REPUBLIC OF SOUTH AFRICA

DRAFT EXPLANATORY MEMORANDUM

FOR

THE CARBON TAX BILL, 2015

[2 November 2015]

DRAFT EXPLANATORY MEMORANDUM FOR THE CARBON TAX BILL, 2015

====================

BACKGROUND

Climate Change Policy in South Africa

Reducing the impacts of climate change through facilitating a viable and fair transition to a low-carbon economy is essential to ensure an environmentally sustainable economic growth path for South Africa. The carbon tax will play a role in achieving the objectives set out in the National Climate Change Response Policy of 2011 (NCCRP) and contribute towards meeting South Africa's commitments to reduce greenhouse gas (GHG) emissions.

The NCCRP provides an overarching policy framework for facilitating a just transition to a low carbon, climate resilient economy. The policy provides for the use of incentives and disincentives, including regulatory, economic and fiscal measures to provide appropriate price signals to nudge the economy towards a more sustainable growth path. The appropriate measures must be developed in line with the "Polluter Pays Principle"; i.e. "Those responsible for harming the environment must pay the costs of remedying pollution and environmental degradation and supporting any consequent adaptive response that may be required" (NCCRP). The development of the carbon tax policy and framework for the use of carbon offsets has been developed along the polluter pays principle.

The draft Carbon Tax Bill includes the detailed and revised carbon tax design features as per the Carbon Tax Policy Paper of 2013 and the Carbon Offsets Paper of 2014 and takes into account public comments received following extensive stakeholder consultation since 2011. The draft Carbon Tax Bill provides for the introduction of the carbon tax in a phased manner. This gradual approach takes cognizance of the developmental challenges facing South Africa and international climate policy developments. This will also help encourage investments in and the uptake of more energy efficient and low carbon technologies.

Carbon pricing options

Environmental challenges, such as climate change, air and water pollution, occur when the assimilative capacity of a particular environmental resource is exceeded. Society is affected by the resulting excessive pollution, and the polluter often does not pay for the costs of such pollution. This is defined as negative externalities and is the result of market failures with the costs of pollution not reflected in the final prices of goods and services. In order to address such market failures, governments intervene by way of regulations and / or market-based instruments (such as taxes and / or emissions trading schemes) to influence the investment, production and consumption decision-making processes of producers and consumers.

There are two approaches to price carbon directly:

- A carbon tax; and
- An emission trading scheme or cap and trade.

Many jurisdictions have implemented carbon pricing using both approaches, but covering different sectors. In some instances regulations prescribe a limit on emissions and companies are required to adhere to that limit, if not they are subject to significant penalties. Establishing such regulatory limits can be quite challenging. The costs incurred to adhere to such limits (without regard to the individual circumstances) could be seen as an indirect form of carbon pricing. In terms of market dynamics this is not always the most cost efficient way to reduce GHG emissions.

A hybrid system is also possible under which the price mechanism is utilized to complement command-and-control measures such as the envisaged alignment with the carbon budgeting approach.

For South Africa, an emissions trading system (ETS) is currently unsuitable due to the dominance of GHG emissions by only a few companies, the result of the oligopolistic market structure of the energy industry. Under such circumstances it is not likely to create a robust market, generate credible carbon prices and it might also result in a very volatile carbon price. In addition, an ETS is relatively complex and will require significant institutional capacity building. A carbon tax is much easier to administer and provide more price certainty. The inclusion of a carbon offset mechanism within the carbon tax design will provide additional flexibility for some companies to reduce their carbon tax liabilities whilst at the same time invest in GHG emission reduction projects. It might be possible, at a later stage (next 10 to 15 years), to link up with an international emissions trading scheme.

Carbon tax design in South Africa

The design of the carbon tax is informed by the administrative feasibility and practicality to cover most GHG emissions. It also takes into account the need for a long and smooth transition to a low carbon economy in a sustainable manner. The significantly high tax-free allowances and phased-in approach will ensure that South Africa's competitiveness is not being compromised. Measures are also taken to protect vulnerable households. The carbon tax will be revenue-neutral during the first five years and all revenue will be recycled by way of reducing the current electricity levy, credit rebate for the renewable energy premium, a tax incentive for energy efficiency savings, increased allocations for free basic electricity/ alternative energy and funding for public transport and initiatives to move some freight from road to rail.

1. Tax base

The tax is based on fossil fuel inputs (coal, oil & gas) and the use of approved emission factors. Alternative procedures will be necessary in the case of process and fugitive emissions resulting from the chemical reactions of certain manufacturing processes, and coal mining.

Emission factors and / or procedures are available to quantify carbon dioxide equivalent (CO_2-eq) emissions with a relatively high level of accuracy for different processes and sectors. The emissions reporting will be in line with mandatory reporting requirements for GHG emissions designed by the Department of Environmental Affairs (DEA), which will approve the appropriate emission factors and procedures, in line with information published by the Intergovernmental Panel on Climate Change (IPCC).

For stationary emissions, reporting thresholds will be determined by source category as stipulated in the National Environmental Air Quality Act of 2004. Only entities with a thermal capacity of around 10MW will be subject to the tax in the first phase. This threshold is in line with the proposed DEA GHG emissions reporting regulation requirements and the Department of Energy (DoE) energy management plan reporting.

For non-stationary emissions (e.g. liquid fuel - transport), the carbon tax will be included in the fuel tax regime.

2. Tax-free allowances

Based on extensive stakeholder engagements and in order to ensure a smooth transition to a low carbon economy, a number of transitional tax-free allowances are provided which include:

- A basic tax-free allowance of 60 per cent;
- An additional tax-free allowance of 10 per cent for process emissions;
- A variable tax-free allowance for trade-exposed sectors (maximum 10 per cent);
- A maximum tax-free allowance of 5 per cent for above average performance;
- A 5 per cent tax-free allowance for companies with a Carbon Budget;
- A carbon offsetting allowance of either 5 per cent or 10 per cent;
- The total tax-free allowance during the first phase (up to 2020) can be as high as 95 per cent.

