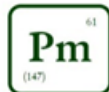


REPORT

DEMONSTRATION OF MARKET READINESS FOR CARBON OFFSET TRADING IN SOUTH AFRICA

29 JANUARY 2015

PROMETHIUM
C A R B O N



EXECUTIVE SUMMARY

This report summarises the outcome of a demonstration of market readiness for carbon offset trading, held at the JSE, on 29 January 2015. This demonstration took place within the context of the provision for carbon offsets to be used in both the announced South African carbon tax system and the announced carbon budgeting system.

The demonstration of market readiness is the culmination of a three year research project executed by Promethium Carbon in close cooperation with the JSE (trading platform), Silocerts (commodities registry) and Done Technologies (technology provider to the registry).

The objective of the project was to investigate the applicability of existing South African commercial and financial infrastructure for use as a carbon trading platform.

The demonstration consisted of performing actual trades of carbon credits from a wide variety of standards (CDM, VCS, GS) on an over-the-counter (OTC) basis. These trades were then mirrored in a test environment on the electronic platforms of the JSE and Silocerts.

The execution of the demonstration showed that full commoditisation of carbon from a variety of international standards is possible, and that the commoditised credits can be traded on a common platform. This means that carbon offset credits, as contemplated by the South African Government, can be traded in the country's existing infrastructure.

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1 INTRODUCTION

This report describes the demonstration of market readiness for the trading of carbon offsets within the context of the proposed carbon tax and carbon budgeting systems in South Africa. It was the final step of a larger project to investigate the design of a South African carbon offset trading system.

The demonstration of market readiness was presented on 29 January 2015 at an event held at the JSE in Johannesburg. The demonstration can be seen in the context of the potential carbon tax and carbon budget as shown below:

Table 1: Context of the market readiness demonstration

	Proposed carbon offset trading system	Demonstration on 29 January
Commodity traded	Carbon offset as defined in the carbon tax or carbon budget system	Voluntary offsets used by SA businesses
Institutional arrangements	ISO accredited auditors, listing entity, registry (Silocerts) and trading platform (the JSE)	Registry (Silocerts) and trading platform (the JSE)
Market participants	Companies owning SA generated credits, traders and companies with carbon obligations under either the carbon tax or the carbon budget system	Companies owning SA generated credits, traders and companies

The demonstration mirrored actual trades for two reasons. The first reason was that the value of the carbon offset credits in South Africa will be created when the carbon tax and/or the carbon budget legislation are promulgated. Until such time, the commodities have no value in the regulatory sphere. The credits do however have a real value in the voluntary market where the demonstration took place. The second reason was that only offsets from specific project types will be eligible to be traded in the South African compliance regime. As the rule stipulating the eligibility criteria is still unknown, the commodities

that would be eligible as offsets could not be created.

In order to overcome these two barriers, the following approach was followed:

- 1) A number of prominent South African companies were asked to trade credits on a voluntary basis.
 - a. The sellers offered credits generated by projects inside South Africa that could potentially comply with the national eligibility criteria.
 - b. The buyers bought the credits to use as offsets in voluntary offset initiatives for a variety of corporate activities.

- 2) The market participants agreed to provide the demonstration project team with information about the trades. The demonstration project team then performed the trades on the infrastructure platform, described in this report, in a test environment.
- 3) The results of testing the trades on the actual Silocerts and JSE platforms were then presented to illustrate the readiness of the platforms to trade carbon offset credits for compliance purposes in SA.

The demonstration of market readiness was the culmination of three years of work conducted by Promethium Carbon in cooperation with the JSE, Silocerts and Done Technologies. The programme was funded by the British High Commission in Pretoria, through the Prosperity Fund. The work done in this programme is summarised in the following reports¹:

- Initial Framework for Carbon Offset Opportunities and Verification Options - April 2013;
- Interim Report Carbon Trading in South Africa: Trading Offsets Against the Proposed Carbon Tax - October 2013;
- Carbon Trading in South Africa: Trading Offsets Against the Proposed Carbon Tax - March 2014;

- Potential Alignment between the Proposed South African Carbon Offset Trading Scheme and the Carbon Budget Approach - September 2014;
- Supply and Demand Modelling in the Proposed South African Carbon Offset Scheme - September 2014

In addition to the above reports, the system was demonstrated to both National Treasury and the DNA during sessions held in November 2014.

