PROMETHIUM CARBON

Development of a South African carbon offset trading standard under the proposed carbon tax for domestic based on Renewable Energy Certificates (RECs)

May 2015

EXECUTIVE SUMMARY

The South African Government proposes a unique carbon tax and offset scheme. This tax includes a mechanism whereby tax payers can reduce their tax obligation by using carbon offsets. The tax is introduced at a time that the country faces an energy crisis in the form a severely constrained electricity generation network. Within the context of both the proposed carbon tax as well as the energy security crisis there is potential to maximise existing mechanisms to alleviate the energy crisis and reduce emissions as per the objectives of the carbon tax.

This can be done in line with the growing need for localized, small-scale energy solutions which is supported by South Africa's Renewable Energy Certificate (REC) platform. RECs is an ideal tool to significantly support and diversify the South African green economy. The same is true for carbon offsets.

The context of this report relates to the documentation that is in the public domain mid-2015, especially the National Treasury Carbon Offsets Paper April 2014 which specifically mentions a *"The development of a South African-specific carbon offsets standard could be considered in the medium term to facilitate cost-effective development of domestic carbon offsets. "*

Both the South African REC market and the potential carbon offset market face unique challenges. The challenge in the REC market is the lack of demand that leads to low volume and low prices. The challenge in the carbon offset market is the high transaction cost that makes it impossible for small projects to access the market.

This report analyses the possibility of converting RECs to carbon offsets in a system that maintains the integrity of the carbon offsets.

The proposed tax offset design already includes CDM, VCS and Gold Standards credits and adding converted RECs would add value and strengthen the proposed system. The RECs is a scheme that incentivises renewable energy installers. If RECs can be converted into a credible carbon offset credit the current REC initiative can be scaled up, thereby supporting green growth.

By selecting small scale renewable energy projects types with no project emissions or leakage calculations (automatic additionality under the CDM) these RECs could be converted through the application of the standardised grid emission factor (UNFCCC approved standardised grid emissions factors) into a credible carbon offset credit.

In theory it is possible and a pilot would demonstrate the practicality thereof. Stakeholders for such a pilot have already been identified.

This report was made possible with the financial support of the British High Commission in South Africa

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

The South African Government plans to introduce a carbon tax in 2016. This tax includes a mechanism whereby tax payers can reduce their tax obligation by using carbon offsets. The tax comes at a time that the country faces an energy crisis in the form a severely constrained electricity generation network. Within the context of both the proposed carbon tax as well as the energy security crisis there is potential to maximise existing mechanisms to alleviate the energy crisis and reduce emissions as per the objectives of the carbon tax.

This can be done in line with the growing need for localized, small-scale energy solutions which is supported by South Africa's Renewable Energy Certificate (REC) platform. RECs is an ideal tool to significantly support and diversify the South African green economy. The same is true for carbon offsets.

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Both the South African REC market and the potential carbon offset market face unique challenges. The challenge in the REC market is the lack of demand that leads to low volume and low prices. The challenge in the carbon offset market is the high transaction cost that makes it impossible for small projects to access the market.

This report analyses the possibility of converting RECs to carbon offsets. If this can be achieved, the challenges faced by the REC and carbon offset markets mentioned above can be solved in a single step. The current REC initiative can be scaled up as an affordable local standard while the transaction cost associated with the generation of carbon offsets can be significantly reduced in a system that maintains the integrity of the carbon offsets.

2. CARBON TAX AND OFFSETS IN SOUTH AFRICA

The Climate Change Response White Paper makes provision for both carbon tax and offsets to be developed in the journey towards a low carbon, climate resilient South Africa. Government has indicated that the proposed carbon tax will be implemented by mid-2016. The proposed tax will have an associated offset component written into the regulations, making it a unique tax-and-trade scheme. The starting level of carbon tax at R120 per ton CO_2 is favourable to incentivise offset providers to develop new emission reduction projects[1]. Under the current carbon tax design 5-10% of the carbon tax liability can be offset through the purchasing of offset credits using four main schemes (CDM, VCS, GS and CCBA). These schemes were selected to guarantee the integrity of the offsets generated. The relative high transaction costs associated

[1] http://www.treasury.gov.za/

with these schemes make them more applicable to large projects (projects reducing more than 5 000 tCO_2 per annum) than to small ones.

The Carbon Tax Policy Paper makes provision for the development of a South African carbon offset standard. The development of such a standard will only make sense if it can contribute benefits that overcome some of the limitations of the existing standards.

Experience in jurisdictions like Europe, California, Australia and China have shown that the development of a new standard can be onerous and take many years. It is within this context that the design of a wholly new scheme appears to be impractical and very costly. The opportunity does however exist to create a new scheme that could achieve the following:

- Utilised well developed components of existing schemes. This will guarantee the integrity of the system.
- Combine the elements of existing schemes in such a way that it reduces the barriers faced by small scale projects and give them access to the developing South African offset market.