Over time, post 2020, these tax-free allowances could be phased down to strengthen the carbon price signal. In addition the percentage based tax-free allowance could be replaced with an absolute tax-free threshold which could be in line with the proposed carbon budgets.

3. Tax rate and tax liability

The proposed headline carbon tax is R120 per ton of CO_2e for emissions above the tax-free thresholds. Given the above tax-free allowances this would imply an initial effective carbon tax rate range as low as R6 to R48 per ton CO_2e.

The carbon tax liability is calculated as the tax base (total quantity of GHG emissions from combustion, fugitive and industrial processes proportionately reduced by the tax-free allowances) multiplied by the rate of the carbon tax.

4. Carbon tax administration (institutional arrangements)

Implementation of the carbon tax requires an accurate system for monitoring, reporting and verifying emissions (MRV). The South African Revenue Service (SARS) will be the main implementing administrative authority on tax liability assessment. In order to audit the self-reported tax liability by entities, SARS will be assisted by the DEA.

The DEA will lead the MRV process, collecting the GHG emissions data which will form the tax base hence incorporating the carbon tax within the National Atmospheric Emissions Inventory System (NAEIS – part of the South African Air Quality Information System, SAAQIS). The DEA will work closely with the DoE, as a joint implementation partner in the carbon tax MRV work. DEA will directly collect the GHG process emissions information and the DoE, which is developing the Central Energy Database, will supply energy combustion data to the NAEIS. It is envisaged that this will be implemented through the National Atmospheric Emission Reporting Regulations of the DEA and the Energy Reporting Regulations of the DoE. The DoE currently hosts the Designated National Authority (DNA) who will be responsible for administering the carbon offsets.

SECTION-BY-SECTION EXPLANATION

Preamble

Part I: Definitions and general provisions relating to imposition of carbon tax

Definitions: Section 1

"allowance" means any amount allowed to be taken into account in terms of Part II, subject to section 13, for the purposes of determining the amount of carbon tax payable;

"carbon tax" means a tax on the carbon dioxide (CO_2) equivalent of greenhouse gas emissions imposed in terms of section 2;

“carbon dioxide (CO_2) equivalent” means the concentration of carbon dioxide that would cause the same amount of radiative forcing (the difference of sunlight absorbed by the Earth and energy radiated back to space) as a given mixture of carbon dioxide and other greenhouse gases;

“carbon offsets” means means a measurable avoidance, reduction or sequestration of carbon dioxide (CO_2) or other greenhouse gas emissions;

"combustion" means the exothermic reaction of a fuel with oxygen;

"Commissioner" means the Commissioner for the South African Revenue Service;

"emissions" means the release of greenhouse gases or their precursors and aerosols into the atmosphere over a specified area and period of time;

"emission factor" means the average emission rate of a given greenhouse gas for a given source, relative to the activity data of a source stream assuming complete oxidation for combustion and complete conversion for all other chemical reactions;

"fugitive emissions" means emissions that occur from the release of greenhouse gases during the extraction, processing and delivery of fossil fuels;

"greenhouse gas" means gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation, and includes carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6);

"industrial process" means a manufacturing process that chemically or physically transforms materials;

"Minister" means the Minister of Finance;

"person" includes a partnership and a trust;

"process emissions" means greenhouse gas emissions other than combustion emissions occurring as a result of intentional or unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and the formation of substances for use as product or feedstock;

"product use" means greenhouse gases used in products and product applications;

"Republic" means the Republic of South Africa;

"taxpayer" means a person liable for the carbon tax in terms of section 3;

"tax period" means a period in respect of which tax is payable as prescribed under section 14.

Imposition of carbon tax: Section 2

This section specifies that the carbon tax will be paid into the National Revenue Fund.

Persons subject to tax: Section 3

This section specifies which entities are liable for the tax. Liability for the tax arises for every entity that emits GHG emissions by conducting an activity included in Annexure 1 to the Notice in respect of the declaration of greenhouse gases as priority air pollutants under section 29(1) read with section 57 (1) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), issued by the Minister of Water and Environmental Affairs.

Tax Base: Section 4

The sources of GHG emissions are diverse and include:

- Scope 1: Direct GHG emissions from sources that are owned or controlled by the entity (e.g. emissions from fuel combustion and industrial processes).
- Scope 2: Indirect GHG emissions resulting from the generation of electricity, heating and cooling, or steam generated off site but purchased by the entity.
- Scope 3: Indirect GHG emissions (not included in scope 2) from sources not owned or directly controlled by the entity but related to the entity's activities (i.e. emissions that occur in the value chain of the reporting company).

The carbon tax covers all direct GHG emissions from sources that are owned or controlled by the relevant entity (Scope 1) emissions. These emissions relate to energy use (i.e. fuel combustion and gasification) and non-energy industrial processes. It will apply to all stationary and non-stationary direct and process emission sources (see below). The carbon tax is based on fuel inputs with approved emission factors, or an approved transparent and verified monitoring procedure.

Complementary measures and incentives (such as the energy efficiency savings tax incentive) have been introduced to encourage businesses to reduce their Scope 2 emissions; i.e. indirect emissions resulting from a firm's use of purchased electricity, heat or steam.

The carbon tax applies to all the sectors and activities except the Agriculture Forestry and Other Land Use (AFOLU) and waste sectors, which will be exempt during the first implementation phase (up to 2020), due to measurement difficulties. The carbon tax covers GHG emissions according to the Intergovernmental Panel on Climate Change (IPCC) Tier 1 guidelines (carbon dioxide, methane, nitrous oxide, perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride).