The outcomes of this research are confirmation that the commercial and regulatory infrastructure exists to allow carbon to be traded in South Africa, as well as for the trading system to be made operational within the same timeframe as the proposed carbon tax. The available infrastructure is sufficient to:

- Guarantee the environmental integrity of the offset system;
- Guarantee the national appropriateness of the offsets within the context of the proposed South African carbon tax system; and
- Guarantee the financial integrity of the trading system.

¹ The reports were compiled by Promethium Carbon and are available for download at http://promethium.co.za/knowledge-center/?category_ids%5B%5D=6

2 BACKGROUND TO THE MARKET READINESS DEMONSTRATION

2.1 System Integrity Requirements

The work carried out by Promethium Carbon in the run-up to the demonstration, indicated that the creation of a domestic market should be done in a context where

the environmental integrity, national appropriateness and financial integrity of the system can be guaranteed. This is illustrated in the diagram below:



Figure 1: System integrity requirements

The proposed trading system addresses the integrity concerns through the optimal use of existing infrastructure. This is described below and indicated in the diagram below:

- 1) **Environmental Integrity:** The environmental integrity is guaranteed in the proposed trading system by utilising existing, credible international standards, which are used in the calculation of carbon credits. These standards have been proven over time to stand the test of environmental integrity.

It is proposed that the South African system contains a set of criteria according to which the standards can be tested, before credits from proposed

standards can be considered eligible to be traded in the system. The National Treasury has indicated in the Carbon Offset Paper that credits from the Clean Development Mechanism (CDM) of the UNFCCC, the Verified carbon Standard (VCS), the Gold Standard (GS) and the Climate, Community & Biodiversity Alliance (CCBA) may be considered eligible to be used in South Africa.

- 2) **National Appropriateness:** The term National Appropriateness is used referring to credits that meet the eligibility criteria, of the South African Government, with respect to the proposed carbon tax and carbon budget legislation. Although the final rules for

national appropriateness have not yet been published, indications are that they will include issues such as the country of origin (only credits generated within the boundaries of South Africa), the position relative to the tax net (only credits generated outside of the tax net) and the access to other government incentives (credits from subsidised projects to be excluded). It must be noted that industry has proposed significant changes to the indicated rules but no indication has been received from National Treasury with respect to how the rules could be modified. It is proposed that auditors accredited by the South African National Accreditation System (SANAS) under ISO 14065, or the Designated National Authority (DNA) fulfil the task of checking the national appropriateness of credits to be traded in the system.

3) **Financial Integrity:** The financial integrity of the system requires that the system must be free from fraud and theft. It is proposed that this can best be achieved by using the existing South African commodities trading system. This system includes Silocerts (the private sector commodities registry in South Africa), and the JSE. Both these institutions have proven their integrity over a long period of time. The financial integrity of the credits in the system is guaranteed through the administrative procedure performed by a listing entity as described in 2.2.1 below.

The institutional arrangements required to guarantee the different levels of integrity within the system are illustrated below:



Figure 2: Proposed market role players to guarantee the system integrity

2.2 Proposed Mechanism for Carbon Offset Trading

The proposed mechanism described below was the outcome of three years’ worth of investigation by Promethium Carbon, the JSE and Done Technologies (the Silocerts technology provider). It covers the listing

of credits, trading of credits, change of ownership and cancellation of credits after a trade has taken place.

2.2.1 Listing of Carbon Offsets in the South African Registry

We propose that the listing of carbon offset credits be done as shown below:

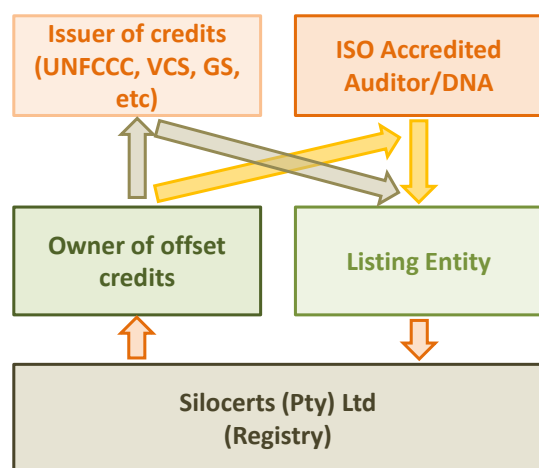


Figure 3: Mechanism of proposed trading system

The proposed mechanism of listing was modelled on the mechanism developed for the linkage of the Australian and European carbon markets. It relies on the cancellation of a credit in the one registry and subsequent issuance of the credit in the other registry. The South African system includes an additional step to ensure the national appropriateness of the credits for the South African carbon tax or carbon budgeting system:

- 1) **Step1 - Cancellation of credits in the registry of origin:** The owner of the offset credits gives instruction to the registry of origin (such as the CDM or VCS) to cancel the credits. The proof of cancellation is then supplied to the listing entity.
- 2) **Step 2 – National Appropriateness:** The owner of the offset credits supplies

information about the project from which the credits were generated to the ISO 14065 accredited auditor or the DNA, who in turn supplies a letter confirming that the criteria for eligibility of the credits have been met. This letter is then provided to the listing entity.

- 3) **Step 3 – Listing in the registry:** The listing entity lists the offset credits in the registry based on the proof of cancellation in the registry of origin and the letter of proof of compliance with the national eligibility criteria. The owner of the offset credits can now trade with the credits.

The integrity of the proposed system rests on the three steps listed above. It is important to understand that the registry does not assume responsibility for the integrity of the credits. This is guaranteed by the administrative process preceding the listing, in which the environmental integrity and national appropriateness is checked. The role of the listing entity is described in Section 3.5.

2.2.2 Trading

Once the carbon offsets are listed in the registry, there are a number of options available to the owner:

- a) The credits can be kept and used against the owner's carbon tax or carbon budget obligations;
- b) The credits can be traded in an over-the-counter (OTC) trade; or
- c) The credits can be traded on the JSE.

The systems for each of these options are well established and available for use by market participants if they choose to do so.

2.2.3 Change of ownership in the registry

The process to change ownership of the carbon credits in the registry is as follows:

- a) Both the buyer and the seller must have an account in the registry;
- b) The seller logs into their account and offers the credits being transferred to the buyer on an offer-out basis;
- c) The buyer logs into their account and accepts the offer on an offer-in

basis within the specified period of time.

- d) The credits are then transferred from the seller's account to the buyer's account.

2.2.4 Cancellation of the credits

The ultimate purpose of the carbon offset trading system is for the credits to be cancelled. This can simply be done by issuing a request for cancellation to the registry. In practice this will probably only be done by Government agencies such as SARS in the case of the carbon tax or the Department of Environmental Affairs in the case of carbon the carbon budgets.

3 DEMONSTRATION OF MARKET READINESS

3.1 Description of the Market Readiness Demonstration

The demonstration of market readiness took place within the context of a number of restrictions:

- **Restrictions on carbon offsets:** The demonstration was aimed at showing that carbon credits can be traded in South Africa should the regulatory environment with respect to the carbon tax and the carbon budgeting system develop to require it. The fact that the legislative actions required to allocate value to carbon as an offset instrument in South Africa have not yet been promulgated, means that the offsets

traded in this demonstration, do not have any value in the compliance offset market. However, the participants in the demonstration felt that the value of the carbon credits in the voluntary offset space was sufficient to justify the trades. The demonstration trades were therefore real commercial transactions, but with the value created in the voluntary market.

- **Restrictions of the registry:** The accounts for the participants (buyers, sellers and administrator) were opened in a test environment on the registry. This means that these accounts cannot

be used to trade carbon credits for any other purpose than for this demonstration of market readiness.

- **Restrictions on the trading platform:** The restrictions of carbon offsets with respect to fact that the legislative framework for the creation of a carbon offset instrument for the compliance market described above apply to the JSE as well. In the case of the JSE all products traded on the market must be approved by the JSE’s regulator, the Financial Services Board. This approval could not be obtained due to the lack of legislative framework.

Within the context of the above restrictions, the demonstration took place as follows:

- **Commodity traded:** Carbon offset credits that were already issued by one of the standards mentioned by the National Treasury in the Carbon Offset Paper (CDM, VCS, Gold Standard, etc.), and came from projects implemented inside South Africa, were traded. The credits were used for the voluntary offset of certain corporate activities in the normal course of business of the buyers.
- **Nature of the trades:** The trades were executed on an over-the-counter (OTC) basis.
- **Demonstration of market readiness:** All trades were mirrored in a test environment in both Silocerts and the JSE, to show how these trades would have looked in the event that they were performed live on these two platforms.