Climate Change Response White Paper

"….Carbon markets are mechanisms for exchanging emission reductions between entities, thereby optimising efficiency and minimising cost in controlling pollution levels. They include both cap-and-trade mechanisms (in which mandatory limitations on emissions create markets in which polluters trade emissions allowances) and offset schemes where actors voluntarily pay compensation for emissions. In respect of carbon markets, the National Treasury will investigate the feasibility of an emissions trading scheme as a medium- to long-term response to climate change"….

3. RENEWABLE ENERGY GENERATION IN SOUTH AFRICA

Renewable energy sources have an important role to play in an energy portfolio that supports the achievement of socio-economic development objectives and energy security. Technologies such as wind, solar, hydro and bioenergy can be used alongside conventional fossil fuel processes.

The development of the renewable energy industry in South Africa has been dominated by the Renewable Energy Independent Power Producer Procurement Programme (REIPPP), which commenced in 2011. REIPPPP enables private sector investment and expertise into large scale grid-connected renewable energy in South Africa. The Programme has completed four bidding rounds. At the end of the third round 64 projects have been awarded to a wide range of private sector developers. Substantial private sector capital has been committed and the projects will generate in total 3922 megawatt (MW) of renewable power[2]. The results of the fourth round were announced on 16 April 2015. The fifth round will be launched in the second quarter of 2016.

[2] South Africa's Renewable Energy IPP Procurement Programme: Success Factors and Lessons, A. Eberhard (UCT); J. Kolker (World Bank Institute) & J. Leigland (Private Infrastructure Development Group); 2014.

The REIPPP process makes provision for large scale and small scale projects. Small scale projects are defined as projects below 5MW. The first round for small scale projects closed in March 2014, and the second round has not yet started.

Small scale renewable energy projects provide a dynamic platform which could be used to address the rising energy crisis within South Africa whilst simultaneously addressing a number of the issues mentioned above. The following table provides an overview of the socio-economic benefit of small scale renewable energy projects:

Table 1: The socio-economic potential of small-scale renewable energy projects

MAIN CHALLENGE AS PER the NATIONAL DEVELOPMENT PLAN DIAGNOSTIC REPORT	THE POTENTIAL OF SMALL SCALE RENEWABLE ENERGY PROJECTS
Too few people work.	Small scale renewable energy project could create a source of employment not only for the manufacturers, but also for installers, distributors and operators. Additional business opportunities could be developed for those who stock spare parts and sell raw materials. Rural communities can also build up an export market to neighbouring regions.
Infrastructure is poorly located, under-maintained and insufficient to foster higher growth.	Small scale projects offer opportunities to implement and distribute energy generation capacity. This will overcome grid constraints in rural and supply-constrained areas. Local economic benefits resulting from distributed generation include business and job creation opportunities related to construction, operation, maintenance and raw material supply.
Spatial patterns exclude the poor from the fruits of development.	Smaller scale projects are practical to implement in rural and peripheral areas. This is due to a wide range of factors such as the fact that large organisations with mega-finance are not required for such projects, and they can be developed by local people or enterprise on a level that is appropriate for each community. In addition, small scale projects have compact project footprint and can optimally utilise locally available resources. The development of rural small scale renewable energy projects will enable service delivery to areas in need which are not part of urban and established grids.
The economy is overly and unsustainably resource intensive.	An increase in the uptake of small scale renewable energy projects will have a positive impact by reducing the resource intensiveness of the South African economy. Positive impacts will be seen in relation to the use of financial resources (small business can be active and will not require large scale financial support), infrastructure resources (distributed generation will alleviate grid pressure and defer capacity upgrades) and fossil fuel resource reliance (remaining fossil capacity must be allocated to energising the sustainable energy transition).

Access to sustainable and affordable energy services is a crucial factor in reducing poverty in South Africa. In particular, small-scale and community-based renewable energy projects are recognized as important forms of development assistance for upliftment of the energy poor.

The NDP is not the only strategic document which highlights the need and the relevance of renewable energy projects within the context of socio-economic development. Globally the Millennium Development Goals (MDGs) drives a number of initiatives.

4. RENEWABLE ENERGY CERTIFICATES (RECS)

4.1. The South African RECs market

Renewable Energy Certificates (RECs) is a voluntary tradable commodity. A REC is a certificate that indicates the generation of one megawatt hour (MWh) of electricity from an eligible source of renewable power. Each REC denotes the underlying generation source, location of generation, and year of generation. REC activity in RSA [3] started in 2002 during the Johannesburg-based World Summit on Sustainable Development (WSSD). zaRECs (Pty) Ltd. administers the South African voluntary REC market along the lines of the European Energy Certificate System (EECS) specifications on behalf of members of the voluntary Renewable Energy Certificate South Africa market participant's association (RECSA) (NPO 096-079). To date 133 775 MWh have been issued (uniquely identified). There are approximately 100 active market participants in this voluntary market association. Certificates are readily available from rural PV, bagasse and hydro renewable energy facilities. The administration cost associated with a REC is significantly less than that of other international carbon credit schemes.

