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Report compiled by:

Project Steering Committee:

Department of Environmental Affairs (DEA):

- Peter Lukey
- Barney Kgope
- Wilma Lutsch
- Kiruben Naicker
- Elizabeth Masekoameng
- Reitumetse Molotsane
- Stanley Semelane
- Pamela Kershaw

Consultants:

Linkd Environmental Services:

- Matthew Gaylard
- Helen Fox
- Onno Huyser

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List of Acronyms

BBBEE	Broad-Based Black Economic Empowerment
DEA	Department of Environmental Affairs
CDM	Clean Development Mechanism
CERs	Certified Emissions Reductions
EGS	Ecosystem Goods and Services
EIA	Environmental Impact Assessment
DEADP	Western Cape Provincial Department of Environmental Affairs and Development Planning
DTPW	Western Cape Provincial Department of Transport and Public Works
DWAS	Department of Water Affairs and Sanitation
MOU	Memorandum of Understanding
NCCRP	National Climate Change Response Policy
NDP	National Development Plan
NEMA	National Environmental Management Act
NGO	Non-Governmental Organisation
NPAES	National Protected Areas Expansion Strategy
NRM	Natural Resource Management Programme
ORASECOM	Orange-Senqu River Commission
NT	National Treasury
PA	Protected Area
REDD	Reducing Emissions from Deforestation and Forest Degradation
SANBI	South African National Biodiversity Institute
UNFCCC	United Nations Framework Convention on Climate Change
WWF	World Wide Fund for Nature



Foreword

Over the last few years there has been an increased interest in the subject of offsetting. Two provinces, KwaZulu Natal and the Western Cape, already have biodiversity offsetting guidelines and the development of national guidelines is well-advanced. The department's document entitled "Mainstreaming Biodiversity into Mining: A Guideline for Practitioners and Decision Makers in the Mining Sector" which was launched by the Minister in 2013 contains a full chapter on offsetting. A detailed wetland offsetting tool has been updated and workshopped and is ready for broad-scale rollout. National Treasury has released their discussion document on carbon offsetting. The department has released a discussion document on air quality offsetting and has held various stakeholder engagements on the topic. An ever-increasing number of environmental authorisations now contain references to, or requirements for, offsets.

However, despite this flurry of activity, offsetting remains either a foreign concept to most South Africans or a topic that is hotly debated by a relatively small group of South Africans with highly polarised views and opinions on the subject.

Given that offsetting is already considered to be a component of the environmental impact mitigation hierarchy and is noted in the national Development Plan as one measure, among others, of protecting the country's natural resources, the department felt it was important to start engaging in a far broader overall discussion around the topic.

To kick-start this process, it was agreed that having an easily accessible broad and basic reference work on the topic would be useful. In order to encourage robust discussion and debate, it was also agreed that this basic reference work should not take any specific policy position, but should fairly reflect all views and opinions.

To this end, this Discussion Document was produced through various stakeholder engagements, including two well attended and lively workshops. As a basic reference work on the topic, this Discussion Document is only to be used as one possible departure point for further discussions on the topic of offsetting and does not necessarily reflect the department's position in this regard.

Peter Lukey

Chief Policy Advisor

Department of Environmental Affairs





I Introduction

In the South African context, environmental offsets are a relatively new mechanism intended to enhance sustainable development outcomes. A number of environmental offset projects are already in the process of being designed and implemented locally, and national and provincial guidelines for various types of offsets have been, or are being, developed by government. While the scope and ambition of offsets undertaken by the public and private sector is increasing, this is happening in the absence of an overarching policy framework. As a result, there is no broad common understanding of the environmental offsetting concept or the possible strengths, weaknesses, opportunities or threats associated with offsetting. In the absence of a common understanding of offsetting, public opinion on offsets and their efficacy is highly polarised with some people regarding offsetting as “the missing link in sustainable development” and others regarding offsets as “a license to trash the environment”.

The purpose of this document is to stimulate discussion around the concepts and principles of environmental offsets amongst as wide a group of stakeholders as possible, in order to assess the need and content requirements for a national policy framework. This document therefore does not represent government’s perspective on any of the issues involved – it cannot, because as yet the Department of Environmental Affairs does not have a policy on offsets. Rather, the document seeks to describe a range of different perspectives and approaches in relation to the possible benefits and risks associated with environmental offsets.

This document uses the Department’s current working definition of environmental offsets as a point of departure:

“An environmental offset is an intervention, or interventions, specifically implemented to counterbalance an adverse environmental impact of land-use change, resource use, discharge, emission or other activity at one location that is implemented at another location to deliver a net environmental benefit.”

This does not mean that the Department’s current working definition is not up for debate, but that the issues that are surfaced in the discussion document should be considered in the context of this definition. Specifically, it has been suggested that offsets should be defined as the outcomes of particular interventions, rather than being defined as the interventions themselves as in the current working definition.

There are some implicit assumptions that underpin this document and government policy in general, which may or may not be shared by all stakeholders. These include that environmentally and socially sustainable economic growth in South Africa is both possible and necessary, and that environmental offsets should be evaluated in terms of the extent to which they can contribute to sustainable development.

It is hoped that this document will help to constructively frame the central issues around which stakeholder engagement is needed so as to develop, at least, a broad common understanding of the concept as it applies to South Africa, or even, a coherent national policy on environmental offsets. As such, the intention is not to forestall any outcomes of that engagement – whether they be to broaden, narrow, redefine or limit the scope and ambition of existing practice.



2 Statement of the problem

Environmental offsets are intended as a mechanism to address the phenomenon of cumulative losses with respect to biodiversity and the ecosystem services that provide us with clean water, air, crop pollination and agriculturally productive soils, amongst others. They are a policy intervention that seeks to correct market failures by avoiding a residual impact from economic development on the environment by factoring in measures to redress such impacts into development decision-making.

The National Development Plan (Vision 2030) provides a succinct summary of the nature of the environmental problem to which environmental offsets are a response:

Market and policy failures have resulted in the global economy entering a period of "ecological deficit", as natural capital (ground water, marine life, terrestrial biodiversity, crop land and grazing) is being degraded, destroyed, or depleted faster than it can be replenished."

Further, the NDP states that

South Africa faces urgent developmental challenges in terms of poverty, unemployment and inequality, and will need to find ways to "decouple" the economy from the environment, to break the links between economic activity, environmental degradation and carbon-intensive energy consumption. In the past, resources were exploited in a way that was deeply unjust and left many communities excluded from economic opportunities and benefits while the natural environment was degraded. The country must now find a way to use its environmental resources to support an economy that enables it to remain competitive, while also meeting the needs of society. Thus, sustainable development is not only economically and socially sustainable, but environmentally sustainable as well.

Chapter 5 of the NDP builds on the National Strategy for Sustainable Development, which defines sustainable development as:

Sustainable development is the process that is followed to achieve the goal of sustainability. Sustainable development implies the selection and implementation of a development option, which allows for appropriate and justifiable social and economic goals to be achieved, based on the meeting of basic needs and equity, without compromising the natural system on which it is based.

Sustainable development involves responding to a history of systemic market failures derived from the failure to internalise environmental and social costs of development. Accordingly, one of the guiding principles articulated in Chapter 5 of the NDP is:

Full cost accounting. Internalise both environmental and social costs in planning and investment decisions, recognising that the need to secure environmental assets may be weighed against the social benefits accrued from their use.

Full cost accounting can be understood as an approach to ensuring that the social benefits derived from the use of environmental assets are leveraged to secure and protect those assets now and for the future, as opposed to posing trade-offs between the environment and social needs.

Text Box 1: The nature and extent of the environmental and social challenges

One attempt to model the vulnerability of the earth system to human impacts is the planetary boundaries framework, an international interdisciplinary research effort led by the Stockholm Research Centre that seeks to define a safe operating space for humanity in relation to impacts of human activity on the planet.

Understanding these boundaries, it is argued, is a precondition to sustainable development. Whilst this work is ongoing, progress has been made in estimating our impacts in relation to at least some of these boundaries at both a global and national scale – and this research suggests the need for urgent action. The planetary boundaries concept, together with an extension of the concept in relation to “safe and just” parameters for sustainable development (Cole et al, 2014) has been applied to South Africa. The research by the African Climate and Development Institute yielded the following radar charts

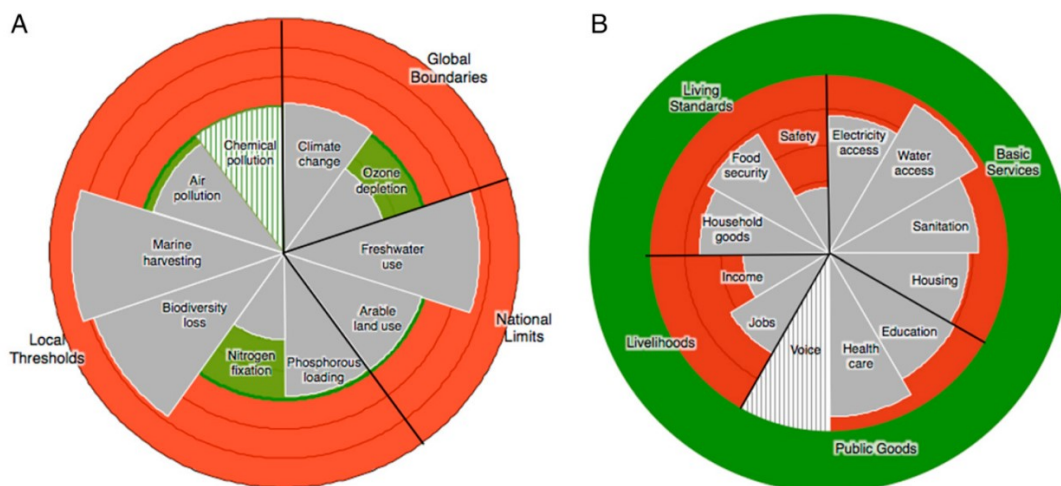


Fig. 2. A national barometer for inclusive sustainable development in South Africa. The green areas represent the safe and just space, beyond which is excessive environmental stress (A) and social deprivation (B), shown in red. The gray wedges measure the national status for each dimension compared to its boundary as a percentage (0% at the centre, 100% at the boundary), striped wedges show indicators still to be determined, the black dividing lines delineate the three types of environmental boundaries (A) or the four social domains (B).