3.2 Demonstration market participants

The participants in the demonstration of market readiness on 29 January 2015 were:

Table 2: Summary of trades

Seller	Buyer	Standard	Volume	Price
Climate Neutral Group	Sanlam & Sanlam Cape Town Marathon	CDM, VCS & GS	Total volume of 873 tonnes	Average price of R110 per ton
Statkraft (credits from Corobrik Lawley)	Harmony Gold	CDM	20	Price not disclosed
Sibanye Gold	Nedbank	CDM	9 643	Price not disclosed
Sappi	Backsberg	CDM	240	R50 per ton

The selection of market participants for the demonstration covered:

- Carbon credits generated by using a range of standards including CDM, VCS and GS. The aim was to indicate that the variety of standards mentioned in the Carbon Offset Paper can be accommodated on a single platform;
- Carbon credits from a range of project types, to indicate that

different project types can be accommodated on a single platform; and

- A range of participants including project owners, banks and carbon traders, to indicate that the different players can be accommodated on a single platform.

A number of other companies ranging from project owners to large emitters also expressed their wish to participate in the demonstration.

3.3 Trading Platform

The JSE has been active in trading commodities in South Africa for two decades. The JSE's historical timeline is highlighted below:

- The commodity derivatives market was established in 1995 due to the deregulation of the grains market by South African Government. The creation of the market introduced a number of physically settled agricultural products;
- Physical delivery of commodities is facilitated via a system of warehouse receipts;
- The commodities exchange established its own clearing house to guarantee all transactions;
- The commodities exchange was bought out by the Johannesburg Stock Exchange (JSE) in 2001;

- The JSE established a currency derivatives market trading major currency pairs in 2007;
- In 2009, cash settled commodity products traded under license from the CME Group (corn, soybean complex, SRW, HRW, crude oil and metals), were introduced;
- The following commodity products are currently being traded by the JSE:
 - Physically deliverable agricultural products (white and yellow maize, wheat, soya beans, sunflower seeds and sorghum)
 - Cash settled commodity products (crude oil, gold, platinum, copper, silver, corn, soybeans, sugar, cotton, coffee, cocoa and natural gas)
- In 2014, all product areas were consolidated under a single business unit called Capital Markets to further enable cross market evolution.

The structure of the JSE commodities market is shown in the figure below. This

market structure is 100% applicable to the trade of carbon offset credits.

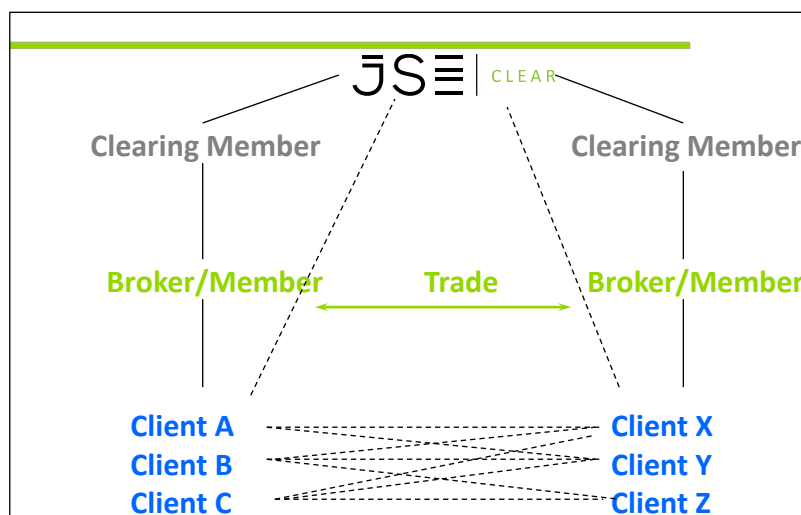


Figure 4: The structure of the JSE commodities market

The proposed platform to trade carbon offset credits, relying on existing technology and market structure, can be integrated with the JSE’s existing systems. This has been done in the demonstration of market readiness in the following ways:

- Silocerts provided the carbon registry;
- JSE Commodities introduced a standard carbon credit contract (in a test environment) where 1 contract = 1 ton of CO₂ equivalent. This contract was referenced as CRBN, a shortened version for carbon;
- JSE derivatives trading and clearing platform performed the trading and settlement of the transactions in a test environment.

The demonstration of market readiness showed that detailed trading rules and contract specifications will be required in

order to support the live trading of carbon offset credits.