4.2. International REC markets

RECs emerged in the United States in the late 1990s as a compliance mechanism under state-level Renewable Portfolio Standards (RPS). The idea of using certificates for verifying and stimulating renewable energy then spread quickly to other countries and regions. The flexibility of these certificates, as they can be sold separately from the physical electricity, has allowed for the promotion of off-grid renewable energy generators in Australia and the creation of regional REC markets in North America and Europe.[4]

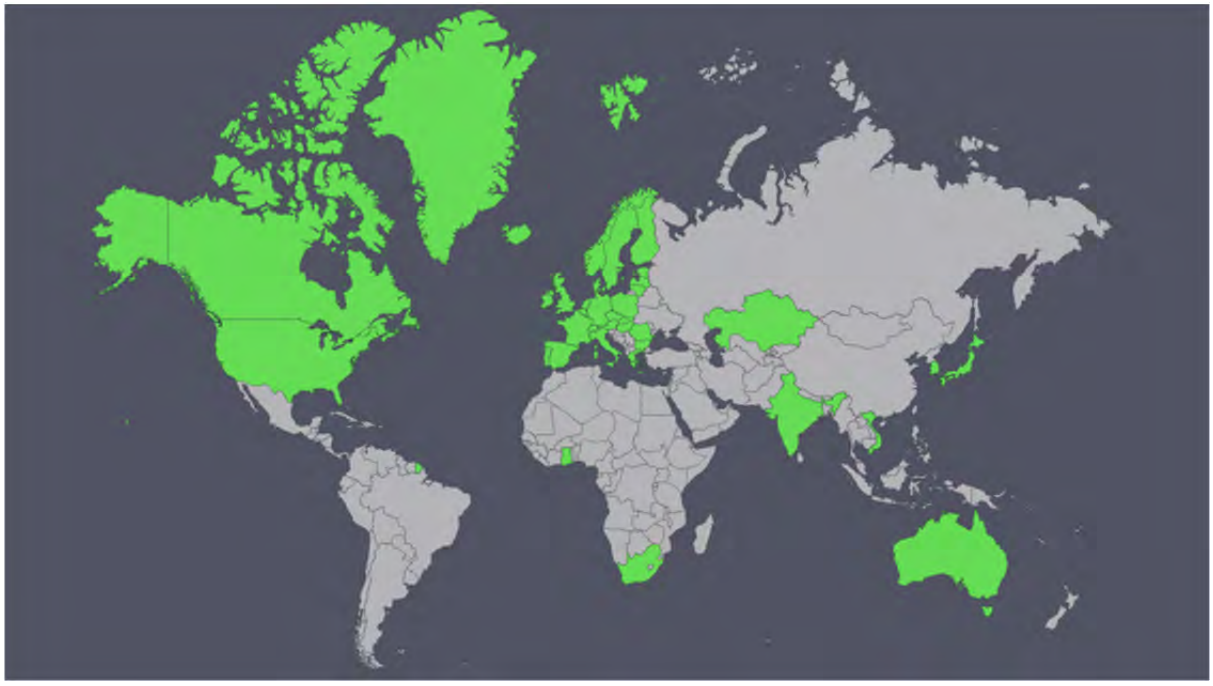
REC markets are internationally supported through different means. Some markets are maintained by imposing quota obligations on suitable entities in society, such as power utilities. This affects the demand and it generally results in higher certificate prices than under voluntary markets. However, it depends on the design of the scheme and the specific renewable energy source. For instance, RECs from solar typically transact at higher prices than RECs from other resource types. But the prices can be difficult to determine without the assistance of brokers, and

[3] http://www.zarecs.co.za/
[4] In Europe they are called Guarantees of Origin

even then, available information only indicates the transactions made by these brokers. Prices can vary considerably depending on marketing mechanisms and strategies. Under the voluntary market the prices cannot go higher than what consumers are willing to pay for the attributes connected to the certificates. This means that off-grid generators in rural poor areas, where socio-economic benefits can also be attributed to the certificates, most likely are valued at higher prices than RECs from utility-scale generators.

The experience of using RECs for communicating environmental sound practices under voluntary markets in developed countries have spurred the industries' interest of REC markets also in emerging economies. This is reinforced by initiatives such as the GHG Scope 2 document and the RE100 companies.[5] International businesses increasingly demand reliable and robust renewable energy options also in these parts of the world. A newly established international REC (I-REC) standard has been developed in order to facilitate such trade and ensure the environmental integrity of the RECs.[6] As with other voluntary REC markets, the certificate prices under the I-REC scheme depends on energy sources and the willingness of consumers to pay for the attributes associated with the certificates. The price levels are therefore determined by the marketing of these attributes. This would therefore also apply in the South African REC market if it is linked to the I-REC scheme.