As can be seen from the modelling of environmental stress in figure A, South Africa is on the cusp of exceeding its “safe and just space” in terms of the global boundary for climate change (carbon emissions). In terms of national limits, we have exceeded this space for Freshwater use, and are very close to exceeding it for arable land use. South Africa has well exceeded local thresholds for Marine Harvesting and Biodiversity loss. At the same time, the modelling of social deprivation in figure B indicates that in none of the four domains of Living Standards, Basic Services, Livelihoods and Public Goods have we achieved a safe and just space.



As stated in the NDP, the state is responsible for identifying and resolving market and policy failures, while at the same time reducing transaction costs i.e. reducing the costs of market participation, often associated with institutional costs. Fulfilling these functions with respect to the environment, involves the complementary objectives of:

- Halting and reversing the trends of environmental degradation and unsustainable use of natural resources; and reducing the carbon footprint of the South African economy
- Facilitating ecologically sustainable social and economic development to address the challenges of poverty, unemployment, and equitable access to public goods and basic services and raise the living standards of all South Africans.

Government has a number of generic policy instruments potentially at its disposal to achieve these outcomes, including legislation, regulated norms and standards, and fiscal policy. The National Environmental Management Act (NEMA) provides the overarching legislative framework for the environmental sector in conjunction with supplementary legislation such as the Air Quality Act and Waste Act and associated regulations. NEMA establishes the principles for environmental management, as well as defining institutional mechanisms such as those for environmental authorisations and Environmental Impact Assessments (EIAs).

NEMA establishes a number of important principles as requirements for sustainable development that provide potential support for environment offsets. In particular, NEMA states:

... that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Environmental authorisations and EIAs are key tools for giving effect to this principle. The practice that has evolved around these tools has focused primarily on avoiding and minimising the negative consequences of land use change, economic activity and the development of infrastructure, rather than remedying these consequences. Inevitably, the consequence of not addressing residual impacts is a cumulative degradation of environmental assets. In the absence of the development of approaches to remedying negative impacts on the environment, we will only be able to slow the rate of environmental degradation, not stop it.

NEMA also states that:

The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

This establishes the “polluter pays principle” in South African law. It can be argued that the existing system of criminal prosecutions and administrative penalties (fines) for transgression of environmental norms and standards does not adequately give expression to this principle since it is focussed on deterrence, rather than requiring the “polluter” to directly fund the costs of remedying pollution and environmental degradation.

Furthermore, the phenomenon of the cumulative degradation of South Africa's environmental assets is not only associated with transgressions of environmental norms and standards, but also with the cumulative effect of residual impacts that are not currently offset by counterbalancing interventions, but which in individual instances may not constitute a prosecutable or penalisable offence, or a “fatal flaw” in terms of the EIA process.



Text Box 2: Discussion Points – Residual impact and the mitigation hierarchy

Residual impacts are those impacts that remain following the implementation of mitigation measures that attempt to minimise negative consequences. Environmental offsets can be considered to be a mechanism for paying for measures that seek to remedy residual negative environmental impacts of development.

It can be argued that practically all economic activity that involves construction, physical infrastructure or land use change has a level of residual impact on the environment that cannot be avoided or entirely mitigated on site. Of course, in some cases these residual impacts may be small and/or difficult to accurately measure.

- One of the policy issues that needs to be considered in relation to environmental offsets is the threshold of residual impact that could be considered to trigger a requirement for counterbalancing interventions aimed at ensuring a net environmental benefit.

NEMA describes a sequence of options in terms of environmental impacts: prevent/avoid – minimise – remedy. This is sometimes referred to as the “mitigation hierarchy” and offsets are sometimes framed as the final step in this hierarchy or the mitigation action of “last resort”.

- It is sometimes raised as a point of concern that environmental offsets risk undermining the requirement to first avoid and then minimise negative environmental impacts.
- Where the unavoidable consequences of a particular project constitute a “fatal flaw” that would otherwise prevent the project from receiving required environmental authorisation, it is questioned whether environmental offsets should be considered as a potential remedy that could be used to facilitate environmental authorisation.
- Arguably, some environmental impacts cannot be offset – for instance, the extinction of a species. At the same time, in specific cases it may be argued that the threatened species is doomed no matter what happens, and that an offset that contributes to stopping preventable extinctions is justified. Determining what the limits are – if any – to what can be offset may be critical to developing a principled approach.
- In practice, the implementation of environmental management legislation may need to be more nuanced than some interpretations of the mitigation hierarchy suggest. Environmental management is concerned with (a) maximising positive environmental outcomes (b) facilitating ecologically sustainable development. The expense of a particular on-site mitigation measure may make a project financially unsustainable while offsite environmental offsets would achieve better environmental outcomes than the on-site mitigation measures at a sustainable cost.



Text Box 3: Discussion Points – Who bears the costs of residual impacts?

It can be argued that environmental offsets have a role to play in ensuring not only that negative environmental consequences of development are remedied and therefore avoided, but that the costs of doing so are not inappropriately socialised i.e. they are factored into planning and investment decisions as part of standard business practice.

Potentially, this has relevance for the threshold of residual impacts for which offsets could be considered an appropriate mechanism. There are transactional costs associated with designing and implementing an environment offset that may not be justified in a particular instance where the residual impact for which offsetting is desired is relatively small. Financial offsets are a mechanism that can potentially address this problem. An example of the principle involved is the use of carbon credits to offset the carbon footprint associated with air travel, which can be purchased for individual flights. It could be possible to establish similar opportunities for financial offsets in relation to other environmental impacts, and there are international examples of a variety of environmental credit schemes.

In the absence of mechanisms for directly remedying residual impacts associated with development, responsibility for this falls to the state: NEMA states clearly that the environment is held in public trust for the people of South Africa by the state. A potential concern arises that within a constrained fiscal environment, the use of financial offsets may lead to a decrease in public funding of the environment.

At the same time, given the difficulty associated with ring-fencing of revenue sources that has been of particular concern to the business community in relation to the carbon tax, a case can be made for offsets as an equitable and complementary mechanism to fiscal policy and financial penalties as tools for making finance available to secure the ecological sustainability of development.



3 Environmental offsets under consideration

For the purposes of this document, five types of environmental offsets are considered, categorised according to the adverse environmental impacts which they are designed to counterbalance:

- Biodiversity offsets are focused on counterbalancing loss of biodiversity. Some provinces have drawn up guidelines for biodiversity offsets and the DEA is in the process of developing a national policy framework.
- Wetlands offsets are focused on counterbalancing loss of wetland biodiversity, as well as counterbalancing adverse impacts on wetland hydrology and ecosystem functions. The DEA is in the process of developing national guidelines for wetlands offsets.
- Water resource offsets are focused on counterbalancing adverse impacts on the

quality and availability of water. Although some projects have been framed as water offsets, there are currently no policies or guidelines in place.

- Air quality offsets are focused on counterbalancing the adverse environmental impacts of atmospheric emissions on air quality, particularly with respect to human health. The DEA is in the process of developing policy on air quality offsets.
- Carbon offsets are focused on counterbalancing the contribution of atmospheric emissions of carbon dioxide to climate change. Over 100 South African carbon offset projects have been registered under the Clean Development Mechanism (CDM) of the Kyoto Protocol and National Treasury have released a Carbon Offsets Paper for public comment.

Text Box 4: Discussion Points – Offsets for existing projects

Due to the use of EIAs as a mechanism for establishing the requirement for an offset, there is a tendency to think of offsets as only applying to new developments. However, consideration also needs to be given to the potential for applying offsets to existing projects.

This is perhaps of particular relevance to environmental impacts that are an ongoing, cumulative consequence of a particular development, rather than a once-off loss associated with the decision to develop a particular location. Examples of this would be water resource offsets associated with water use or discharges that are ongoing and air quality or carbon offsets that seek to counterbalance the adverse environmental consequences of atmospheric emissions.

Further, it can be argued that offsets should be considered as an option for achieving compliance when new norms and standards are introduced, such as was the case with the introduction of the Air Quality Act, in order to avoid the creation of stranded assets.



A number of key concepts and terms have cross-cutting relevance for the different types of offsets, and some explanation of these is useful for the purpose of framing discussion in relation to the possible need for an overarching policy framework. It remains an open question whether such an overarching policy framework would be useful, and whether all the possible offset options described in this discussion document should be embraced within such a framework, or indeed whether additional types of offset should be considered as well. It may be, for instance, that separate policy frameworks are required for each category of offset.

Additionality

This is often considered to be a necessary property of any environmental offset, and refers to the fact that the environmental outcomes delivered by the offset should be “additional” in the sense that they are:

- demonstrably new; and
- would not have been achieved without the offset.

Demonstrating additionality requires that the outcomes of offset interventions be measured relative to both the impacts they are intended to counterbalance and relative to existing legal requirements and background trajectories that would pertain in the absence of the offset intervention.

Like-for-like

The framing of offsets in the working definition as an outcome of interventions that directly counterbalance adverse environmental impacts with measures designed to redress the specific environmental impacts (like-for-like), distinguishes offsets from other forms of compensation, and from trade-offs. For instance, providing monetary compensation to a community for loss of ecosystem functionality would not, in these terms, be considered to be an environmental offset because the loss of ecosystem functionality would itself not be remedied. More specific possible applications of the “like for like” principle are discussed in relation to the different environmental offsets.

No net loss (net gain)

The working definition suggests that an environmental offset should deliver “a net environmental gain”. The concept of “like for like” can be extended such that not only should the environmental benefit of the offset be of the same kind as the residual impact it seeks to counterbalance, it should also deliver environmental benefits that are of the same (or greater) magnitude as the damage done. The implication is that a project which requires offsetting should in principle at worst have no net negative impact on the environment, and at best have a positive net impact on the environment.



Mitigation hierarchy

Offsets can be considered a form of mitigation, and part of a hierarchy of mitigation measures that should be applied to any development that has adverse environmental impacts, typically as part of an EIA process. Proceeding from the top of the hierarchy, each measure should be exhausted before the next level of measures is considered. Figure 1 graphically represents the mitigation hierarchy.

It has been suggested that for offsets to be implemented in a responsible manner, it is essential that they be embedded within the mitigation hierarchy, with interventions based on avoiding or minimising impacts being prioritised before offsets are considered.

Residual impact

The remaining adverse impact on the environment after appropriate avoidance, minimisation and rehabilitation measures have been taken according to the mitigation hierarchy.