The mechanics of the trade on the JSE are:

- Following a willing buyer-willing seller agreement to trade, the trade is submitted for settlement;
- “Delivery Notice” generated to determine the settlement amount due to the seller;
- “Assignment Notice” generated to provide the buyer with an invoice to confirm the amount due;
- Messages generated to send instructions to Silocerts to transfer ownership of the carbon credit as represented by the receipt.

A number of screen shots from the mirroring of the OTC trades in the JSE test environment are shown below:

Instrument	QtyB	Bid / Offer	QtyO	Change	Last	Time	High	Low	Volume	OpenInt
27 FEB15 CRBN	9	81.00 / 83.00	9	1.00	81.00	10:13	81.00	81.00	1	1

Memb	QtyB	Bid / Offer	QtyO	Memb
X	9	81.00 / 83.00	9	NEDM
X	10	79.00 / 84.00	9	SAFM
	0	0 / 0	0	
	0	0 / 0	0	
	0	0 / 0	0	
	0	0 / 0	0	
	0	0 / 0	0	

Figure 5: Screen shots from the JSE test environment

The outcome of the work done on the JSE highlighted the following requirements:

- The JSE will require clarification around how carbon credits will be classified and if the credits will fall within the ambit of a “security” as referenced in the Financial Markets Act before proceeding to list such; and
- It was confirmed that the integrity of the entire system relies on the validity of the carbon credits listed in the registry.

3.4 Registry

Silocerts is the registry for all commodity trades on the JSE. The Silocerts registry is administered by the Exordia Division of PricewaterhouseCoopers, independently of any industry player. The registry provides for the full life cycle of the electronic certificates representing a carbon credit.

This includes listing, transfer of ownership and cancellation.

The screen shots below shows the mirroring of the listing and transfer of ownership of the carbon credits that were traded in the demonstration:

Certificate Management System
APPROVAL OF QUEUED CERTIFICATES

Home | Create Cert | Manage Certificate | Reporting | Approval | Safex Split | Logout

Certificate Number	Certificate Type	Product	Grade	Site	Tonnage	Issued To	Issued To (Site Acct)	Date Issued	Issued By
877011	Safex Compliant Certificate	CRBN	SACER	Bryanston Office	20	Statkraft	PRM0002	2015-01-28	Promethium Carbon
877012	Safex Compliant Certificate	CRBN	SACER	Bryanston Office	9469	Sibanye Gold	PRM0001	2015-01-28	Promethium Carbon
877013	Safex Compliant Certificate	CRBN	SACER	Bryanston Office	50	Climate Neutral Group	PRM0003	2015-01-28	Promethium Carbon
877014	Safex Compliant Certificate	CRBN	SACER	Bryanston Office	823	Climate Neutral Group	PRM0003	2015-01-28	Promethium Carbon
877015	Safex Compliant Certificate	CRBN	SACER	Bryanston Office	240	Sappi	PRM0004	2015-01-28	Promethium Carbon

Approve Certificates | Reject Certificates | Amend Certificates

ESC Electronic Site Certificates

Welcome: Statkraft
Managing certificates for: Statkraft
User: statkraft001 - The last time you logged on was: Jan 28 2015 1:30PM

My Certificates
Transfer Out
Modify transfer
Transfer In
Release
Licences/Incentives
Show others
See others
Certificate history

Total Certificates: 1
Selected: 1

My certificates

Certificate #	Type	Site Owner	Site	Product	Grade	Quantity	Units	Portfolio
877011	Safex Compliant Certificate	Promethium Carbon	Bryanston Office	CRBN	SACER	20 000	(No/Yes)	

Transfers out

ESC Electronic Site Certificates

Welcome: Harmony
Managing certificates for: Harmony
User: harmony001 - The last time you logged on was: Jan 28 2015 1:46PM

My Certificates
Transfer Out
Modify transfer
Transfer In
Release
Licences/Incentives
Show others
See others
Certificate history

Total Certificates: 1
Selected: 1

My certificates

Certificate #	Type	Site Owner	Site	Product	Grade	Quantity	Units	Portfolio
877011	Safex Compliant Certificate	Promethium Carbon	Bryanston Office	CRBN	SACER	20 000	(No/Yes)	None/Gas

Transfers out

ESC Electronic Site Certificates

Welcome: Harmony
Managing certificates for: Harmony
User: harmony001 - The last time you logged on was: Jan 28 2015 1:58PM