Map of REC markets



Based on the REN21 interactive map and supplementing research. This map however only include countries with official policy support.

Saved from: http://www.amcharts.com/visited_countries/

[5] The GHG Scope 2 document contains guidelines for how to do greenhouse gas accounting by using RECs. For further information, see http://ghgprotocol.org/files/ghgp/Scope%202%20Guidance_Final.pdf

[6] For further information, see http://www.internationalrec.org/

5. CONSIDERING RECS FOR CARBON CREDITS

The international markets for RECs and carbon offset credits are unrelated and operate separately from each other. The consideration of REC for carbon offsets is a novel approach that needs to be analysed in great detail to ensure that the integrity of the existing systems are not compromised.

Promethium has analysed the requirements for carbon offset system integrity requirements in a previous report[7]. The outcome of this analysis is shown in the figure below:

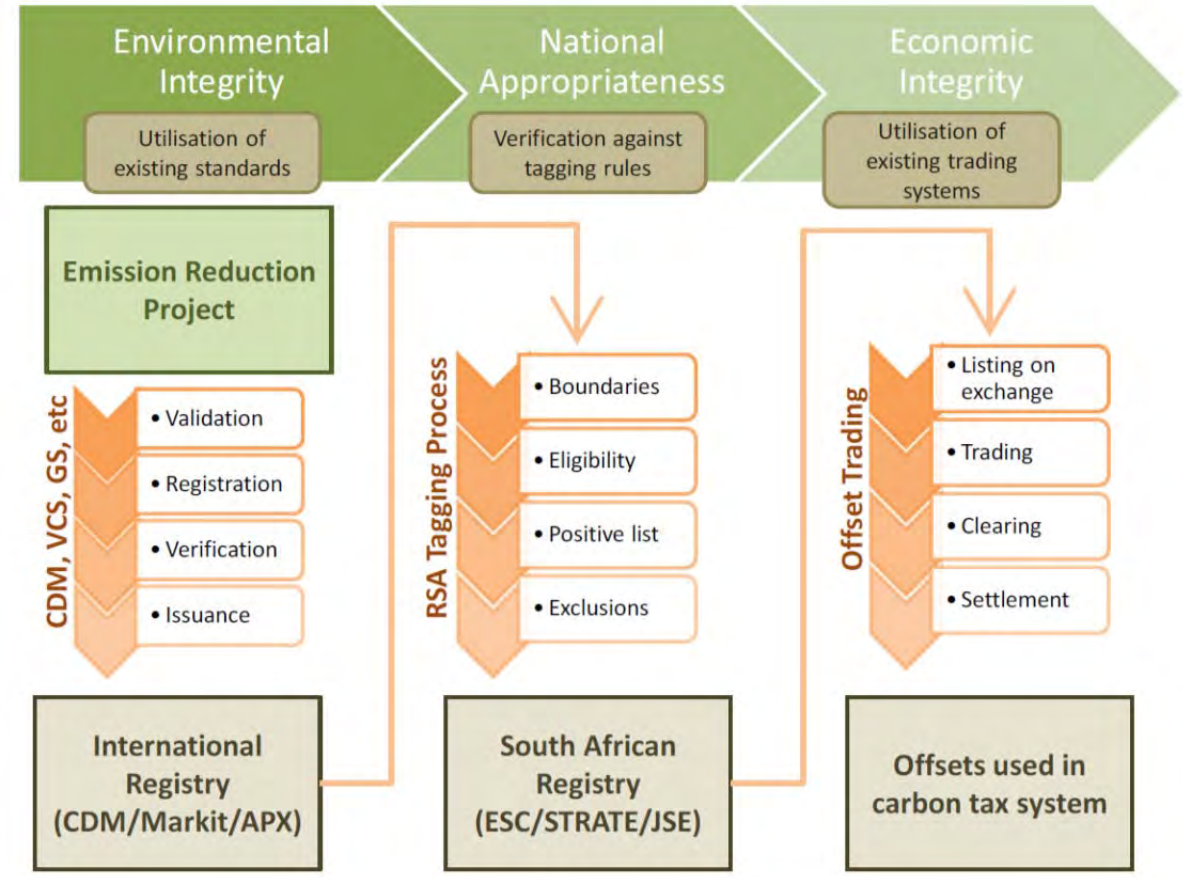


Figure 1: Requirements for system integrity in carbon offset trading systems

This report focusses only on the environmental integrity requirements of the system.