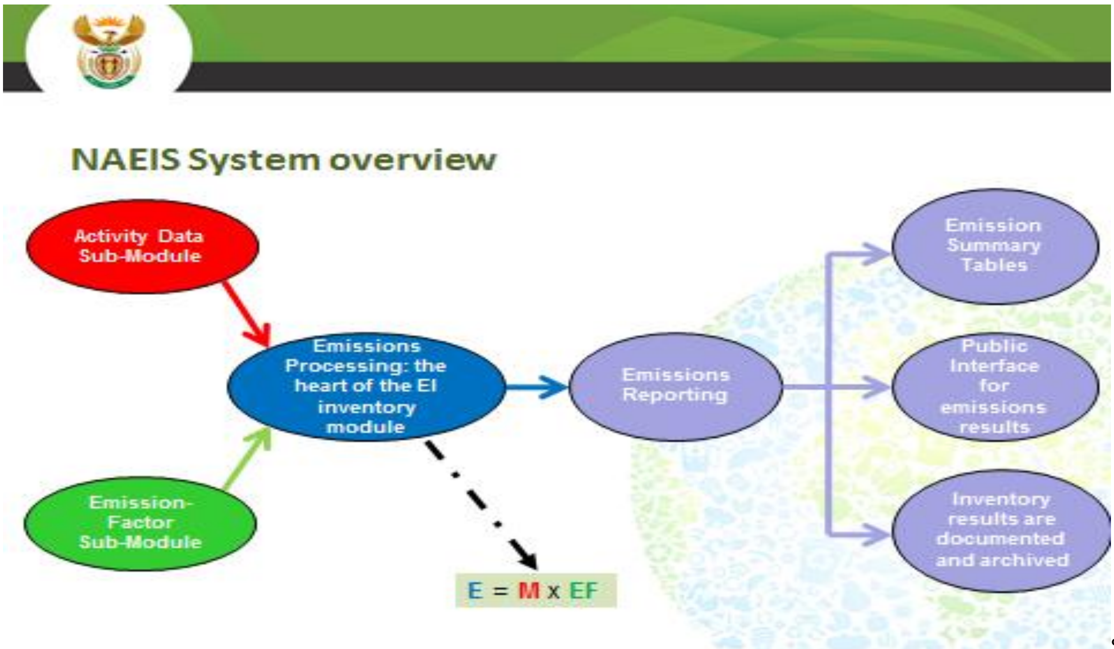
1. Carbon Tax Base Calculation

Entities that engage in activities that produce direct GHG emissions will be liable for the tax and will need to submit their tax returns based on their own assessment of emissions to SARS.

To calculate the company's tax liability, the volume of GHG emissions is determined based on the fossil fuel combusted or product processed and multiplied by a corresponding emission factor. Schedule 1 provides emission factors for energy combustion, process emissions and fugitive emissions as will be used for mandatory reporting requirements under the NAEIS system developed by the DEA.

The calculation of the tax base is closely linked to the DEA mandatory reporting requirements of emissions for all economic sectors in South Africa which is expected to become effective in the first half of 2016. The NAEIS will play a major role in the emissions verification process for carbon tax liability. The DEA will collect information on emissions at installation level, which will be aggregated to company level in order to verify that companies are complying with their tax liability. Figure 1 below depicts the way that the GHG emissions will be reported under NAEIS.

Figure 1: GHG emissions reporting under NAEIS



Source: DEA

The scheme also represents the basis upon which emissions to be used as the tax base for individual taxpayers will be calculated. The activity data component will contain fuel use data inputted by entities. The data will be composed of different types of fossil fuels. The emission factors sub module contains factors to quantify CO_2-equivalent emissions with a relatively high level of accuracy for different processes and sectors. The DEA will approve the appropriate emission factors and procedures, in line with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Over time, emission factors could change depending on whether South Africa specific emission factors or methodologies are developed, verified and certified by DEA in consultation with local entities. Equally should the approach of emission factors not be suitable for particular industry processes, direct measurement methodologies or modelling techniques such as higher tier measurement solutions can be developed in conjunction with DEA (e.g. mass balance approach in the synthetic fuels production). Companies will have to use the same methodology to report their emissions to both DEA and SARS.

Entities will be liable for their, (1) fossil fuel combustion emissions, (2) fugitive emissions (e.g. fugitive emissions from coal mining) and, (3) industrial processes and product use emissions. Calculation will be carried out along the formulas in the carbon tax bill, which reflect mandatory reporting requirements. The tax base comprises of emissions from fossil fuel combustion, emissions from industrial process and product use and fugitive emissions.

EXAMPLES OF CARBON TAX BASE CALCULATION

Fossil fuel combustion emissions

$$E = A_1 \times B_1 + A_2 \times B_2 + A_3 \times B_3 + \ldots\ldots\ldots\ldots + A_n \times B_n$$

where A_n is the mass of fossil fuel type n and B_n is its respective emission factor.

Example 1

Company 1C produces electricity and heat from sub-bituminous coal mined underground. It uses 2000 tonnes of sub-bituminous coal with an emissions factor of 1.8541 tCO_2e per tonne of coal. Its emissions **E** from combusting the coal to produce electricity will be calculated as follows:

$A = 2000$

$B = 1.8541$

$E = A * B = 2000 * 1.8541 = 3\ 708.20$ tonnes CO_2e

Example 2

Company 2C produces electricity and heat from sub-bituminous coal mined underground as well as diesel in open cycle gas turbines (OCGTs). The company combusts 2000 tonnes of sub-bituminous coal with an emissions factor of 1.8541 tCO_2e per tonne of coal, 500 000 litres of diesel (equivalent to 418.5 tonnes) with an emissions factor of 2.8326 tCO_2e per tonne of diesel. Its emissions **E** from combusting the coal and diesel to produce electricity will be calculated as follows:

$A_1 = 2000;$ $A_2 = 418.50$

$B_1 = 1.8541$ $B_2 = 2.8326$

$E = A_1 * B_1 + A_2 * B_2 = (2000 * 1.8541) + (418.50 * 2.8326) = 4\ 893.64$ tonnes CO_2e