CERTIFICATES ON OFFER TO ME

Back | Exit

TRANSACTION REFERENCE: 80724 | TONNAGE: 20 000 | TYPE: TRANSFER | DIFFER PERIOD: 72 HOURS | OFFER EXPIRES: 2015-01-29 14:00:15

Certificate #	Product	Grade	Quantity	Type	Shipment paid to
877011	CRBN	SACER	20 000	Safex Compliant Certificate	2015/12/01 12:00:00 AM

Figure 6: Examples of screen shots from test environment

3.5 Listing entity

The role of the listing entity in the proposed structure is to ensure that the integrity of the listed credits is guaranteed. This will be achieved through an administrative process, where the environmental integrity will be

checked by ensuring that the credits were listed in an acceptable registry of origin and that a competent authority has audited the national appropriateness of the credits. This process is illustrated in the diagram below:

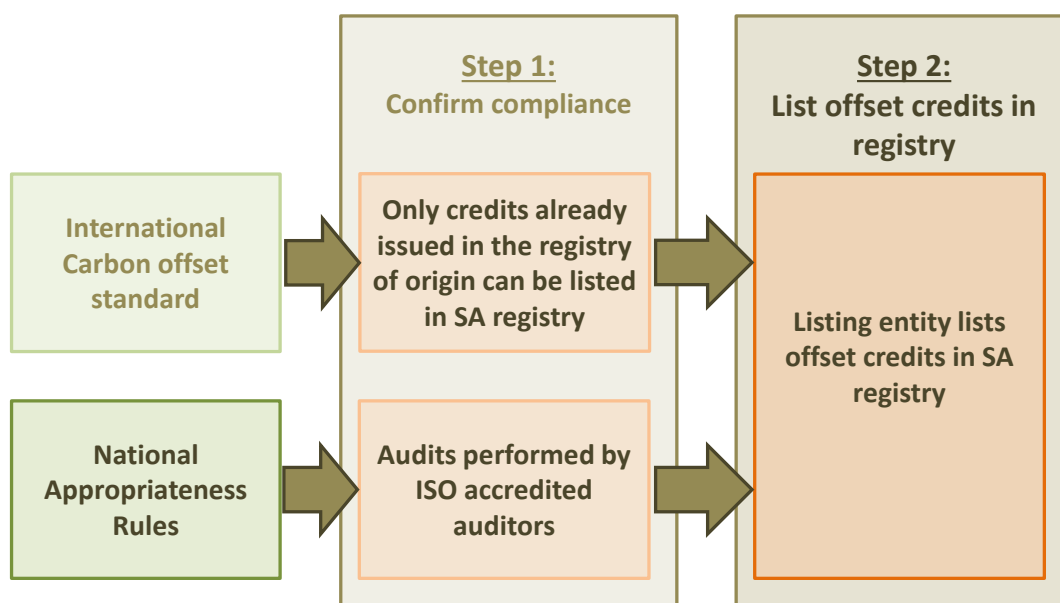


Figure 7: Process to guarantee the integrity of the listing of carbon offset credits

The listing entity’s role is mainly administrative. The listing entity receives authority to list carbon offset credits in the registry by entering into an agreement with Silocerts. Such an agreement was developed as part of the demonstration of market readiness in order to understand all the issues that are important when the system is implemented. This draft agreement was based on the existing agreement with listing entities in the commodities market and established the following:

- The listing entity gains access to the registry database, as the administrator of carbon offsets, through this agreement;
- The listing entity has to comply with a set of minimum requirements, with respect to its governance structures and administrative capabilities before it can act as listing entity;
- The listing entity has to ensure that only credits that comply with the regulatory

requirements of the South African Government (carbon tax and/or carbon budget) are listed in the South African registry. This includes:

- Confirmation that the credits were issued in the registry of origin and that the cancellation has been achieved and no double counting can occur
- Confirmation that the project in which the credits were generated complies with the eligibility criteria for national appropriateness.

The existing commodities market operates with a number of silo operators acting as listing entities for traded commodities. It is therefore recommended that the role of the listing entity is not given to a single entity, but that organisations who comply with the minimum requirements may act as listing entities. This will ensure a competitive environment and help to promote competitive prices and market efficiency.

3.6 Possible roles for the DNA

Both National Treasury and the DNA have expressed the view that the DNA should play a central role in the carbon offset scheme. Depending on the role, significant capacity building should be done. The current role of the DNA relates only to the evaluation of the adherence of CDM projects to the sustainable development criteria of South Africa. The DNA is not currently involved in the evaluation of the emission reduction estimation or evaluation of the applicability of methodologies.