[7] http://www.promethium.co.za/wp-content/uploads/2014/02/2014-02-26-Tax-and-Trade-Final-Report-submitted.pdf

5.1. Maintaining the environmental integrity

A variety of carbon offset credit systems have been developed worldwide. Most of these systems require that the following issues be addressed to ensure the environmental integrity of a program:

- Additionality
- Baseline emissions
- Project emissions
- Leakage

The baseline emissions, project emissions and leakage are required in order to accurate calculate the emission reduction associated with an activity. It is therefore essential that these three items be adequately addressed if a REC is to be converted to a carbon offset. The emission reduction achieved by an activity is calculated as:

ER = BE – PE – LE

Where:

ER	=	emission reduction;
BE	=	baseline emissions;
PE	=	project emissions, and
LE	=	emissions due to leakage.

5.1.1. Additionality

Additionality is a key part of the existing offset programmes considered under the carbon tax. The concept of additionality requires that one proves that the implemented activity, for which environmental credits such as carbon offset is sought, is different from the baseline scenario[8]. In this context the baseline scenario is defined as what would have happened in the absence of the incentive offered by the environmental benefit. In terms of the CDM, additionality is defined as "*demonstration … that the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity.*"[9]

As there are no additionality requirements in the REC system, it is necessary to prove the additionality of a project before the RECs issued on a specific project can be converted to carbon offset credits.

[8] Gillenwater M., What is Additionality?, GHG Management Institute, January 2012
[9] CDM project standard, CDM-EB65-A05-STAN, Version 9.0

The CDM makes provision for automatic additionality for certain types of projects[10]. Project types that qualify for automatic additionality are placed on a positive list. The VCS also makes provision for positive lists through the application of standardised methods[11].

The VCS defines a positive list as "*An activity method allows specific activities on a positive list to pre-qualify as additional, Using a positive list, additionality can be pre-determined for classes of project activities that have low levels of adoption in the marketplace, that are not the least cost option or that have no revenue streams other than carbon finance.*"

The Gold Standard relies on the CDM rules for positive lists and automatic additionality.

Renewable energy project types that currently qualify for automatic additionality under the CDM are[12]:

- *All micro projects <5 MW of installed renewable energy technologies.*
- *The following grid-connected and off-grid renewable electricity generation technologies less than 15 MW installed capacity :*
    - *Solar technologies (photovoltaic and solar thermal electricity generation);*
    - *Off-shore wind technologies;*
    - *Marine technologies (wave, tidal);*
    - *Building-integrated wind turbines or household rooftop wind turbines of a size*
    - *up to 100 kW;*
- *The following off-grid electricity generation technologies where the individual units do not exceed the thresholds indicated in parentheses with the aggregate project installed capacity not exceeding the 15 MW threshold:*
    - *Micro/pico-hydro (with power plant size up to 100 kW);*
    - *Micro/pico-wind turbine (up to 100 kW);*
    - *PV-wind hybrid (up to 100 kW);*
    - *(iv) Geothermal (up to 200 kW);*
    - *(v) Biomass gasification/biogas (up to 100 kW);*

5.1.2. Baseline emissions

The baseline of a carbon offset project is defined as the situation that would have occurred in the event that the project was not implemented. Baseline emissions are the GHG emissions associated with such a situation. The baseline emissions for renewable energy projects implemented in South Africa are taken as the emissions associated with the Southern African Power Pool (SAPP) grid.

[10] Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, EB 68 Report, Annex 27
[11] Scaling up: VCS Standardized Methods, New requirements for standardized methods offer a robust framework for
streamlining project development and scaling up GHG emission reductions
[12] [12] https://cdm.unfccc.int/Reference/Guidclarif/meth/methSSC_guid05.pdf

Baseline emissions for electricity in South Africa can be calculated through various methodologies resulting in an emission factor of around 1 tCO_2 per 1 MWh. A standardised baseline has been approved for CDM projects in South Africa. This baseline is valid from 31 May 2013 until 31 May 2016. According to this baseline the emissions associated with the consumption of 1 MWh from the SAPP grid is 0.9644 tons of CO_2e for all projects other than wind and solar, and 0.9801 tons of CO_2e for all wind and solar projects. These values are relevant to projects in their first crediting periods.

It is therefore possible to apply the standardised baseline of the CDM for the SAPP grid to reliably specify the baseline emissions for renewable energy projects implemented in South Africa.

5.1.3. Project emissions

The methodology to determine project emissions is specified in the applicable approved methodologies for a variety of project types. CDM approved methodology AMS-I.D. ***Grid connected renewable electricity generation*** provides for the project emissions for all renewable energy projects with the exception of geothermal plants, water reservoir based hydro power plants and biomass power generation to be zero. In terms of this methodology, the project emissions of renewable energy projects are:

• Wind projects	-	zero
• Solar projects	-	zero
• Run-of-river hydro plants	-	zero
• Water reservoir based hydro plants	-	emissions from water reservoirs must be considered
• Biomass power plants	-	if the biomass is sourced from dedicated plantations, the procedures in the tool "Project emissions from cultivation of biomass" must be used

5.1.4. Leakage

Leakage in the carbon and energy context are the emissions that occur outside the boundary of the project. CDM methodology AMS-I.D. allows for the leakage from wind, hydro and solar projects to be zero. With biomass related renewable energy the emissions related to generating/growing the biomass as well as the transportation of the biomass and the waste products would have to be factored in. This is typically done by deducting these leakage emissions from the emission reduction associated with the project.