Example 3

Company 3C produces electricity and heat from sub-bituminous coal mined underground, diesel used in open cycle gas turbines (OCGTs) and crude oil transported by pipeline. The company combusts 2 000 tonnes of sub-bituminous coal with an emissions factor of 1.8541 tCO_2e per tonne of coal; 500 000 litres of diesel (equivalent to 418.5 tonnes) with an emissions factor of 2.8326 tCO_2e per tonne of diesel; and 10 000 litres of crude oil (equivalent to 8.8 tonnes) with an emissions factor of 3.2214 per tonne. Its emissions **E** from combusting the coal, diesel and crude oil to produce electricity will be calculated as follows:

$A_1 = 2000;$ $A_2 = 418.50$ $A_3 = 8.8$

$B_1 = 1.8541$ $B_2 = 2.8326$ $B_3 = 3.2214$

$E = A_1 * B_1 + A_2 * B_2 + A_3 * B_3 = (2000 * 1.8541) + (418.50 * 2.8326) + (8.8 * 3.2214) =$ $4\ 921.99$ tonnes CO_2e

Fugitive emissions

$F \quad = \quad N_1 \times Q_1 + N_2 x Q_2 + N_3 x QB_3 + \ldots\ldots\ldots\ldots + N_n \times Q_n$

where N_n is the mass or volume of fossil fuel n and Q_n is its respective emission factor

Example 4

Company 1F mines sub-bituminous coal from underground and produces fugitive emissions. In the past year, it extracted 2000 tonnes of sub-bituminous coal with an emissions factor of 0.118657 tCO_2e per tonne of coal extracted. Its fugitive emissions **F** from underground coal mining will be calculated as follows:

$N = 2000$

$Q = 0.118657$

$F = N * Q = 2000 * 0.118657 = 237.314$ *tonnes* CO_2e

Example 5

Company 2F mines sub-bituminous coal from underground and uses crude oil transported by pipeline in most of its machinery which results in fugitive emissions. In the past year, it extracted 2000 tonnes of sub-bituminous coal with an emissions factor of 0.118657 tCO_2e per tonne of coal extracted and used 10 000 litres of crude oil (equivalent to $10M^3$) with an emissions factor of 0.1247 tCO_2e per M^3 of oil. Its fugitive emissions **F** from mining coal from underground and transportation of its crude oil will be calculated as follows:

$N_1 = 2000 \qquad N_2 = 10$

$Q_1 = 0.118657 \qquad Q_2 = 0.1247$

$F = N_1 * Q_1 + N_2 * Q_2 = (2000 * 0.118657) + (10 * 0.1247) = 238.56$ *tonnes* CO_2e

Process emissions

$P \quad = \quad G_1 \times H_1 + G_2 x H_2 + G_3 \times H_3 + \ldots\ldots\ldots\ldots + G_n \times H_n$

where G_n is the mass of fossil fuel n and H_n is its respective emission factor

Example 6

Company 1P uses dolomitic lime to produce lime which results in process emissions.

In the past year, it produced 5 000 tonnes of lime from dolomitic lime with a process emissions factor of 0.77 tCO_2e per tonne of lime produced. Its process emissions **P** from processing dolomitic lime into lime will be calculated as follows:

G = 5000

H = 0.77

*P = G * H = 50000 * 0.77 = 3 850 tonnes* CO_2e

Example 7

Company 2P is an aluminium smelting plant that operates both a Soderberg plant and centre work pre-bake cell technology with bar brake (CWPB) smelters to produce aluminium which results in process emissions. The Soderberg smelter produced 10 000 and the CWPB 20 000 tonnes of aluminium with respective process emission factors of 1.700 and 2.7560 tCO_2e per tonne of aluminium produced. Its process emissions **P** from using the Soderberg and CWPB smelting technologies to produce aluminium will be calculated as follows:

$G_1 = 10000$ $G_2 = 20000$

$H_1 = 1.700$ $H_2 = 2.756$

$P = G_1 * H_1 + G_2 * H_2 = (10000 * 1.700) + (20000 * 2.756) = 72\ 120$ tonnes CO_2e

Example 8

Company 3P produces carbide using a silicon carbide production furnace or process unit which is not vented through the same stack as the combustion unit and also uses petroleum coke resulting in process emissions. 9 000 tonnes of silicon carbide and 1 000 tonnes of petroleum coke were consumed with respective process emission factors of 2.5346 and 1.7000 tCO_2e per tonne of raw material used. Its process emissions **P** from using the silicon carbide and petroleum coke will be calculated as follows:

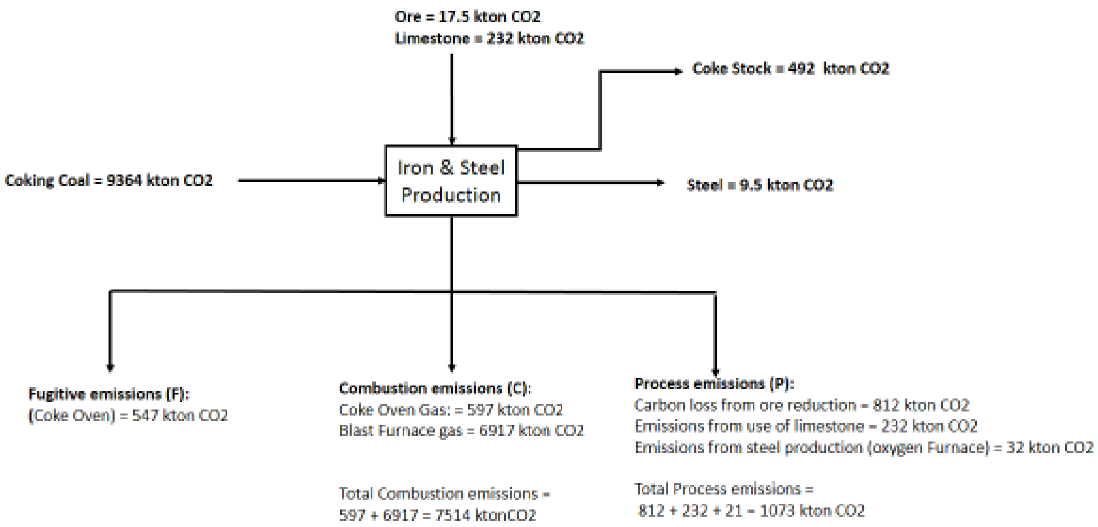
$G_1 = 9000$ $G_2 = 1000$

$H_1 = 2.5346$ $H_2 = 1.700$

$P = G_1 * H_1 + G_2 * H_2 = (9000 * 2.5346) + (1000 * 1.700) = 24\ 511.4$ tonnes CO_2e