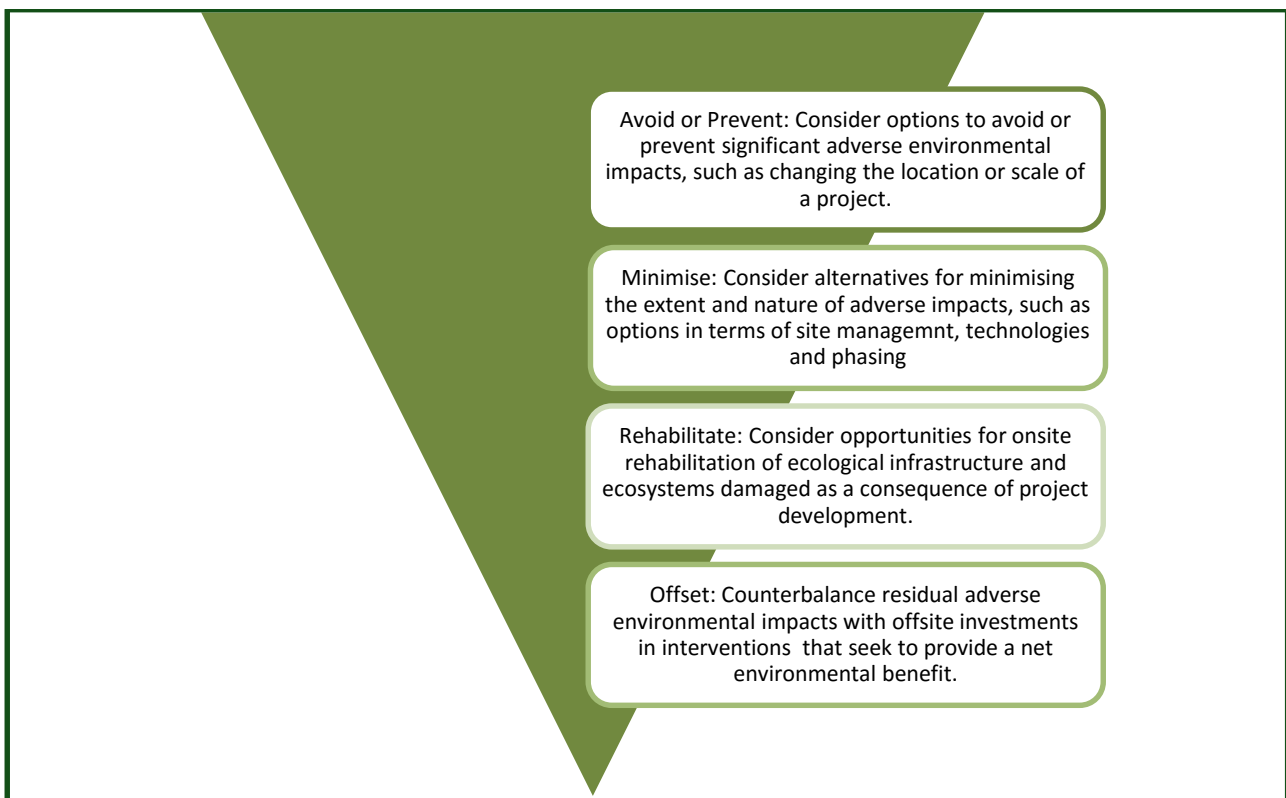


Figure 1: The Mitigation Hierarchy



3.1 Biodiversity offsets

Chapter 5 of the National Development Plan makes an implicit case for biodiversity offsets:

“The biodiversity and ecosystems in conservation areas are national assets. Long-term planning to promote biodiversity and the conservation and rehabilitation of natural assets is critical, and should be complemented by a strategy for assessing the environmental impact of new developments as an important component of overall development and spatial planning. Where damage cannot be avoided or mitigated, and where the social and economic benefits justify the development, a commensurate investment in community development and the rehabilitation and conservation of biodiversity assets and ecosystem services is required.”

Biodiversity offsets can be understood as representing an investment in rehabilitation and conservation of biodiversity that is commensurate¹ with (or “counterbalances”) the damage that cannot be avoided or mitigated, and which is socially and economically justifiable. The draft national framework for biodiversity offsets defines them as follows:

Biodiversity offsets are defined as measurable conservation outcomes resulting from actions to compensate for residual negative impacts on biodiversity. Biodiversity offsets are designed to deliver remedial measures commensurate with the significance of residual impacts.

The Western Cape and Kwazulu-Natal Biodiversity Guidelines use definitions that more explicitly locate biodiversity offsets within the mitigation hierarchy. The Western Cape’s

Draft Biodiversity Guidelines include the following description of Biodiversity Offsets:

Biodiversity offsets provide a mechanism to compensate for residual negative impacts on biodiversity after a developer has proven that a) all feasible and reasonable alternatives have been considered in arriving at the proposed development, and b) reasonable and responsible actions have been taken in the location, siting, scale, layout, technology and design of the proposed development to avoid, minimize and repair/restore associated impacts. That is, offsets are seen as a last resort option in the mitigation hierarchy.

Both the draft national framework and provincial guidelines seek to establish the scope of residual environmental impact for which offsets should be considered in the same way. From the national framework:

Biodiversity offsets should be considered to compensate for residual negative impacts on biodiversity and ecosystem services of ‘medium’ to ‘high’ significance.

Residual impacts of ‘very high’ significance are a fatal flaw for development. Impacts would in all likelihood lead to irreplaceable loss of biodiversity, and/ or irreversible deterioration in valued ecosystem services, and therefore could not be compensated or offset.

Residual impacts of ‘medium’ to ‘high’ significance should trigger an investigation into biodiversity offsets; and

Residual biodiversity impacts of ‘low’ significance would not require any offset.

¹ The existing draft provincial guidelines for biodiversity and the draft national framework, as well as many international definitions use the language of “compensating” for residual adverse impacts. In order to reflect the importance of the

concept of “like-for-like” and avoid confusion between environmental offsets and compensation as discrete mechanisms, this document uses the language of “counterbalancing” rather than “compensation”.



The draft provincial guidelines provide detailed guidance in terms of evaluating the significance and extent of anticipated and actual residual impacts. In particular the biodiversity status of the land as defined in existing spatial plans needs to be considered, with development in the following areas likely to trigger residual impacts of very high or high significance:

- Core Biodiversity Areas as defined in Bioregional Plans
- Priority Areas identified in Biodiversity Plans or declared in terms of the Protected Areas Act
- Threatened ecosystems, ecological corridors and habitat containing threatened species
- Areas identified as containing irreplaceable biodiversity by a national or provincial management authority for protected areas.

Text Box 5 Discussion Points – Business as usual or last resort?

The existing draft frameworks and guidelines for biodiversity offsets explicitly frame offsets as a last resort within the mitigation hierarchy intended to counterbalance residual impacts once all other mitigation options have been exhausted. There is the potential for divergent perspectives on this in practice that are of crosscutting relevance to all the environmental offset categories discussed in this document:

- There is a risk that the acceptance of offsets as a valid mitigation mechanism may in practice lead to inversion of the mitigation hierarchy as developers pursue offsets as a least cost mitigation option. In this scenario it can be argued that the cumulative environmental impacts derived from the failure to apply avoidance, minimisation and rehabilitation to the full extent will ultimately threaten the ecological integrity of the offsets that are implemented.
- A countervailing argument is that the framing of offsets as a last resort to only be employed where there are environmental impacts of “**high**” or “**medium**” significance implies that they should not be part of standard business practice, with the cumulative effect of “**low**” significance residual impacts going unmitigated. Instead, a lower threshold for offsetting requirements should be supported by the use of offsets accomplished by financial contributions to projects with relevant environmental outcomes.

A common thread in both these perspectives may be the capacity of the state to enforce policy prescriptions through available regulatory mechanisms such as EIAs.



Text Box 6: The receiving environment – the South African context

The figure below is drawn from the National Biodiversity Assessment of 2011, undertaken by the South African National Biodiversity Institute (SANBI) and illustrates the status of South Africa's ecosystems.

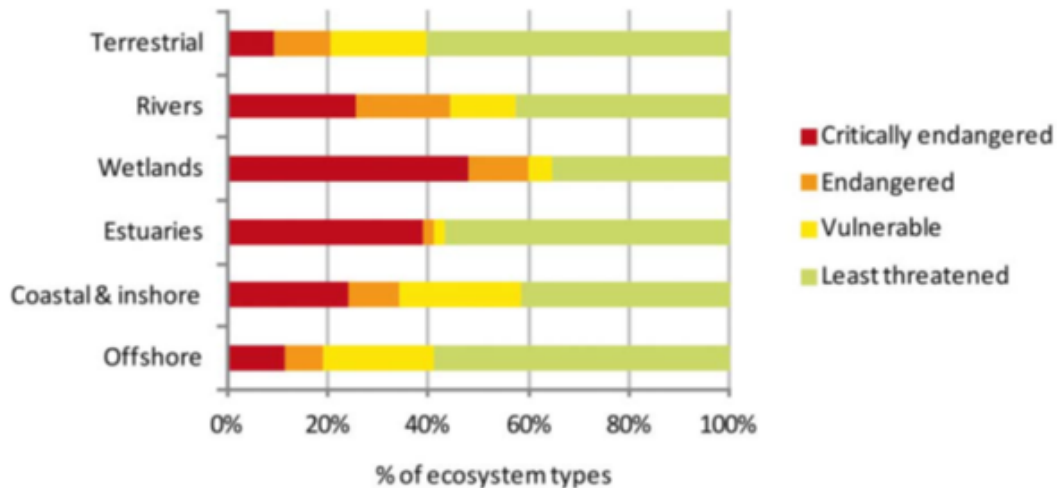


Figure 2: Ecosystem threat status

While particular biomes within South Africa's ecosystems are under varying degrees of threat, in general large areas of the country feature relatively intact ecosystems with high levels of biodiversity in comparison with many developing countries, where landscapes have been deeply impacted by land use changes. In the United Kingdom, for instance, the receiving environment for offsets can be argued to be far more constrained than ours.

The existing draft guidelines suggest that the identification of receiving areas for potential biodiversity offsets should begin with identification of high priority sites for biodiversity conservation for the affected ecosystem as flagged in bioregional plans, biodiversity plans and/or biodiversity networks. As far as possible, offset sites should be connected to other formally protected sites and/or identified in expansion plans for protected areas.

According to the draft provincial guidelines, as far as is possible offset receiving areas should:

- Be close to the impacted site;
- Minimize fragmentation of habitat; and
- Provide comparable ecosystem services to those delivered by impacted site.