5.2. The administrative process of converting RECs to a carbon offset

5.2.1. Issuance of RECs

The generation of RECs follows international protocol. A RECS certificate is issued for each 1 MWh of power generated from renewable energy sources. Each certificate is uniquely identifiable, transferable and hence tradable, and contains a range of information including:

- Unique certificate number;
- Issuer;
- Quantity in MWh;
- Identity of the generating station;
- Time of issue;
- Technology used for generation;
- Installed capacity;
- Details of public support payments received.

The ownership of RECs certificates is recorded upon transfer to prevent multiple use.

Cancellation or redeeming is a voluntary activity – RECs shall be redeemed as soon as they are used for electricity disclosure or for conversion into an offset.

zaRECs (Pty) Ltd. administers the South African voluntary REC market along the lines of the EECS specifications on behalf of members of the voluntary Renewable Energy Certificate South Africa market participant's association (RECSA).

Market participants sign a set of standard terms and conditions to commence access to the registry and declining volume based charges are applicable. Transactions proceed via a secure form based process throughcrd@zarecs.co.za.

5.2.2. REC system process and capability

- Device registration – by renewable energy declaration.
- Certificates are issued upon production.
- Record of transfer between market participant accounts and redemption is retained by the Issuing Body (IB) – not financial details of transaction.
- Certificates are redeemed when they are no longer available to be traded.
- They are redeemed:
    - Prior to green labelling in voluntary markets (products, events or general disclosure of environmental performance).
    - In claiming production-based support.
    - In proof of compliance with purchase or supply obligations.
        - Verification and legal requirement for green power trade in South Africa (NERSA).

- Upon international export (transfer to intl. customer's CRD account).