Example 9 – carbon balance approach

Company CFP is an iron and steel manufacturer. Within its operation, it has a coke oven, blast furnace as well as an Oxygen Furnace for steel production. Company CFP uses a carbon balance approach to quantify greenhouse gas emissions from all activities occurring within its iron and steel facility. A simplified version of its carbon balance is provided below for illustration purposes. Note that inputs and outputs from the carbon balance are expressed in kilotonnes of carbon dioxide for ease of comparison between inputs and outputs. The results of the comparison should demonstrate that total carbon contained in all inputs is equal to the sum of carbon outputs (i.e. carbon in product, by-products and all greenhouse gas emission streams). The results from the carbon balance submitted by company CFP shows that it generated 547 ktonCO$_2$ from fugitive emissions, 7514 kton CO$_2$ from combustion emissions and 1073 kton CO$_2$ from process emissions.



The total emissions for CFP from its steel making processes will be calculated as follows:

F = 547 *C = 7514* *P = 1073*

*E = F + C + P = (547 + 7514 + 1073) * 1000 = 9 134 000 tonnes CO$_2$e*

The total carbon contained in all inputs (ore + limestone + coking coal) is equal to the sum of carbon outputs (fugitive emissions + combustion emissions + process emissions + steel + coke stock).

Rate of the carbon tax: Section 5

The headline carbon tax will be introduced at a rate of R120 per ton of CO_2-equivalent. The actual rate will be confirmed by the Minister of Finance through the annual budgetary process.

Calculation of amount of carbon tax payable: Section 6

The carbon tax liability is determined by multiplying the tax base adjusted for the allowable tax-free thresholds with the carbon tax rate. The base is set and defined in section 4 and the rate is set in section 5. To moderate the impact of the tax, take account of international competitiveness and enable a smooth transition to a low carbon economy, tax-free thresholds will be allowed during the first phase. The tax-free allowances will range between 60 per cent and 95 per cent, effectively reducing the effective carbon tax rate to a range of between R6 and R48 per tCO_2-eq. A deduction for emissions emanating from the use of liquid fuels (petrol and diesel) in stationary processes is provided to avoid double taxation since the carbon tax on liquid fuels (petrol and diesel) will be imposed at source, as an addition to the current fuel taxes.

The amount of tax payable will be calculated as follows:

T (tax payable) =

{**E** (Energy combustion emissions) – **D** (diesel and petrol emissions) – **S** (emissions sequestered by company as verified by DEA)] x 1- **C** (where **C** is the sum of the allowable tax-free thresholds related to combustion) x **R** (tax rate)} +
{**P** (process emissions) x 1- **J** (where **J** is the sum of the allowable tax-free thresholds related to process emissions) x R (tax rate)} +
{**F** (fugitive emissions) x 1-**K** (where **K** is the sum of the allowable tax-free thresholds related to fugitive emissions) x R (tax rate)}.

EXAMPLES OF TAX PAYABLE CALCULATION

The formula used to calculate carbon tax liability elaborated on in section 6 (1) of the draft bill is as follows:

X = {(E – D - S) x (1 – C) x R} + {P x (1 - J) x R} + {F x (1 - K) x R}

Example 10

Company 1 produces electricity and heat from sub-bituminous coal mined from a surface coal mine. It uses 2000 tonnes of sub-bituminous coal with an emissions factor of 1.8541 tCO_2e per tonne of coal.

Company 1 is not trade-exposed but has outperformed its peers, has complied with information requirements for its carbon budgets and has decided to make use of its full carbon offset allowance. There was no use of liquid fuels or any sequestration activities by Company 1.

Thus Company 1 is eligible for the basic 60 per cent tax-free allowance for (energy) combustion emissions; receives the 5 per cent allowance according to the performance allowance (Z-factor calculation) for outperforming its peers and 5 per cent allowance for complying with carbon budgets information requirements; and is eligible for up to 10 per cent offset allowance which it uses up to the maximum. The sum of Company 1's allowances is **80 per cent** (60+10+5 +5) for fossil fuel combustion emissions. The carbon tax liability for Company 1 will be calculated as follows:

*E = A * B = 2000 * 1.8541 = 3 708.20 tonnes* CO_2e
F = D = S = P = 0
C = 60% + 5% + 5% + 10% = 80%

X = {(E – D – S) * (1 – C) * R} + {P * (1 – J)} * R} + {F*(1-K)*R} =
{(3708.20 – 0 - 0) * (1 – 0.8) * R120} + 0 + 0 = R88 996.80

Example 11

Company 2 produces electricity and heat from sub-bituminous coal mined from a surface coal mine as well as diesel in open cycle gas turbines (OCGTs). It uses 2000 tonnes of sub-bituminous coal with an emissions factor of 1.8541 tCO_2e per tonne of coal, 500 000 litres of diesel (equivalent to 418.5 tonnes) with an emissions factor of 2.8326 tCO_2e per tonne of diesel.

Company 2 is not trade-exposed but has outperformed its peers, has complied with information requirements for its carbon budgets and has decided to purchase its full carbon offset allowance. There were no sequestration activities by Company 2.