Certain ecosystems and biomes are under particular threat in South Africa – wetlands have experienced particular pressure, for instance – and in these instances the



The basis for biodiversity offsets proposed in the draft provincial guidelines is a system of area-based offsets, with mitigation ratios defined in relation to the conservation status of the impacted ecosystem. For instance, a mitigation ratio of 30:1 is defined for critically endangered ecosystems in the draft Western Cape guidelines with the implication that for every hectare of habitat that is adversely impacted, 30 hectares need to be restored, rehabilitated or protected. The mitigation ratio may be further increased or decreased by the application of context specific mitigation factors that relate to the significance of the residual impacts, and the perceived risk associated with the offset.

The principle of no net loss of biodiversity up to a target for a given ecosystem is fundamental to the emerging framework for biodiversity offsets in South Africa. Accordingly, draft guidelines recommend that a biodiversity offset be targeted at the ecosystem that is impacted, although it may be acceptable for an offset to target an ecosystem that is more threatened than the impacted ecosystem.

The draft national framework and provincial guidelines for biodiversity offsets suggest one or more of the following types of interventions as possible offset mechanisms:

- Preventing probable loss of vulnerable ecosystems adversely affected by residual impacts by securing areas for protection and putting in place adequate funding for their long term management.
- Rehabilitating an ecologically suitable area of land with the intention of restoring an area of the same habitat as that which was adversely impacted.
- Improving degraded areas by reintroducing native species, and undertaking rehabilitation measures such as the clearing of invasive alien plants species.
- Working with communities to stop ongoing loss of biodiversity through, for instance, switching to sustainable land use practices and livelihood strategies.

These interventions do not automatically qualify as appropriate mechanisms for achieving an environmental offset – rather, particular mechanisms are selected as part of the process for securing and managing a particular offset site.

Where the residual impacts of a project adversely impact on ecosystem services to a community, the draft national framework suggest that biodiversity offset should ideally provide comparable ecosystem services to the affected community.

The Western Cape's Draft Provincial Guidelines on Biodiversity Offsets and the KwaZulu-Natal Norms and Standards for Biodiversity Offsets both allow for the possibility of biodiversity offsets being accomplished through a financial contribution, rather than direct involvement of the developer in design of an offset. The Western Cape's guidelines make clear that such a contribution should be made to a recognised conservation organisation with the express purpose of being used for the acquisition of land for conservation purposes. The Draft KwaZulu-Natal Norms and Standards further mention the possibility of biodiversity credits being purchased at such time as a market for biodiversity credits is established. Biodiversity credits are generated by conservation activities that protect threatened species and restore habitat in "biodiversity banks". A market for biodiversity credits can be entirely voluntary, but it can also be a response to a need for offsets created by environmental regulations.



Text Box 7: Discussion points – putting a price on nature?

Biodiversity offsets have been criticised for perpetuating the commodification of nature, and from this perspective, using market forces to attempt to address existing market failures is likely to result in environmentally undesirable outcomes. Instead, it may be argued, the state should focus on enforcing and strengthening environmental legislation.

The objections to the commodification of nature rest in part on the complexity of natural ecosystems. It is argued that offsets are a fundamentally flawed concept that leads to false equivalences and inevitably unsound trade-offs, since it is near to impossible for two different areas to contain exactly the same biodiversity pattern in terms of species composition and density, and provide exactly the same range and quantum of ecosystem services.

The extent to which biodiversity rehabilitation and restoration projects are successful has been questioned. International experience of projects of this nature is at best mixed. Restoring complex ecosystems such as those of the Cape Fynbos biome to a pristine state may be difficult if not impossible. A more realistic and less risky target for offsetting projects may be to rehabilitate natural habitat to a state in which ecosystem functionality is improved – but this does not necessarily address loss of biodiversity, and may not be appropriate where the primary environmental impact is on biodiversity.

It can also be argued that natural ecosystems are dynamic systems, and that offsets have the potential to contribute significantly to biodiversity stewardship programmes that have a landscape-wide impact by creating ecological corridors that have the potential to greatly enhance ecosystem resilience.

What can be said with confidence, is that the loss of biodiversity and the accompanying degradation of the ecological infrastructure that sustains ecosystem services has very real economic costs to society at large, and frequently rural communities are the most immediately and directly impacted. A strong case can be made for involving affected communities in the design of biodiversity offsets, and as beneficiaries of “green jobs” that may derive from environmental offsets.



Text Box 8: Case Study – Shaw’s Pass

Shaw’s Mountain Pass, built in the early 1800s, traverses the R320 route (‘Hemel-en-Aarde’ road) between Caledon and the Hemel-en-Aarde Valley near Hermanus. It occurs in an ecologically significant area, with a number of rare and critically endangered fynbos species. Between 2012 and 2013, the Western Cape Provincial Department of Transport and Public Works, sought to upgrade portions of a main road linking Hermanus with Caledon, and realign the dangerous portion through the pass. Unfortunately all potential alignments over the pass had a high negative impact on a highly sensitive and critically endangered vegetation type, Overberg Sandstone Fynbos.

Consequently a 30 ha offset was designed for the 1 ha of damage, using a ratio of 30:1 as defined for critically endangered ecosystems in the Western Capes Provincial Biodiversity Guidelines. The offset site was identified during the EIA process and roles and responsibilities, management requirements (including funding) and security were negotiated before the Environmental Authorisation was issued by the competent authority (the Western Cape Department of Environmental Affairs and Development Planning, DEADP), allowing for effective compliance monitoring and enforcement interventions if necessary.

The Environmental Authorisation identifies a second statutory organisation, CapeNature, as the offset intervention implementing agency. In this regard, CapeNature assisted the applicant with identifying, purchasing (initially), proclaiming and managing an appropriate piece of private land in the surrounding landscape.

The offset transaction was designed by a professional Environmental Assessment Practitioner working with the applicant, CapeNature and DEADP and it has now been fully implemented, using a Stewardship mechanism. A Management Fund has also been established by CapeNature and capitalised by the applicant. This ensures the effective management of the offset site in perpetuity (the required funding component for management was calculated using a 30 year horizon).

The project is notable for the cooperation between three provincial statutory authorities (DTPW, DEADP and CapeNature), the use of Stewardship to secure the final offset, and the willingness of CapeNature to exercise their authority to establish and manage the Management Fund.



Text box 9 – Mapungubwe

The Mapungubwe Cultural Landscape World Heritage Site lies in Limpopo province and includes areas of unique cultural and biodiversity value. It is also located in an area rich in mineral resources, particularly coal. Coal of Africa, (CoAL) owners of Vele colliery, sought and was granted mining rights by the Department of Mineral Affairs in 2010 in an area adjacent to the world heritage site that had been earmarked for expansion as part of the Greater Mapungubwe Conservation Transfrontier Area involving Zimbabwe and lay within the buffer zone of the world heritage site. CoAL commenced operations although it did not at the time have environmental authorisation.

In July 2011 the DEA granted environmental authorisation for the mining activities, but included the condition that CoAL enter into an Memorandum of Understanding (MOU) with the DEA and SANParks to develop a Biodiversity Offset Agreement. The Mapungubwe Biodiversity Offsets Negotiation Committee was established as a result of the MOU, with the purpose of agreeing on the scope of the offsets in terms of residual impact, offset receiving areas, financial requirements, policy and legal arrangements.

In September 2013 the Committee announced that CoAL had agreed to an offset amount of R55 million, payable in 5 tranches over 25 years – the estimated life of the mine. This money would be used to fund management and rehabilitation of archaeological sites and pay for park infrastructure, creating an estimated 349 temporary jobs for local communities in the process and supporting local SMME's.

The offset agreement was met with criticism in some quarters, mobilising as the Save Mapungubwe Coalition. These included criticisms about the process, particularly the failure to include Interested and Affected Parties in the negotiation process. Further, the Coalition were concerned that an increase in the conservation area of the Mapungubwe National Park and World Heritage Site was not an objective in the agreement, and there was a lack of clarity as to how the offset agreement proposed to remedy the residual impacts of CoAL's mining activities. The coalition felt that there were insufficient guarantees to bind CoAL to the terms of payment and that, by the time the agreement lapsed in 2038, R55 million would represent an insubstantial contribution.

Other objections that have been raised include that there is that the offset is being used to substitute for state funding of protected areas and to develop park infrastructure, therefore undermining the principle of additionality and "like-for-like".



3.2 Wetland offsets

Although they make up a small percentage (2.4%) of the country's surface area, wetlands are exceptionally valuable ecosystems. Due to the social and economic importance of water and the vital role wetlands play in water purification, regulating water flows and supporting a rich species diversity that has both high cultural and economic value, the Department of Water Affairs has produced "Wetlands Offsets: A Best Practice Guideline for South Africa" in conjunction with SANBI and its Grasslands Programme.

Wetland offsets may be required either as part of the EIA process, or by the Department of Water Affairs and Sanitation (DWAS) as part of a water use authorisation process. The draft guidelines suggest wetlands offsets are seen as a last resort for dealing with residual impacts after prior steps in the mitigation hierarchy have been exhausted. In terms of the Water Use Authorisation process, the guidelines indicate that wetlands offsets cannot be used to justify a Water Use Authorisation that would not otherwise be considered due to unacceptably high residual impacts.

The DWA's guidelines define wetland offsets as:

... measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse impacts on wetlands (including all impacts on water resources, including hydrological and ecological processes and function, and wetland biodiversity including ecosystems, habitats and species). Wetland offsets address residual impacts to both the intrinsic value of wetlands as well as their value in terms of water resources, hydrological functioning and ecosystem services, arising from project development after appropriate prevention and mitigation measures have been taken.

A distinguishing feature of wetlands offsets is that they combine the need to address residual impacts on biodiversity with an explicit focus on the key regulating and supporting ecosystem services provided by wetlands in relation to water resource management and quality objectives. The goal of wetlands is expressed as follows in the guidelines:

The goal of wetland offsets is to achieve no net loss and preferably a net gain on the ground with respect to water resources (focusing on the importance of wetlands for supporting water resource management objectives, as well as people's use and cultural values associated with wetlands), ecosystem and habitat objectives (especially in terms of meeting national and local objectives for habitat protection and avoiding worsening of ecosystem threat status), and species of special concern (particular threatened, rare or keystone wetland species).

