the first allocation period.

Following the calculation and submission of each company carbon budget, DFFE will, in writing, communicate the outcome and give the applicant 30 working days to acknowledge receipt and respond to the outcome.

Note that the carbon budget will only be finalised, approved and issued once the applicant has fully aligned their carbon budget with the submitted mitigation plan, describing mitigation measures that will be implemented to achieve the allocation. A letter of allocation will be directed to the company to confirm the carbon budget upon finalization.

Final approval of carbon budgets and mitigation plans must be completed by 31 December 2022 for the first carbon budget/mitigation plan period, and every five years thereafter. A generalised procedural flow for budget calculation and allocation is summarised in Figure 10 below.

7. COMMITMENT PERIODS

Carbon budgets are allocated for a period of 5 years. In order to allow for DFFE to manage the transition to product-level benchmarking as the preferred allocation methodology, three Commitment Periods of 5 years each are defined. It is accepted that not all companies will be in a position to implement product-level benchmarking for the first Commitment Period. In the the first two Commitment Periods, companies may be allocated carbon budgets using defined top-down methodologies (see Section 6 above). This allows companies time to implement adequate systems and controls. Universal product-level benchmarking applicable in the third Commitment Period. This approach is presented in Figure 11 below.

Mandatory annual progress reporting will be required, as defined in Section Error! Reference source not found. below.

8. DATA SOURCES AND DATA SYSTEMS

8.1. Input Data

Company data will be sourced through existing and established and legislated reporting mechanisms. The interrelationship between mechanisms is represented graphically in Figure 12 below.

Figure 12: Reporting mechanisms supporting the Carbon budget allocation process

As per requirements of the GHG Regulations, the provision of clear and disaggregated data fuel type, process type, activity data and emissions data is the responsibility of the company concerned.

For the first mandatory allocation period, data provided must include projections for the period 1 January 2022 to 31 December 2027. Data is to be provided by the company disaggregated to facility level.

8.1.1. Emissions Data

Company emissions data will be sourced by from the South African Greenhouse Gas Emissions Reporting System (SAGERS). As per the GHG Reporting Regulations, emissions are to be estimated using methods stated in the Technical Guidelines for Reporting of GHG Emissions. If a specific activity or process, emission factor or other input is not listed in the Technical Guidelines for Reporting of GHG Emissions, the IPCC 2006 Guidelines is to be used.

It is important to note that if data does not exist for an activity and a company has made all attempts to acquire this data, approximate values will be accepted if a clear and transparent method of derivation accompanies the submission.

The submission data and associated calculations is to be included and visible in the carbon budget template document and the values disclosed must align across all Government reporting mechanisms.

8.1.2. Mitigation Data

Mitigation potential will be sourced from the MPA model. Only industry and mining sectors are considered.

8.1.3. Estimated Production Data

Production estimations will be obtained directly from companies through the Annexure B of the Regulations. Robust production data estimations are critical for the calculation of benchmark intensities. In order to ensure that there is cross-sectoral alignment in the estimation methodologies for production, the following production estimation methodologies are proposed:

- Production levels are similar to a base year as selected within the previous carbon budget allocation period 2016 to 2020
- Production growth rates are in line with National Treasury expected GDP growth rates (the Medium term budget speech suggests a 3.3% growth in 2021 and 2.1% growth thereafter)

• Production growth is in line with company executive decisions, where such evidence can be provided

If the company wishes to estimate production values differently, company specific and/or sectoral specific information should be included to justify the production values.

The projected production data submitted by the company should reflect the structure of the company at the time of submission.

9. MANAGING CONCERNS AND ANOMALIES

DEFF acknowledges that the transisiton to, and incorporation of mandatory carbon budgets in business planning may not be entirely frictionless. It is accepted that a toolbox of measures is required to allow for moderation of the budget allocation process to accommodate both industry and mining concerns and the need to satisfy South Africas emissions reduction commitments. The following tools are available to ensure that the transition to regulated budgets is smooth.

9.1. Production-Linked Adjustment

A request for change can be made if any operational change results in an annual change in production of 5% or more. The request should be initiated within 90 days of the finalization of the changed operations. If a company does not notify the department an allocated carbon budget may be cancelled.

For a carbon budget adjustment, the company is to provide clarity on the nature of the change triggering a review of the budget. Information should be provided on the emissions occurring without the change, after the change and the difference that will result from the change.

Impacts on operations include:

- Merging or selling of assets
- Expansion of production lines, increased production
- Restructuring the company

9.2. Correction Factor

A correction factor allows for the updating of a carbon budget to suit a unique context. In certain instances, it may be necessary to introduce a correction factor arise where companies within a sector are not comparable or the applicable sector methodology unfairly disadvantages a certain company. Examples include platinum mining, where the energyuse per unit PGM mined increases as mining goes deeper. Also, in heat treatment and high temperature industries, furnace efficiency decreases with age. The correction factor will be derived on a need by need basis, based on rigorous analysis and based on best available science.

9.3. Carbon Leakage Factor

Carbon leakage refers to the transferring of production activity to other countries or regions with less stringent climate policy and regulation when climate policy in the area of current operation becomes more stringent. To prevent company relocation, a carbon leakage factor can be applied.

The correction factor will be applied if companies meet certain criteria:

- Direct and indirect costs induced by the implementation of carbon budgets would increase production cost, calculated as a proportion of the gross value added, by at least 5%; and
- The sector's trade intensity with markets outside the region (imports and exports) is above 10%,

OR

- The sum of direct and indirect additional costs is at least 30%; or
- The trade intensity is above 30%

9.4. Cross-Sectoral Leakage Factor

If the sum of all the carbon budgets, non-reported emissions estimate, new entrant space exceeds the national GHG Emissions target, a factor can be applied to all industry to reduce their emissions proportionally. This is a balancing mechanism to ensure the national GHG emissions target is achieved. The cross sectoral correction factor is derived after a bottom up assessment is made of the total carbon budgets in relation to the national GHG emissions target.