Company 2 is eligible for the basic 60 per cent tax-free allowance for energy combustion emissions; receives the 5 per cent allowance according to the Z-factor calculation for outperforming its peers and 5 per cent allowance for complying with carbon budgets information requirements; and is eligible for up to 10 per cent offset allowance which it uses up to the maximum. Since liquid fuels are taxed at the point of sale, their emissions are subtracted from the total combustion emissions to avoid double taxation. The sum of Company 2's allowances is **80 per cent** (60+10+5 +5) for fossil fuel combustion emissions. The carbon tax liability for Company 2 will be calculated as follows:

$E = A_1 * B_1 + A_2 * B_2 = (2000 * 1.8541) + (418.50 * 2.8326) = 4\ 893.64$ *tonnes* CO_2e

$D = 418.50 * 2.8326 = 1\ 185.44$ *tonnes* CO_2e

$F = S = P = 0$

$C = 60\% + 5\% + 5\% + 10\% = 80\%$

$X = \{(E – D – S) * (1 – C) * R\} + \{P * (1 – J)\} * R\} + \{F*(1-K)*R\} =$

$\{(4\ 893.64 – 1\ 185.44 - 0)* (1 – 0.8) * R120\} + 0 +0 = R88\ 996.80$

The carbon tax paid for diesel will be included in the fuel price and will not require any further submissions by the company.

<u>Example 12</u>

Company 3 produces carbide using a silicon carbide production furnace or process unit which is not vented through the same stack as the combustion unit and also uses petroleum coke resulting in both combustion and process emissions. It combusts 2000 tonnes of sub-bituminous coal for energy with an energy emissions factor of 1.8541 tCO_2e per tonne of coal, 500 000 litres of diesel (equivalent to 418.5 tonnes) with an energy emissions factor of 2.8326 tCO_2e per tonne of diesel. 9 000 tonnes of silicon carbide and 1 000 tonnes of petroleum coke were used with respective process emission factors of 2.5346 and 1.7000 tCO_2e per tonne of raw material used.

Company 3 is trade-exposed, has process emissions but does not have any fugitive emissions. It has outperformed its peers, has complied with information requirements for its carbon budgets and has decided to purchase its full carbon offset allowance. There were no sequestration activities by Company 3.

Company 3 is eligible for the basic 60 per cent tax-free allowance for combustion emissions, the basic 70 per cent tax-free allowance for process emissions, 10 per cent for trade exposure, receives the 5 per cent allowance according to the Z-factor calculation for outperforming its peers and 5 per cent allowance for complying with carbon budgets information requirements and finally is eligible for up to 5 per cent of offsets allowance which it uses up to the maximum. Thus, the sum of Company 3's process allowances is **95 per cent** (70+10+5 + 5 +5) and fossil fuel combustion allowances is **85 per cent** (60+10+5 + 5 +5) and its total tax liability will be calculated as follows:

$P = G_1 * H_1 + G_2 * H_2 = (9000 * 2.5346) + (1000 * 1.700) = 24\ 511.4$ *tonnes* CO_2e

$E = A_1 * B_1 + A_2 * B_2 = (2000 * 1.8541) + (418.50 * 2.8326) = 4\ 893.64$ *tonnes* CO_2e

$D = 418.50 * 2.8326 = 1\ 185.44$ *tonnes* CO_2e

$C = 60\% + 10\% + 5\% + 5\% + 5\% = 85\%$

$J = 70\% + 10\% + 5\% + 5\% + 5\% = 95\%$

$X = \{(E – D – S) * (1 – C) * R\} + \{P * (1 – J)\} * R\} + \{F*(1-K)*R\} =$

$\{(4\ 893.64 – 1\ 185.44 - 0)* (1 – 0.85) * R120\} + \{24\ 511.4 * (1- 0.95)* R120\} + 0 =$

R213 816.06

Example 13

Company 4 is an iron and steel manufacturer. Within its operation, it has a coke oven, blast furnace as well as an Oxygen Furnace for steel production. Company 4 uses a carbon balance approach to quantify greenhouse gas emissions from all activities occurring within its iron and steel facility. The total carbon contained in all inputs should equal the sum of carbon outputs (i.e. carbon in product, by-products and all greenhouse gas emission streams). The results from the carbon balance submitted by Company 4 shows that it generated 547 ktonCO_2 from fugitive emissions, 7514 kton CO_2 from combustion emissions and 1073 kton CO_2 from process emissions.

Company 4 is trade-exposed, has process and fugitive emissions. It has outperformed its peers, has complied with information requirements for its carbon budgets and has decided to purchase its full carbon offset allowance. There were no sequestration activities by Company 4.

Company 4 is eligible for the basic 60 per cent tax-free allowance for fossil fuel combustion emissions; the basic 70 per cent tax-free allowance for process emissions; 10 per cent for fugitive emissions; 10 per cent for trade exposure; receives the 5 per cent allowance according to the Z-factor calculation for outperforming its peers and 5 per cent allowance for complying with carbon budgets information requirements and finally is eligible for up to 5 per cent of offsets allowance which it uses up to the maximum. Thus, the sum of Company 4's allowances is **85 per cent** (60+10+5 +5 +5) for fossil fuel combustion emissions, **95 per cent** (70+10+5 +5 +5) for process emissions, and **95 per cent** (60+10+10+5 +5 +5) for fugitive emissions and its total tax liability will be calculated as follows:

$E = A * 1000 = (7514 * 1000) = 7\ 514\ 000$ *tonnes* CO_2e

$P = G * 1000 = (1073 * 1000) = 1\ 073\ 000$ *tonnes* CO_2e

$F = N * 1000 = (547 * 1000) = 547\ 000$ *tonnes* CO_2e

$D = S = 0$

$C = 60\% + 10\% + 5\% + 5\% + 5\% = 85\%$

J = 70% + 10% + 5% + 5% + 5% = 95%

K = 60% + 10% + 10%+ 5% + 5% + 5% = 95%

X = {(E – D – S) * (1 – C) * R} + {P * (1 – J) * R} + {F*(1-K)*R} =

X = {(7 514 000 – 0 – 0) * (1 – 0.85) * R120} + {1 073 000 * (1 – 0.95) * R120} + {547 000 * (1 – 0.95) * R120} = R 144 972 000.