The ecosystem services provided by wetlands support local ecosystems and may be of direct significance to local communities. As a consequence of this focus, there are particular issues that need to be considered in the design of wetlands offsets:

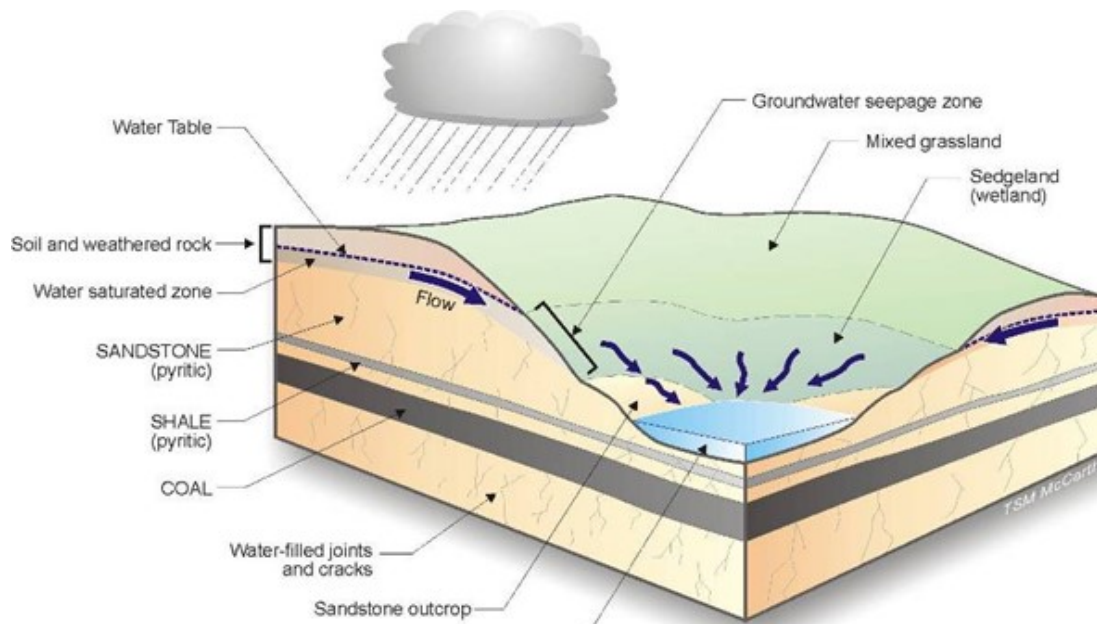
- Adopting a watershed approach to the identification of offset receiving areas so as to locate offsets within the same watershed as the impact site, preferably as close to the impact site as possible, where it can most successfully replace lost function and services.
- It can also be argued that the individuals and communities impacted by the loss of ecosystem services that require offsetting should benefit from the counterbalancing positive impacts of any offset project.



Text Box 10: The South African Context

Wetlands are the most threatened ecosystem in South Africa, according to the National Biodiversity Assessment (2011) undertaken by SANBI. While the historical extent of South Africa's wetlands is uncertain, SANBI state that a substantial portion of this has already been irreversibly lost, and that of the remaining wetlands, 45% has suffered substantial adverse impacts from human activities.

Wetlands face a variety of key pressures, either directly on site or linked to land management practices in the wider catchment. The main on-site pressures are cultivation (e.g. sugar cane, wheat and fruit orchards); urban development; dam construction; poor grazing management causing erosion, and mining, particularly open cast coal mining. The challenge with coal mining is that coal provides most of South Africa's energy needs, yet many of the shallow coal seams correlate with wetlands, as represented in Figure 3. Opencast coal mining can cause unavoidable residual loss of wetlands on a large scale, with frequent losses of 100s of hectares of wetlands through one coal mine.





The watershed approach implies a hierarchy of preferences for wetlands offset site selection, as illustrated in figure 3.

Notwithstanding the above, in order to secure a wetland offset that maximises benefits in terms of the specific regulating and supporting services targeted, their persistence over time,

as well as avoiding loss of biodiversity, it may necessary to locate the offset within the context of the broader landscape and regional ecosystem and water resource management priorities.

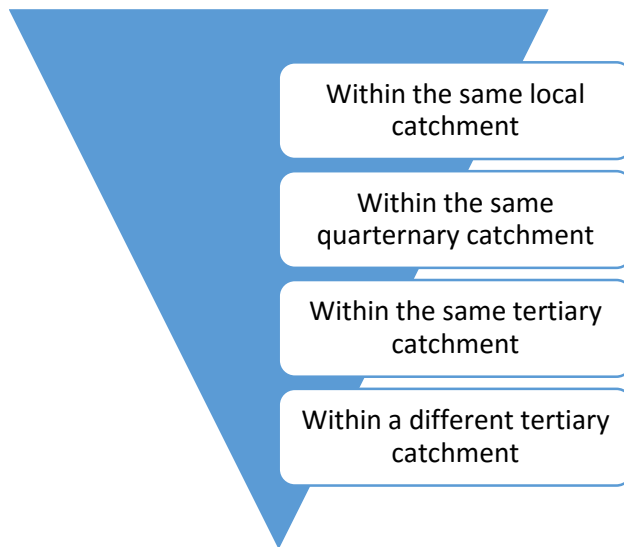


Figure 4: Hierarchy of preferences for wetland offset receiving areas relative to location of residual impact

Text Box 11: Discussion Point – Wetlands offsets and water resource offsets

Given that it may not be practical or environmentally optimal to locate a wetland offset so that local communities that relied on the lost or diminished ecosystem services benefit from the offset, the question arises as to whether possible mitigation measures, such as the provisioning of reliable potable water to the affected communities, should be regarded as being part of the offset framework.

Apart from anything else, this possibility may provide evidence of the need for environmental offsets to be implemented in a transparent and consultative manner, with input from all interested and affected parties into their design.



Text Box 12: Discussion Points – What can be offset?

The wetlands guidelines build on the Biodiversity guidelines in providing a list of residual impacts that suggest “a very strong preference should be given to the avoidance of impacts altogether” rather than the possibility of offsets. These include:

- The status of the potentially impacted wetland as a Freshwater Ecosystem Priority Area, its location within a Strategic Water Resource Area, or its status in Biodiversity and Bioregional plans, or its status as a protected area and/or Ramsar site or as part of a protected area expansion strategy.
- Whether the wetland is providing critical regulating or supporting services to a catchment.
- Heavy reliance on the wetland by local communities for livelihoods.

In addition to the points cited in the guidelines, it should be noted that communities have also opposed wetland development on the basis that the cultural, recreational and/or spiritual value of the wetland would be diminished or destroyed.

It can also be argued that the question of what can and cannot be offset should be approached primarily on a case-by-case basis from a scientific and practical perspective on the environmental efficacy of the offset (which need not preclude consideration of social and cultural factors) rather than as a consequence of automatic policy triggers. The discussion points in Text Box 11 raise some of the practical issues encountered with different strategies for accomplishing biodiversity or wetlands offsets.

A further issue for consideration is what constitutes an “exceptional circumstance” (Draft Wetlands Guidelines) in which offsets for residual impacts will be considered. It can be argued that the social and economic value derived from incurring the residual impacts contemplated should significantly exceed that which is already provided at the development site. In practice, this can be quite a high bar to cross if a total economic valuation of the unimpacted site is performed, and there are cases where such valuations, often undertaken by interested and affected parties, have served to prevent development taking place. Furthermore, some ecosystems may provide services for which there is no feasible, acceptable or affordable substitute. It may be in the interests of all parties that DEA, after stakeholder consultation, issue guidelines for methodologies to be followed in assessing total economic value for wetlands and other ecosystems.



Test Box 13: Discussion Points – Protection, restoration and rehabilitation

A key theme, when discussing biodiversity or wetland offsets is the merits and disadvantages of undertaking an offset through either restoration, rehabilitation, or protection.

Restoration to a previous (pristine) state is scientifically challenging and poorly understood and therefore may be considered risky as an offset target. In practical timeframes it may actually be impossible to restore some ecosystems. For example, many rivers in Cape Town cannot be reverted to a pristine condition due to impacts such as canalisation and building on the riverbanks. There is a case to be made for limiting restoration offsets to particular ecosystems where some success in restoration has been proven to be viable.

Rehabilitation of ecosystems back to a degree of functionality is regarded as being better understood, with a higher success rate than restoration, but is still challenging. There are many examples of failure and it is therefore suggested that monitoring systems are built into rehabilitation projects. Although the target of rehabilitation is not to restore the ecosystem to a pristine state, but rather one that has some benefit to humans, it can halt a trajectory of degradation and put positive feedbacks in place for ecosystem processes to steadily improve ecosystem function and condition, and improve biodiversity.

In South Africa, an argument can be made that a better focus of offsets is on **protecting areas**, especially high priority areas such as critically endangered and irreplaceable ecosystems and those that provide critical ecosystem services. This argument is based on the substantial amount of intact and healthy ecosystems that remain unprotected in our country and are therefore potentially at risk. Protecting such areas can be implemented at much lower costs and risk than rehabilitation/restoration of transformed systems. The offset mechanism may provide an opportunity in South Africa to expand the protected area network and appropriately manage reasonably intact systems.

Averted loss is a form of protection described in the wetlands guidelines, consisting of interventions that prevent degradation of an existing wetland system by responding to clearly demonstrated threats to the biodiversity and ecosystem functions of the wetland – for instance, by taking measures to prevent the entry of excessive sediment loads into the wetland.

The wetland guidelines also refer to **establishment** as an offset option, whereby a wetland is created where none existed previously through engineering the characteristic of a site, but it is an option only to be considered in exceptional circumstances due primarily to the limitation of current knowledge in terms of proven methodologies for recreating the full range ecological values found in natural wetlands.



Text Box 14: Case Study - Steenkoolspruit wetland

In 2003, Angola Coal applied to mine coal at Isibonelo, an open cast colliery near Kriel on the Mpumalanga Highveld. This venture would have negative impact on a significant portion of the Steenkoolspruit wetland. The Department of Minerals and Energy (DME) (now the Department of Mineral Resources, DMR) and DWAF (now DWAS) set a new precedent: They would only issue authorisation on the condition that AngolaCoal offset the impact by rehabilitating 119 hectares of wetlands elsewhere in the catchment (equivalent to what would be destroyed), which would benefit Kriel municipality, local communities and farmers.

The Isibonelo wetland offset became a pilot project to explore effective wetland offset design and implementation. The Mpumalanga Tourism and Parks Agency (MTPA) assisted with the selection of suitable offset sites while Working for Wetlands (managed by SANBI) drew on their extensive experience to help design and implement wetland rehabilitation and add credibility to the process.

With Working for Wetlands being a government public works programme, the rehabilitation process was labour intensive and designed to provide local people with opportunities to develop work skills. In these terms, the offset therefore has had a positive social impact on communities impacted by the mine.