There are 3 possible roles for the DNA within the structure of the proposed trading system:

- **The custodian of the rules for national appropriateness:** It is highly likely that the rules for national appropriateness will change over time. As such we believe that the indications given by National Treasury are a starting point. It is also important to note that, within the context of the South African process of inclusive regulatory development, role players

such as business and civil society will be given inputs in the development and ongoing refinement of the rules. It is within this context that we believe that the best entity to act as chair of the committee, that is the custodian of the rules of national appropriateness, is the DNA.

- **Auditing of project for national appropriateness:** The Carbon Offset Paper hints that the DNA should act as the auditor of the projects in terms of national appropriateness, prior to offset credits being listed in the South African registry. We believe that this will place the DNA in the role of being both player and referee, and that this could compromise the integrity of the market.
- **Listing entity:** The DNA could potentially act as listing entity, but this will also create a position where they are player and referee.

The options for the three possible roles listed above for the DNA are shown in the diagram below:

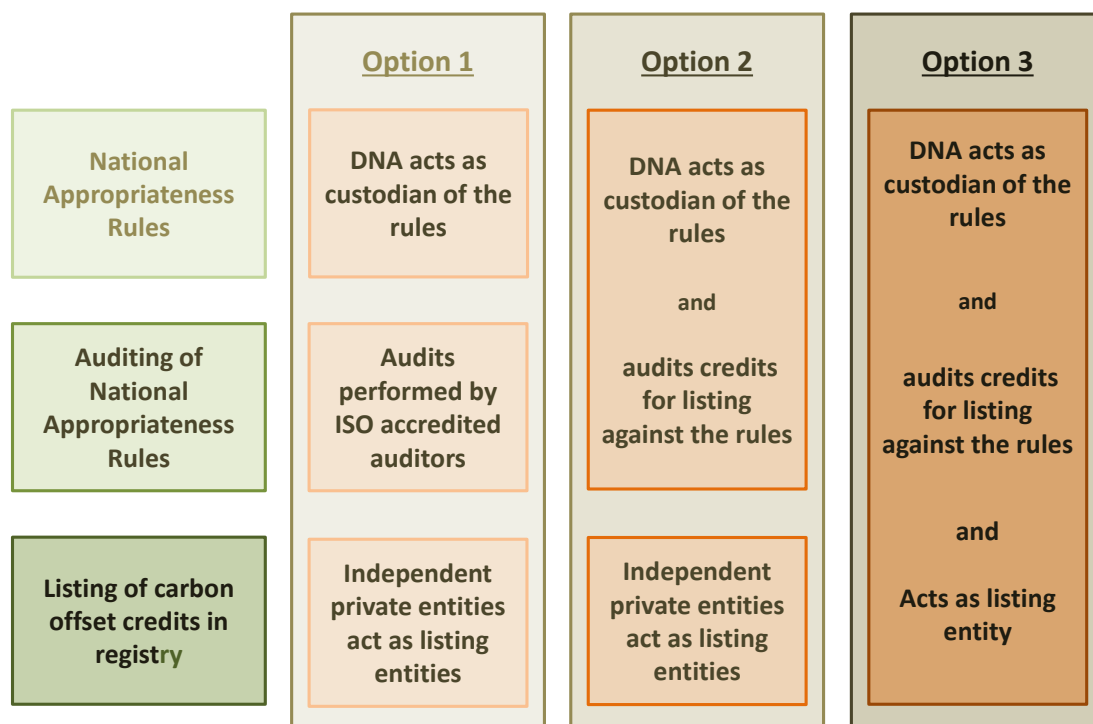


Figure 8: Possible roles of the DNA

4 CONCLUSION

The following outcomes have been achieved by carrying out the demonstration of market readiness:

- 1) Full commoditisation of carbon offsets is possible, irrespective of the international standard on which it was registered or the nature of the project in which it was created. This demonstration of market readiness has shown that credits, from both the CDM and the VCS, ranging from community based to industrial projects

can be commoditised and traded on a single platform;

- 2) South Africa's private sector commodities registry, Silocerts, can successfully host carbon offset credits as a new commodity;
- 3) The JSE can successfully trade carbon offset credits as a new commodity under the condition that, the regulatory environment of the compliance criteria is in place;
- 4) The South African market participants, buyers and sellers, are eager to participate in the market.