Amount of tax payable in respect of electricity generation

Section 6 (2) deals with the calculation of the tax liability by entities that generate electricity taking into account the generation of electricity from renewable energy source as guided by the Integrated Resource Plan (IRP). This section outlines a formula that will be used to calculate the tax liability of electricity generation and at the same time providing a credit for the actual (calculated) implicit carbon price in any given year that is based on the actual renewable energy "premium" (e.g. wind, solar and small-scale hydro) in the electricity prices.

This credit will reduce the impact of the carbon tax on electricity prices and will avoid the so-called "double taxation". The credit will be calculated annually and an estimate of this premium will be consulted on and agreed with Eskom, NERSA and the DoE.

The amount of tax payable by taxpayers for the generation of electricity from fossil fuels should be calculated as above and should then be adjusted as follows:

TE_{final} (final tax payable by electricity generator) = TE (tax payable by electricity generator) – REP (renewable energy premium)

Part II. Allowances

Tax-free allowances are provided to entities during the first phase of the carbon tax regime to provide for a smooth transition to a low carbon economy and to take into account international competitiveness and carbon leakage concerns. The basic tax-free threshold will be 60 per cent for the fuel combustion emissions and 70 per cent for process emissions. Upward adjustment of the basic tax-free threshold by up to 5 per cent will be based on the GHG intensity benchmark associated with over performance within the sector and up to 5 per cent allowance for complying with information reporting requirements for the carbon budgeting process. Furthermore, additional exemptions for specific sectors of up to 10 per cent for companies which are energy-intensive / trade exposed and 10 per cent for some companies with fugitive emissions will be provided.

In addition, an up to 10 per cent carbon offset allowance is available to emitters as per the 2013 Carbon Tax Policy paper's commitment. Details regarding the development of a carbon offset program were further elaborated on in the 2014 Carbon Offsets paper. Besides providing a flexibility option, offsets are also used to encourage locally-based emissions reduction in sectors not directly covered by the tax.

These percentage tax-free thresholds may be reduced in the second phase of the tax (2020 onwards) and / or may be replaced by absolute emission thresholds to align with the proposed carbon budgeting system.

The allocation of tax-free thresholds under the carbon tax will be calculated as per sectoral classification in Schedule 2. The classification reflects the IPCC classification and is aligned with mandatory reporting requirements under the DEA GHG inventory.

Basic tax-free allowance for fossil fuel combustion emissions: Section 7

All entities that generate emissions from energy combustion will be allocated a basic, percentage-based, tax-free threshold on actual energy combustion emissions of 60 per cent, below which the tax will not be payable.

Basic tax-free allowance for industrial process emissions: Section 8

One of the challenges in applying a comprehensive, broad-based carbon tax is to consider opportunities that are available for mitigation. Emissions from chemical processes that occur in fixed stoichiometric ratios (e.g. coal gasification, crude oil cracking and the production of cement, iron, steel, glass, ceramic and certain chemicals, such as calcium carbide and titanium dioxide) have limited potential for mitigation over the short term. A higher tax-free basic percentage-based threshold is therefore provided for these emissions compared to energy combustion emissions. A basic percentage-based threshold on actual industrial process and product use emissions of 70 per cent is applied, below which the tax will not be payable.

Allowance in respect of fugitive emissions: Section 9

This section deals with allocation of a tax-free allowance to entities that generate fugitive emissions. An additional tax-free allowance of 10 per cent will be provided to sectors with fugitive emissions. This allowance is provided due to the limited potential for mitigation of fugitive emissions over the short term.

Trade exposure allowance: Section 10

This section deals with the allocation of a tax-free allowance to entities that are exposed to trade and international competitiveness. Potential adverse impacts on industry competitiveness are addressed by providing an additional maximum 10 per cent tax-free trade exposure allowance for energy intensive and trade intensive sectors (EITI).

Trade-intensive industries can be defined as those industries in which exports are more than 40 per cent of their domestic sales; other references use 60 per cent as the threshold (see the discussion in Jooste et al., 2009).

This tax-free allowance will be structured as graduated relief. Firms will use their exports as a percentage of sales as an indication of their trade intensity.

The additional percentage relief (tax-free threshold) will be:
$Y2 = 0.4 \times (E)$

where E = the value of exports expressed as a percentage of sales (it must be greater than 5 per cent), up to a maximum of 10 per cent, as indicated in Table 2.

Table 2: Trade-exposed, tax-free threshold relief

Exports (E)	
0.4	
% relief (Y2)	% of sales
0	Below 5
2	5
4	10
6	15
7.2	18
8	20
10	25
10	30
10	35
Y2 = 0.4 × E E must be >5%	
Maximum for Y2 = 10%	

Performance Allowance (Z-factor): Section 11

This section deals with allocation of a tax-free allowance to entities that have proactively implemented GHG mitigation measures.

An additional tax-free allowance of 5 per cent, based on the Z-factor formula, is available to reward all companies that have taken voluntary actions to reduce their GHG emissions. This will be accommodated by adjusting the basic tax-free threshold of 60 or 70 per cent by a factor (Z), calculated with reference to the agreed GHG emissions intensity benchmark (including both Scope 1 and Scope 2 emissions) for the sector or sub-sector. Essentially, firms below the emissions intensity benchmark will be rewarded.

Calculation of the Z-factor and application of GHG emissions intensity benchmarks for different industrial sectors or sub-sectors will be specified in regulation. The development of this regulation will be done based on inputs received from the different industry associations or companies.