To date the first phase of the offset has been complete, with 45 hectares of wetland rehabilitated. However, the second phase, covering the remaining 74 hectares has not yet occurred and awaits the finalized agreement between DWS and AngloCoal, 10 years after the commencement of mining activity.

This project highlighted the need for clear, agreed upon guidelines for offset implementation and became the motivation to develop a nationally applicable guideline for wetland offsets, which is now in its final draft stages. It is hoped that the guidelines will prevent future wetland offset projects being undermined by ad hoc approaches, which slow down the process, limit the quality of outcomes and increase danger of misuse.



3.3 Water resource offsets

Fresh water is a scarce and valuable resource in South Africa. Chapter 2 of the National Water Resources Strategy, Second Edition (NWRS2) of 2013 describes the importance of water in relation to the National Development Plan:

As water plays a central role in all sectors, including agriculture, energy, mining, industry, tourism, urban growth and rural development, the allocation, development and protection of water is an essential prerequisite for inclusive economic growth, poverty reduction and the significant reduction of inequality in South Africa.

Chapter 16 of the NWRS2, focuses on emerging policy issues and notes the need to review and consolidate the National Water Act of 1998 and the Water Services Act of 1997 to ensure a coherent legislative framework capable of addressing changing policy requirements. Water offsetting is described as one of these emerging policy issues. The NWRS2 notes that government sets limitations in terms of quality and quantity on the use of water:

As a result, municipalities, the private sector and public owners are making significant investments in reducing water usage and improving effluent quality compliance. However, at some stage, a point of 'diminishing returns' is reached, with industry facing a situation of having to make substantial investments to obtain relatively small water savings or meet effluent quality specifications.

The NWRS2 suggests that the concepts around water offsets and water trading need to be refined as part of the policy review process, with the purpose of allowing public and private users to balance their water accounts within a water neutral framework using demand and supply-side interventions with the following overarching objectives:

- *Minimise the gap between the available water supply and demand nationally, particularly in water stressed catchments.*
- *Promote more water-friendly growth and development.*
- *Incentivise better stewardship and greater use-efficiency of our water sources.*
- *Raise awareness of the extent of competition for finite water supplies, the vulnerability of water sources, and the vital importance of pursuing greater use efficiency.*
- *Stimulate greater efficiencies through promoting measurement of water consumption, pollution and use impacts over the complete production and supply chain.*
- *Harness investment by private and public enterprises in water security.*



Water demand offsets are a potential mechanism for achieving water neutral growth. Testing of the concept internationally has been primarily at the level of local authorities, including water constrained cities

in the United States. Drawing on a study of 13 local water demand offset programmes in the United States by an NGO, the Alliance for Water Efficiency, the basic components of water demand offsets are described below:

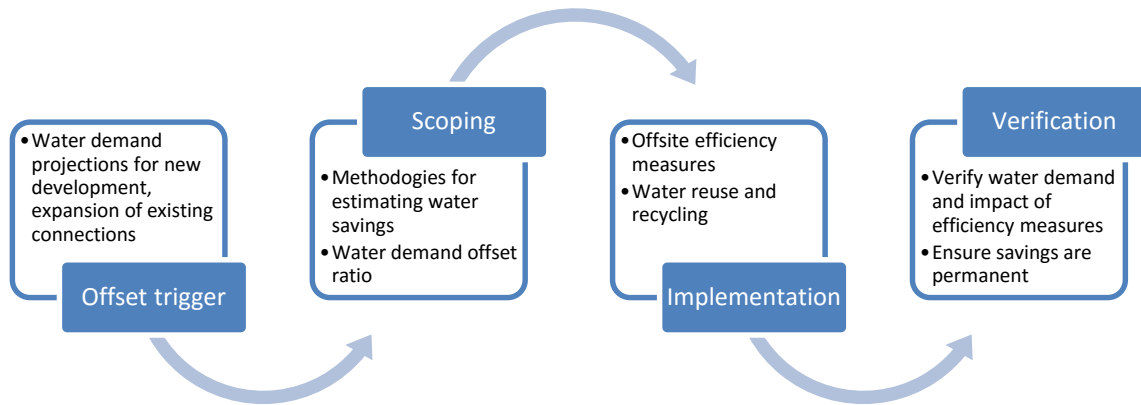


Figure 5: Water demand offsets process

The basic principle involved is that projections for increased water demand arising from new development, or projected increases in demand from existing users must be counterbalanced by efficiency measures that achieve an amount of savings determined by an offset ratio i.e. an offset ration of 1:1 would mean that for every litre of new demand, one litre of savings must be achieved, either on or off-site. Typically, the offset ratio would be

calibrated according to the degree of uncertainty about the extent of savings and projected demanded. Savings need to be measured according to agreed methodologies for particular interventions, which could include demand-side measures such as replacing water fitting with efficient and low-flow alternatives, reducing water losses due to leaks, and reusing grey water.

Text Box 15: Discussion Point – Supply-side interventions

The majority of international case studies of water demand offsets involve water efficiency interventions, leaving the question open of whether supply-side interventions can be used to offset demand. Locally, Working for Water projects involving the clearing of invasive alien plants species aim, in part, to increase the availability of water by removing alien species that use more water than indigenous species, raising the question as to whether water demand offsets could be used to finance an expansion of alien clearing projects.



Water quality offsets are explicitly raised as a policy issue that needs consideration in the NWRS2. Water quality offsets are the outcome of interventions designed to counterbalance the negative environmental impacts of water discharges that affect the quality of the water supply that are implemented at an off-site location.

The discharge of waste water as municipal and industrial effluent, as well as discharges to stormwater systems is regulated according to standards maintained by DWAS in terms of regulations promulgated under the National Water Act (Act No. 36 of 1998) and its provisions for water use licencing, with penalties for entities that discharge water that does not meet the regulated standards for protection of the water resource. A general principle governing water discharges is that they should improve the environmental values of the receiving waters rather than the reverse.

Many South African municipalities, and particularly smaller municipalities, face significant challenges in municipal waste water treatment, with the result that quality of water discharged into rivers and coasts in many cases does not meet the required standards. This is a major driver of declines in the water quality of our freshwater systems and coastal waters near urban centres.

A possible application of water quality offsets would be their use as financing mechanism for building, upgrading and/or maintaining waste water treatment plants. It can be argued that investing in regional water treatment infrastructure is more efficient and has better environmental outcomes than a distributed system of treating many point sources.

A further water quality problem that is of particular urgency in the South African context is that of acid mine drainage, which provides an unfortunate example of historical and ongoing regulatory failures resulting in unacceptable residual impacts on our freshwater systems, with the costs being borne by affected communities in terms of human health, as well as by agricultural water users and surrounding industries in addition to more systemic consequences for the integrity of ecological infrastructure.

It can be argued that acid mine drainage provides an example of the need for a retrospective application of financial offsets by mining companies to contribute to the costs of mitigation requirements in the present. There are however significant obstacles to accomplishing this in the context of fluid patterns of ownership in the sector, and the fact that many of the mining companies owning now-decommissioned mines no longer exist.



Text Box 16: Case Study – Boloka Metsi

Boloka Metsi is a multi-partner project involving demand-side water management interventions in Emfuleni Municipality which is located on the banks of the Vaal River and has the motto “Vaal River City, Cradle of Human Rights”.

Sasol’s production processes require large volumes of water with a high level of assurance of supply, for which it depends on the Vaal River system, accounting for 4% of the demand on the system. The Orange-Senqu River Commission (ORASECOM) is a multilateral institution involving affected SADC countries that promotes the equitable and sustainable development of the resources of the Orange-Senqu River basin, of which the Vaal River system forms part.

Sasol already invests in a range of measures to improve the efficiency of its water use and minimise the environmental impact of its water discharges, but recognises the need to “go beyond the corporate fence” to address long terms issues of security of supply. In the absence of any regulatory and policy frameworks guiding water resource offsets, SASOL’s involvement in the Emfuleni Water Conservation Project could be considered voluntary corporate social investment.

Water losses due to poorly maintained municipal infrastructure, particularly in low-income townships, and inefficient patterns of consumption are a known problem in South Africa. In partnership with GiZ, Sasol identified the possibility to have a significant impact on water demand in Emfuleni, with a particular focus on interventions in the townships of Sebokeng and Evaton. Sasol and GiZ worked with the municipality and under the oversight of ORASECOM to run education and awareness programmes in the community and schools around water conservation, and supported the development of community plumbing businesses to tackle leaking water infrastructure.

The savings were quantified by tracking actual water usage against the historical trend in growth of water demand, amounting to some 2 million m³ of water saved from July 2012 to June 2013 and a close to R10 million reduction in the municipalities Rand Water bill. R10 million in seed funding (split between GiZ and Sasol) was depleted but this was augmented by R3 million contributed by the municipality from ring-fenced savings. Future projections for the project suggest that savings will exceed expenditure.

In terms of its suitability as a model for water offsets, the project raises challenging issues in relation to additionality. Constitutionally, municipalities are responsible for managing and maintaining water reticulation systems, and reducing municipal water losses by 50%. This was highlighted as a local government priority by President Zuma in his 2010 State of the Nation address. At the same time, municipalities such as Emfuleni typically experience serious capacity constraints, and it is almost certain that without the intervention by Sasol and GiZ, the water savings would not have been achieved.

A further issue emerging from the project is the potential for offsets to be accomplished against ongoing residual impacts from existing activities, rather than only undertaken in relation to new projects or an expansion of existing projects.



Text Box 17: Discussion Points – Water quality offsets

There are a number of policy issues that may need to be considered in designing a policy framework for water quality offsets. These include:

- Whether or not off-site investment in water treatment facilities or ecological infrastructure that contribute to the provisioning of clean water can be used to justify water discharges that would otherwise not meet regulated standards. Considerations here might include:
 - a) Who would be affected by the discharge, and what would be the nature and extent of the environmental impact?
 - b) Who would benefit from the investment in water treatment facilities, and what would be the nature and extent of the environmental impacts?

Due to the nature of the water resource, the location of interventions that impact on water quality (either positively or negatively) in relation to upstream and downstream communities and ecosystems is critical.

- As a separate consideration, it may be necessary to define volumetric thresholds for particular types and levels of discharges of polluted water for which offsets would be a requirement.
- As has been learnt from the example of Acid Mine Drainage, impacts on water quality can accumulate over time and may only become apparent as a problem after the activity that caused them has ceased. Is it practical and desirable to require environmental offsets of projects that have already been developed. or even after they have been wound down?