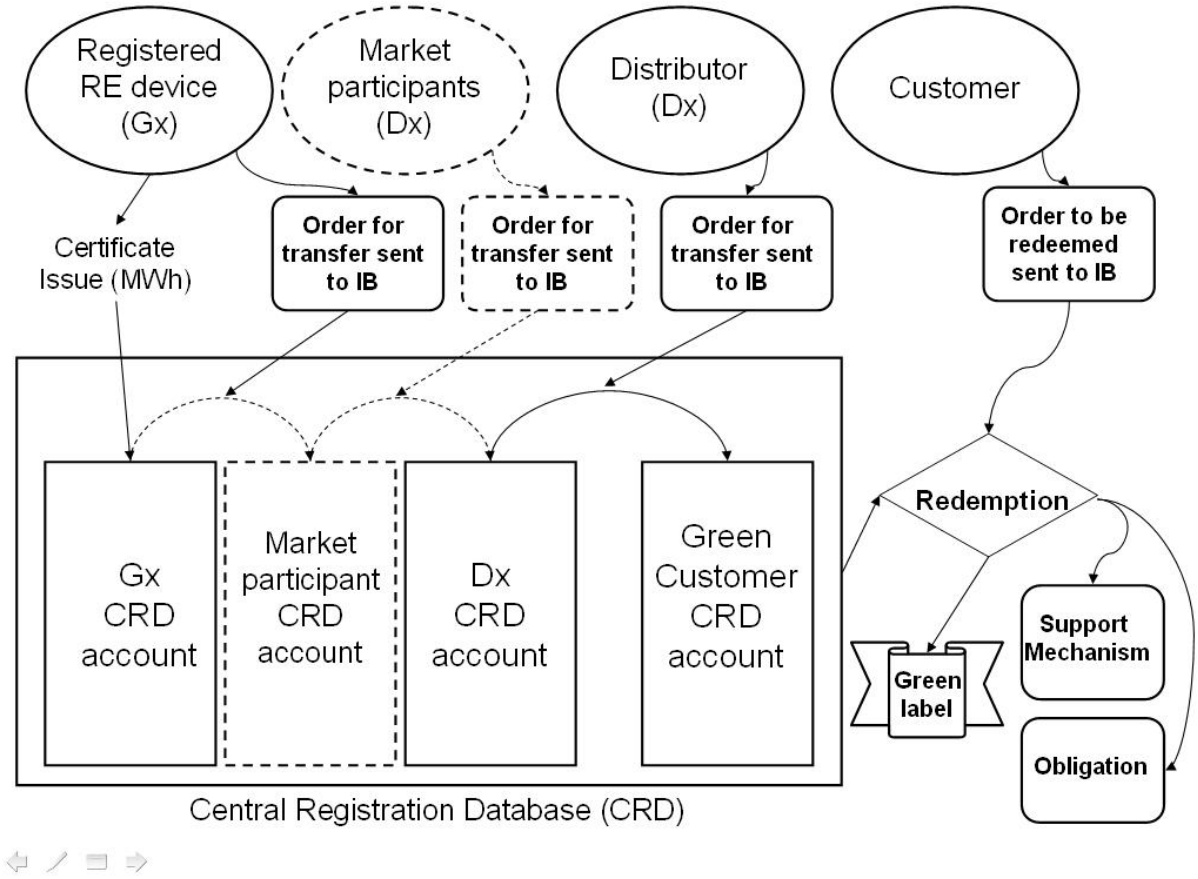


Figure 2: REC system process

5.2.3. Conversion of a REC to a carbon offset

The requirements and safeguards for the creation of carbon offsets with high integrity are listed in the table below:

Table 2: Requirements and safeguards for high integrity offsets

Requirement	Safeguard
Project type	The type of project activity is determined by the REC listing
Power generated	The amount of power generated is based on the amount of RECs issued.
Additionality	The additionality of the projects are safeguarded by only allowing conversion of REC from projects on either the CDM or VCS positive lists for conversion. If a project type is not listed on either of the positive lists, then the project owner must apply to either the CDM or the VCS for inclusion in the positive lists before RECs from such a project can be converted.
Emission reduction:	The amount of carbon offset credits issued per REC will be calculated for each

	project according to the formula ER = BE – PE – LE, with the variables determined as described below:
Baseline emissions	The CDM standardised baseline for the SAPP grid is used. This can only be done while the standardised baseline is valid. This means that the standardised baseline must be renewed before May 2016 in order for projects to be able to convert RECs to carbon offsets. The baseline emissions are taken as the amount of MWh (RECs) multiplied by the standardised baseline emission factor.
Project emissions	The project emissions for wind, solar and run-of-river hydro projects are zero in terms of CDM approved methodology AMS-I.D. Projects utilising technologies other than these must apply to the CDM or VCS to have standardised baselines approved for the project emissions of such technologies before RECs from such projects can be converted to carbon offsets. The project emissions are taken as the amount of MWh (RECs) multiplied by the standardised baseline project emission factor.
Leakage	Wind, solar and hydro projects have zero leakage. Biomass based projects will have to have a standardised baseline approved before RECs from biomass projects can be converted to carbon offsets.

A potential mechanism for the issuance of carbon offsets is shown in the diagram below:

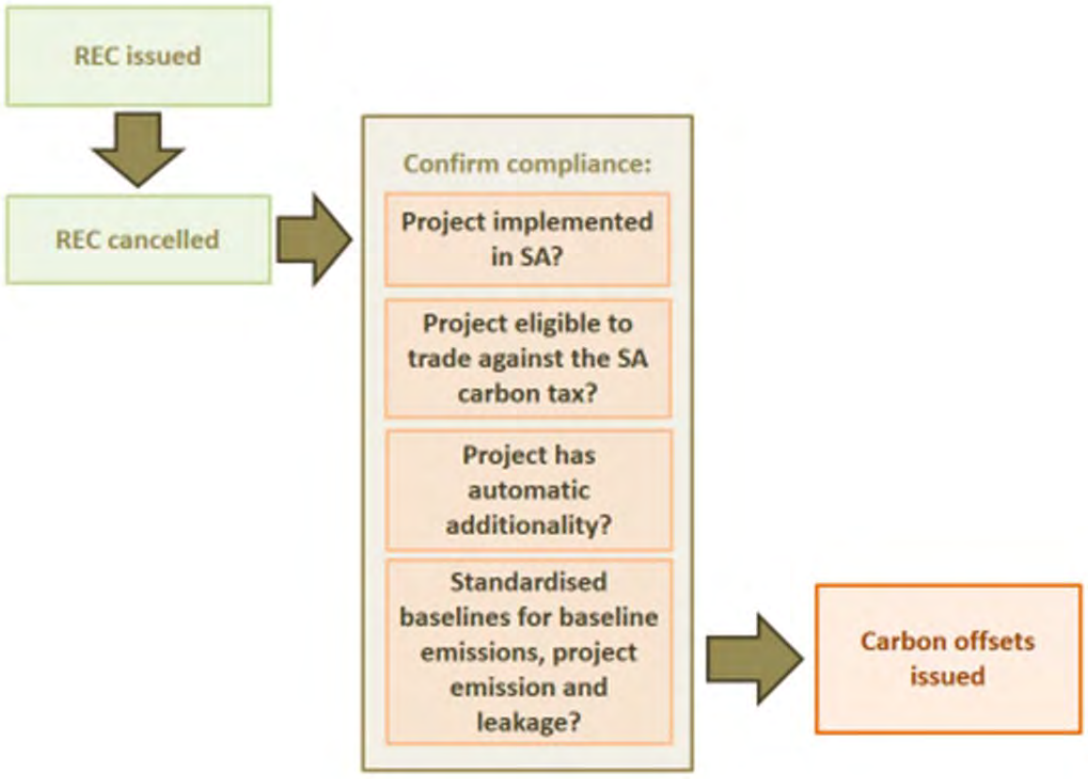


Figure 3: Proposed mechanism for issuing carbon offset on the basis of RECs

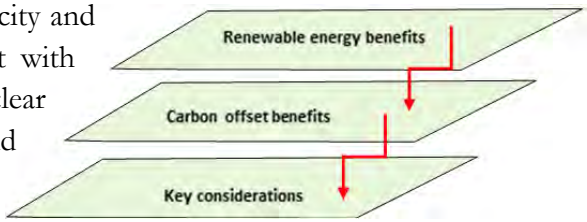
5.3. The socio-economic value of converting RECs to carbon credits

The proposed carbon tax will emphasise the importance of carbon management and drive social awareness around sustainability issues. In this regard business and industry will increasingly need to demonstrate commitment with respect to the following key considerations:

- Acknowledging and addressing climate change;
- Reducing environmental impacts;
- Understanding, managing and reducing carbon footprints; and
- Supporting social upliftment programmes.

Carbon offsetting is a practical approach to addressing these diverse but interlinked key considerations.

In view of South Africa's constrained energy capacity and the need for cost-effective infrastructure roll-out with the above-mentioned key considerations, it is clear that small scale renewable energy projects could effectively addresses these issues.



RECs converted to carbon credits, within the context of the NDP and the current South African energy landscape, can achieve the following:

- Meeting environmental targets in terms of reduced emissions and pollution prevention;
- Aligning business strategy with environmental and carbon related regulatory policies;
- Contributing towards company buy-in with regards to environmental and sustainability issues;
- Facilitating renewable energy market diversification; and
- Benefitting on a local and national level from increased resource efficiency.

Converting RECs to carbon offsets creates a platform for business and industries to take direct responsibility for residual emissions. Simultaneously carbon offsetting will allow for investment in the growing renewable energy market as these offsets provide critical finance for renewable energy projects[1]. This allows companies the advantage of managing emissions whilst realising the efficiency and broader socio-economic benefits of renewable energy. Table 4 provides an overview of the broader socio-economic as well as corporate benefits related to the conversion of RECs to carbon credits.

Benefits of using RECs as carbon offsets include the following:

- Broader socio-economic benefits:
  - Job creation.
  - Household savings.
  - Health benefits.
  - Environmental conservation.
  - Investment in local economies.
  - Technology and skills transfer.

[1] Unlocking the hidden value of carbon offsetting; ICROA.

- Local infrastructure support and provision; and
- A positive impact on water sources.

- Corporate benefits:
  - Energy / cost reduction.
  - Increased ability to meet tendering requirements:
    - Tenders / companies require supply chain and vendors to prove commitment to emission reduction and / or use of renewable energy sources.
  - Market differentiation.
  - Increased positive employee engagement.
  - Brand recognition:
    - Relevance of commitment to carbon emissions and / or renewable energy in context of green economy and South Africa's journey to a low carbon economy.

6. WAY FORWARD

It is evident that the necessary infrastructure exists to trade carbon offsets in South Africa. In addition, the potential supply and demand indicate a viable market at around 20 million tons CO_2 per year. In this regard RECS could effectively contribute to the carbon offset supply as well as create opportunities for green jobs.

A pilot project would be an effective next step to highlight any issues and to demonstrate the mechanisms. There is interest from the market participants to do a pilot project.

In terms of the way forward there are some policy questions which need consideration. The following table provides a summary of the key issues as well as an indication of the authoritative mandate that should be responsible for addressing these issues.

Table 3: Policy issues to move forward and related mandates

Policy Question	Authoritative Mandate
Guidance on the validity period of RECs.	National Treasury.
Submission of automatic additionality.	Department of Energy – DNA.
Update of SB for GEF.	DEA.
Policy for appropriateness.	Department of Energy – DNA together with DEA.

7. CONCLUSION

Both RECs and offsets are aligned in their long term objectives. Within the limited financial and institutional capacity in South Africa, combining these would add value and strengthen the proposed system. The RECs is a scheme that incentivises renewable energy installers. If RECs can be converted into a credible carbon offset credit the current REC initiative can be scaled up, thereby supporting green growth.

By selecting small scale renewable energy projects types with no project emissions or leakage calculations these RECs could be converted through the application of the standardised grid emission factor into a credible carbon offset credit.

In theory it is possible and a pilot would demonstrate the practicality thereof. Stakeholders for such a pilot have already been identified.

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is a dedicated carbon and climate change advisory firm helping major international clients gain global competitive advantage in the fast-emerging low carbon economy.

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