Carbon budget system allowance: Section 12

In recognition of the carbon budgets process being developed by DEA, an additional 5 per cent allowance, to companies participating in phase 1 of the carbon budget system, will be provided.

Offset allowance: Section 13

This section deals with tax-free allowances for entities that would like to purchase carbon offsets to reduce their tax liability. Carbon offsets are proposed to provide entities with additional flexibility to reduce their GHG emissions. Carbon offsets can be used by firms to reduce their carbon tax liability by 5 or 10 per cent of their total emissions.

Work is currently underway to finalise Regulations on the specifics of the proposed carbon offset mechanism.

Part III. Limitation of allowances

Limitation of allowances: Section 14

This section provides a limitation to the overall maximum tax-free allowances and allowances with respect to carbon offsets that an entity liable for the carbon tax may receive.

The overall maximum tax-free allowance (threshold) is limited to 95 per cent.

Part IV. Administration, tax period and payment of tax

Administration: Section 15

This section describes the administration procedures regarding the tax. The carbon tax will be collected by SARS and will be administered through the Customs and Excise Act, 1964.

Tax period: Section 16

This section describes the time period to which the tax applies.

Payment of tax: Section 17

This section specifies modalities regarding the payment of the tax.

Part V: Impermissible arrangements

Impermissible tax avoidance arrangements: Section 18

This section addresses avoidance of the carbon tax liability.

Part VI: Miscellaneous

Reporting: Section 19

This section specifies the type and frequency of reporting that the Commissioner must do to the Minister of Finance.

Regulations: Section 20

This section specifies complementary regulations to be introduced.

Amendment of laws: Section 21

This section specifies the extent of amendments to the Customs and Excise Act required in order for SARS to administer the carbon tax.

Short title and commencement: Section 22

This section specifies the commencement date of the tax.

SCHEDULE 1

Schedule 1 provides emission factors for energy combustion, process emissions and fugitive emissions as will be used for mandatory reporting requirements under the NAEIS system being developed by the DEA.

Table 1: Energy Combustion Emission factors

Calculating emission factors for energy combustion emissions

Energy combustion emissions are classified according to whether they emanate from a stationary or mobile source category and their emission factors also differ across these categories. For all combustion activities, the carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) GHG emissions are converted to a carbon dioxide equivalent (CO_2e) standard. The CO_2e is a measure used to compare the emissions from various GHGs based upon their global warming potential (GWP). The GWP is a relative measure of how much heat a GHG traps in the atmosphere i.e. it compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide. For example, according to the IPCC Third Assessment Report (TAR) the GWP over 100 years is 23 for methane, 296 for nitrous oxide and 1 for carbon dioxide. These GWP values are applied in this case because indications from DEA are that these are the values which have been agreed on with the industry. Thus each source category's various GHGs are standardized to a CO_2e as follows:

$$CO_2e \text{ emissions / terra joule} = CO_2 * 1 + CH_4 * 23 + N_2O * 296$$

The sum of the total carbon dioxide equivalent emissions/ terrajoule for each fuel type in the source category is then multiplied by the calorific value of the fuel type source category to derive the GHG carbon dioxide equivalent emission factor. This emission factor is then multiplied by the mass of fuel type within the source category to derive the amount of CO_2e emissions subject to the carbon tax.

Table 2: Fugitive Emission Factors

Calculating emission factors for fugitive emissions

Fugitive emissions for each source category activity are reported either as a mass per volume or volume per mass. For those reported as a mass per volume, the conversion to a CO_2e is straightforward as the reported mass per volume of each GHG is multiplied by its GWP (as highlighted above) to derive the CO_2e per volume which are then summed per activity to derive the total GHG CO_2e emission factor per volume of emissions. For source category activities reported as a volume per mass which is the underground coal mining, the volume per mass has to be converted to a mass by using a density factor. In South Africa, this applies to underground coal mining for which the industry developed its own South African specific emission factor. The density factor for methane for underground coal mining is $0.67 * 10^{-6}$ and this converts the methane into a mass which is then multiplied by the GWP to get a CO_2e emissions factor which is then used to calculate the carbon tax payable. For South Africa, there is no guidance on the density factor for CO_2 emissions so they are not included in calculating the underground coal mining fugitive emissions. Also, for surface coal mining, the DEA and industry have agreed that fugitive emissions are negligible hence they are treated as zero.

Table 3: Industrial Process and Product Use Emission Factors

Calculating emission factors for process emissions

Process emissions for each source category activity are reported in mass hence their conversion into a CO_2e is by multiplying the respective GHG by its GWP from the TAR as follows:

$$CO_2e \text{ emissions} = CO_2 * 1 + CH_4 * 23 + N_2O * 296 + C_2F_6 * 11\,900 + CF_4 * 5\,700 + SF_6 * 22\,200$$

With regards to hydroflourocarbons (HFCs) process emissions, these are currently not being measured by the DEA because they depend on how leakages are managed and these vary per installation and there is a wide range of them (currently no reporting threshold for HFCs). Hence for phase 1 of the carbon tax, these emissions will not be included in the process emissions calculation until such a time as when DEA can measure and monitor them.

SCHEDULE 2

The carbon tax will be calculated as per sectoral classification in Schedule 2. The classification reflects the IPCC classification and is aligned with mandatory reporting requirements under the DEA GHG inventory.

It may be difficult to administer the application of the carbon tax to the land-use, land-use change & forestry and waste sectors due to the inaccuracies, absence of appropriate measurement and verification procedures for GHG emissions. The land-use, land-use change & forestry and waste sectors will therefore be excluded during the first phase, largely due to administrative difficulties in measuring and verifying emissions from these sectors. The intention is to include them in the carbon tax regime after the first phase implementation period. However, if the land-use, land-use change & forestry and waste sectors produce emissions from fossil fuel combustion, such as from coal or liquid fuels, these emissions will be liable for carbon tax.

SCHEDULE 3

See notes on Clause 15 in the draft bill.