3.4 Air quality offsets

In consultation with officials in DEA currently engaged in developing what will either be policy or guidelines on air quality offsets, the following definition of air quality offsets has been suggested:

In the air quality context, an offset is an intervention, or interventions, specifically implemented to counterbalance the adverse environmental impact of atmospheric emissions in order to deliver a net ambient air quality benefit within the affected airshed/s. Wherein "affected airshed" means the closest area to a section 21 facility where ambient air quality standards are being or have the potential to be exceeded and opportunities for offsetting exist.

A section 21 facility is one that engages in listed activities for which minimum emissions standards have been defined as per section 21 of the NEMA: Air Quality Act, 2004 (Act No. 39 of 2004).

Air quality legislation is driven by the impacts of air quality on human health, with human health functioning as a proxy for environmental impact. The DEA's current approach is outcome based, targeting an overall improvement in ambient air quality as a result of offset interventions, which must complement rather substitute for on-site emissions reduction measures.

As a consequence of the particular nature of the air quality impacts from atmospheric emissions, DEA suggest that the principle of "Like for Like" cannot be applied literally to air quality offsets, beyond the principle that the air quality offsets seek to redress the impact of

atmospheric emissions though interventions that have positive outcomes on air quality, with any other benefits being of secondary consideration.

More specifically, the DEA suggest that offsets should target the air pollutants whose ambient air quality standards are being exceeded in the airshed of the emissions source that is being offset.

The DEA suggest that the only measure of impact of an air quality offset is ambient air quality, and there is therefore no requirement to establish and quantify equivalence between different air pollutants at the source of emissions that are being offset, and the source of emissions where reductions are being reduced as an offset.

The DEA's current approach, as reflected in the draft air quality offsets policy currently being developed, suggests the importance of the following factors:

- In general it is important to ensure that the general public are consulted on offsets. Where offsets involve interventions that depend on other parties for implementation, agreements on the implementation of the offset must be properly documented and signed by parties involved.
- In order to demonstrate additionality, credible baseline measurements of the emissions to be reduced by the offset intervention must be made. The efficacy of the offset is measured in terms of actual reductions relative to the baselines, using credible and robust scientific methodologies.



Text Box 18: Air Quality – the South African context

According to the 2013 State of Air in South Africa Report released by DEA, air quality is a cause for national concern, with ambient levels of particulate matter either at or worse than the minimum quality level, particularly in urban-industrial areas. Air pollution “hotspots” deprive South Africans of their constitutional right to air that is not harmful to their health or well-being. The 2013 Reports also states that efforts to reduce the levels of Sulfur Dioxide (SO₂) pollution have begun to show results.

Particulate matter covers a broad range of fine particles, including soot, smoke, pollen, ash, aerosols and liquid droplets which collectively represent the greatest threat to air quality standards in the country, according to the report. Airsheds in the Vaal triangle, Highveld, and Waterberg-Bojanala have been declared Priority Areas in terms of the Air Quality Act. Significant industrial sources of particulate matter include iron and steel plants, coal-powered electricity generation, and petro-chemical fuel refineries.

Many households in dense low-income settlements rely on coal, wood or other dirty fuels sources for cooking and heating. This results in localised problems of ambient air-quality and poor indoor air quality due to particulate matter. Further, the use of these fuels creates additional health and safety risks from fire (which annually result in a number of deaths and injuries in informal settlements). A recent study estimated that indoor air pollution is responsible for up to 1400 child deaths per year in South Africa due to Acute Lower Respiratory Infections.

Currently, the DEA are contemplating the possibility of air quality offsets as an option in the following scenarios:

- The National Framework for Air Quality Management provides for the DEA to postpone compliance requirements for minimum emissions standards for a listed activity. Such a postponement may be granted if, for example; technology to reduce emissions for the listed activity is not available; or if there is a plan to decommission the emissions source within 10 years. In such cases, an air quality offset could be a requirement of the postponement being granted.
- Where a variance to an existing Atmospheric Emissions License is requested that increases the atmospheric licence, an air quality offset programme could be a requirement of the variation being granted.
- Where a new atmospheric emissions license is sought in an Air Quality Priority Area as declared in terms of Section 18 of the Air Quality Act, or in any area in which there is a risk of Ambient Air Quality Standards being exceeded, if there are sufficiently compelling social and economic reasons for granting the license it may be appropriate to include the requirement for an air quality offset in the licensing conditions.



Potential interventions for consideration as air quality offsets, might include:

- Interventions designed to improve indoor air quality based on switching from dirty fuel sources (such as coal) to clean fuel (such as gas); electrification or subsidisation of electricity.
- Switching public transport to clean fuel sources or promoting take-up of, and constructing infrastructure to support, non-motorised transport.
- Paving of roads and other dust suppression interventions.

Text Box 19: Discussion Points – Air quality offsets

Some general issues that may need to be considered in terms of air quality offsets include:

- Is the focus on human health appropriate as a target for an environmental offset? It might be argued that this approach does not adequately address the environmental impact of particular pollutants. For instance SO₂ contributes to acid rain, which can have an indirect impact on human health and livelihoods as a consequence of its impacts on plants, soil and aquatic ecosystems. The suitability of treating different atmospheric pollutants as fungible and the manner in which ratios to allow for fungibility will be established through a single currency for air quality credits are critical issues that need to be resolved.
- The long term implications of air quality offsets need careful consideration in terms of sustainability and social acceptance – for instance, once subsidies have been provided, their withdrawal may prove problematic.
- Related to the above, subsidies may create conflicts of interest. For instance, considering Eskom's core business, its involvement in electricity subsidies or electrification as an air quality offset might be viewed in this light.
- In general, local offsets of pollutants that may have a much wider spatial dispersion may be considered problematic.
- The fact that compliance levels for air quality are not directly measured as emissions at the level of facilities but in terms of air quality within the airshed of a facility may result in difficulty in accurately ascribing responsibility for exceeding ambient air quality standards since airsheds for different sources of emissions may overlap.
- There are not well established international precedents for air quality offsets, and as a consequence businesses will need clear guidance in terms of acceptable methodologies. At the same time, some businesses argue that it is either physically impossible for them to comply with new air quality standards, or economically unfeasible. Offsets may represent a cost-effective mechanism for achieving compliance and positive environmental and social outcomes.



Text Box 20: Case Study – Eskom’s air quality offsets

Eskom, as one of South Africa’s most significant energy companies, produces large quantities of emissions which affect ambient air quality. Eskom has installed technology at its coal-fired power stations to reduce emissions of particulate matter, but estimate the cost of full compliance to the Minimum Emissions Standards to be in excess of R200 billion in capital expenditure in real terms, with additional annual operating costs in excess of R5 billion, which would need to be recovered from consumers through tariff increases. Additionally, this full compliance scenario would introduce numerous environmental pressures such as an increased water footprint, the opening of new limestone mines, and an increase in waste production (gypsum). Eskom believe that air quality offsets present a way of achieving a much greater reduction in the exposure to harmful levels of air pollution, at a fraction of the cost to the South African economy.

Together with the North West University, the Nova Institute, EScience Associates and Prime Africa, Eskom has initiated a study into air quality offsets on the basis of research that indicates that:

- Residential burning of solid fuels such as coal and wood represents the most important sources of human exposure to air pollution in the vicinity of the operations of Eskom.
- The impact of ambient and indoor air pollution disproportionately affects low income households and is concentrated in low income housing estates and informal settlements.

The project team argues that counterbalancing the impact on human health from poor air quality should be the primary target of air quality offsets, and that the design of air quality offsets should address those most at risk. A currency for air quality offsets has been proposed that allows for source emissions of (for instance) SO₂ to be offset by reductions emissions of a different type (e.g. particulate matter). The currency is based on air quality impacts in terms of: (a) quantity of emissions; (b) size of the exposed population; (c) their exposure and proximity to the emissions source; and (d) the persistence of the pollutant in the environment. This is an alternative to the usual “like-for-like” framing used in other environmental offset projects. Eskom’s air quality offsets complement the company’s point source emission reduction initiatives, and are a condition of the approved Minimum Emissions Standards (MES) postponements which were granted in February 2015.

Eskom’s air quality offset pilot study is being conducted in a selected number of households in Kwazamokuhle, near Hendrina town, in which a range of household interventions are being investigated to find out which interventions are most effective in reducing solid fuel use. The piloted interventions include: improved household thermal insulation (by installing ceilings and wall insulation), replacing coal cooking stoves with more energy efficient stoves, providing LPG heaters and stoves, and by providing electricity subsidies.



3.5 Carbon offsets

The National Climate Change Response Policy (NCCRP) provides the following overview of the impacts of climate change:

It will significantly affect human health, agriculture, other water-intensive economic sectors such as the mining and electricity-generation sectors as well as the environment in general. Increased occurrence and severity of veld and forest fires; extreme weather events; and floods and droughts will also have significant impacts. Sea-level rise will negatively impact the coast and coastal infrastructure. Mass extinctions of endemic plant and animal species will greatly reduce South Africa's biodiversity with consequent impacts on ecosystem services.

According to the NCCRP, South Africa accepts that climate change currently being experienced is driven by the impact of human activities. As a consequence, South Africa has committed itself to an ambitious trajectory in terms of a peak, plateau and decline in the emissions of the greenhouse gases (GHG) responsible for global warming, of which carbon dioxide (CO₂) is the most significant.

There are two fundamental strategies that are deployed in an attempt to slow, halt and ultimately reverse the rate at which GHG of anthropogenic origin accumulate in the earth's atmosphere:

- Reductions in emissions derived from energy consumption, and particularly the use of fossil fuels through switching from high carbon fuels to lower carbon fuels, energy efficiency measures and changes in patterns of energy consumption, including behaviour change to conserve energy.
- Slowing or reversing negative impacts from agriculture and land use change activities on the carbon sequestration potential of biological systems.

Carbon offsets are intended to serve as a mechanism that provides some flexibility in how emissions reductions targets are achieved so as to allow market forces to determine economically efficient ways of reducing emissions so as to minimise potentially negative economic consequences.

Chapter 5 of the National Development Plan makes an explicit case for carbon offsets:

The creation of a properly regulated domestic market in carbon offsets will enable industry to identify least-cost approaches to emissions reductions and drive private-sector investment in renewable energy and mitigation.

Carbon offsets differ from the environmental offsets discussed so far in that the impact of carbon emissions is global and not local. The underlying principle of carbon offsets involves emitters who have difficulty in reducing their emissions paying someone else to undertake emissions reductions activities at another location.

The international market in carbon credits is primarily driven by the Clean Development Mechanism (CDM), a UNFCCC mechanism intended to promote sustainable development in developing countries while providing a degree of flexibility to emitters in industrialised countries as to how emissions reductions are achieved. Specifically, the CDM mechanism allows emitters in industrialised countries to counterbalance their emissions by directly investing in emissions reduction projects in developing countries that generate Certified Emissions Reductions (CERs, also known as "carbon credits" or "offset credits"), or by purchasing CERs from projects established unilaterally in developing countries.



The market for carbon credits established by the Kyoto protocol is compliance driven in that it provides flexibility in the manner in which Annex 1 countries (industrialised countries) achieve their commitments to cap their emissions. There is also a smaller voluntary market for carbon credits that is driven by consumers and standards for responsible corporate governance and reporting. There

are a variety of standards for verifying carbon offsets that do not seek UNFCCC accreditation, the most widely adopted being the Verified Carbon Standard.

Text Box 21: Case Study – Eskom-Shell solar home system

The cost of extending the national grid to isolated rural communities is high, and Eskom's ability to recover those costs from what are often very poor communities is limited. As a consequence these communities often experience energy poverty that constrains local economic development and the delivery of infrastructure and services such as health and education. Households in these communities tend to rely on wood fuel, paraffin and candles for cooking, heating and light.

On the strength of a CDM pilot project undertaken by Shell international, Eskom and Shell formed a joint venture to develop a CDM project as part of the South African government's off-grid electrification programme. The government programme was implemented on the basis of area-based concessions, and provided substantial subsidies for each installation. The project initially undertook to provide some 50,000 rural households in the north east of the Eastern Cape and southern KwaZulu-Natal with electricity from photovoltaic solar power systems, using battery storage. The system would be capable of providing a rural household with lighting and power a 12V black-and-white television set and radio for about 4 hours per day.

The project was intended to deliver a range of sustainable development benefits, including improved indoor air quality, the direct and indirect creation of local jobs, and stimulus to local economic development as well as an estimated 230 kg of CO₂ emissions reductions per household.

Although the government's procurement process was initiated in 1999, the Eskom-Shell joint venture only began to rollout at scale in 2003, and government stopped subsidies to the programme in 2004 so that it could undertake a review.

A number of analyses of this project have been undertaken. While in general households welcomed the project, there was also frustration with the limitations of the system relative to the grid-connected electricity, with the perception that it was an inferior service for poor people. From the perspective of the Department of Energy, the project's conception of sustainable development was too narrow, as it could not support key socio-economic objectives for energy provision in terms of supporting the delivery of infrastructure and services. On a broader level, the project points to some of the risks associated with CDM projects in terms of mismatches between expectations of local stakeholders and international investors in relation to sustainable development outcomes.



Text Box 22: Discussion Points – CDM and the international carbon market

The value of the global carbon market reached a historical high in 2011 of 98 billion Euro. For a variety of reasons, including the global economic climate, the value of the market has more than halved since then, but it continues to attract substantial investment. A number of issues have been raised with the way global carbon markets function, including:

- The stringent technical requirements for the design, implementation, monitoring and verification of CDM projects (and other regional trading schemes) result in high transactions costs. This not only serves as a barrier to market entry, but it can be argued that it compromises the sustainable development outcomes of these projects, with large corporates benefiting disproportionately from CDM projects, rather than local communities and local businesses in developing countries.
- Despite the stringent technical requirements of the CDM mechanism, it is alleged that in many cases CDM projects do not provide real additionality in terms of emissions reductions. In CDM terms, additionality means that a carbon offset project would not have been financially feasible without the income derived from the sale of carbon credits. It is suggested that in many instances industries extract a double benefit for implementing measures – for instance, in terms of energy efficiency – they would have undertaken irrespective of carbon financing.
- A number of technical criticisms have been raised about particular CDM project methodologies and the manner in which they are implemented. For example, CDM projects designed around capture of methane from landfills (a potent GHG gas) may deter investment in recycling and as a consequence have a far less positive net environmental and emissions reduction impact than may be apparent from project documentation. This problem is sometimes referred to as “leakage”, with the project gains in emissions reductions leaking due to emissions being incurred outside the project boundary.
- There are also potentially problematic implications arising from the system of international accounting of emissions. Technically, the emissions reductions derived from a CDM project implemented in South Africa as a developing country are to the account of the investor countries, thereby constraining the mitigation options available for our national carbon account.
- Objections to the global carbon market include criticism of the underlying conceptual framework. For instance, some commentators are of the opinion that carbon offsets in practice provide a disincentive to emissions reductions in industrialised countries.
- On the other hand, some criticism is advanced from the perspective that trading of carbon offsets is a work in progress which can be reformed and strengthened as an outcome of improved global commitment to the UNFCCC processes and the evolving framework of multilateral climate change agreements.

DEA is the Designated National Authority for South Africa with responsibility for governance and administration of the CDM mechanism. There are currently in excess of 80 registered CDM projects in South Africa that generate CERs. The CDM is an established institution, with procedures for registering emissions reductions methodologies and a monitoring, reporting and verification process that CDM projects need to comply with in order to generate CERs. South Africa is an active participant in the UNFCCC processes concerned with governance and reform of the CDM. There are now a number of different markets for carbon offsets, with slightly different criteria for eligibility of projects generating carbon credits.

Chapter 5 of the National Development Plan makes an explicit case for carbon offsets:

The creation of a properly regulated domestic market in carbon offsets will enable industry to identify least-cost approaches to emissions reductions and drive private-sector investment in renewable energy and mitigation.

The NCCRP outlines two potential mechanisms that could be used to drive a market for carbon offsets:

- Carbon budgets for sectors, industries and companies.
- A Carbon Tax

The Carbon Tax is scheduled to be implemented in 2016, and in preparation for its implementation National Treasury published a carbon offsets paper in April 2014, outlining its thinking on the use of carbon offsets to reduce carbon tax liability in South Africa. National Treasury's definition of carbon offsets encompasses the following key concepts:

- Carbon offsets can be achieved through projects that avoid, reduce or sequester CO₂ or other GHG emissions, typically through biological sequestration, the production of renewable energy, implementation of

energy efficiency measures and reduction of non-GHG emissions.

- It may be cheaper for companies to reduce their carbon tax liability by funding GHG measures implemented by someone else than to reduce emissions by investing in their own operations.
- To ensure consistent accounting of carbon offsets, project developers should develop new methodologies or implement existing methodologies that are approved by a credible standards body. Carbon offset markets in the form of a carbon exchange ensure that carbon offsets are priced as a commodity – the project methodology used to generate carbon credits does not affect their price, which is market determined.

The Treasury paper provides guidance in terms of principles that might be used to inform the design of a domestic carbon offset market. These include the need for carbon offsets to be real, additional and permanent (i.e. not reversible, for instance by biologically sequestered carbon being released due to land use changes).

Treasury also suggest that timing of the emissions reductions achieved by an offset should match the timing of the emissions being offset. Allowing emissions reductions incurred in the past, for instance, to be used to offset emissions produced in the present could compromise measurement of baseline emissions. Treasury stress the importance of the enforceability of an offset regime in terms of legal instruments that guarantee the validity of offsets on the basis of transparent systems for measuring, monitoring and verifying emissions reductions.

National Treasury's Carbon Offset Paper outlines approaches to a number of policy questions in relation to the eligibility criteria for offset projects:

- It is proposed that only local (South African) projects be eligible as carbon offsets. This is to promote the development of local carbon offset



projects, thereby encouraging an absolute reduction in national emissions and contributing to broader sustainable development objectives in terms of job creation and the development of skills and capacity.

National Treasury propose that only activities not covered by the carbon tax be considered as possible carbon offsets. This

is to avoid a potential double incentive for emissions reductions projects that both reduce liability in terms of the carbon tax, and derive income from carbon credits. Specific sectors are exempted from the carbon tax, and entities whose emissions fall below the carbon tax threshold defined for their sector are exempted, and therefore eligible to generate carbon credits for emissions reductions activities.

Text Box 23 Discussion Points: Eligibility and scope of carbon offsets

National Treasury's proposal that offset projects be limited to those based in South Africa has the advantage of stimulating the development of local capacity to implement carbon offsets, ensuring that local communities receive co-benefits such as job creation, and in the case of biological sequestration, realising local ecosystem benefits.

National Treasury's suggested approach of limiting eligibility for the generation of carbon credits to activities not already subject to the carbon tax will further limit the initial supply of carbon credits. At the same time, these restrictions on the supply of credits is likely to create upward pressure on the price of eligible carbon credits, thereby incentivising entry into the market by early adopters.

In order to avoid supply constraints inhibiting the initial market for carbon offsets, Treasury propose a two-phase approach to accreditation of offsets. Initially it is proposed that carbon credits generated under the CDM, Gold Standard, Verified Carbon Standard and Climate, Community and Biodiversity Alliance standards be recognised. In the medium term, Treasury suggest that a domestic standard for CERs be developed by the DEA as the current Designated National Authority (DNA) for the CDM, drawing on the capacity that has been developed by the DNA in administering the CDM locally. A major concern for many potential players in a possible domestic carbon offset market is that barriers to entry in the form of transaction costs for the verification and accreditation of offset projects be kept low.

Treasury also proposes to cap the percentage of emissions reductions that can be offset to between 5% and 10% of an organisation's tax liability. Considering that the stated intention of the carbon tax is to promote least cost reductions of carbon emissions rather than to generate revenue and that there will be no ring-fencing of tax revenue, there may be some resistance to this from the private sector.



Text Box 24: Case Study – The Jobs for Carbon Project

Sub-tropical thicket is classified as a global biodiversity hotspot with more than 8000 species, of which more than 20% are endemic. Apart from its high biodiversity value, it also captures large amounts of carbon, similar to the amount of carbon captured and stored as tropical forest. Spekboom, a keystone species of South African sub-tropical thicket accumulates one of the highest stores of below ground carbon. Spekboom can store between 2 to 4 tonnes of carbon per hectare per year.

However, 80% of sub-tropical thicket is moderately to severely degraded, largely a consequence of injudicious goat pastoralism. This has resulted in the loss of important ecosystem services, such as carbon capture and storage, erosion and flood control and water infiltration, with negative social and economic consequences (e.g. a depressed economy, lower farmer returns and chronic unemployment).

Once degraded, Spekboom thicket does not often bounce back, unless there is active intervention through dry planting of spekboom cuttings. As Spekboom matures it attracts other plants and animals and begins the process of thicket restoration, making it an effective and simple restorative strategy.

Work is underway to explore the potential for restoring degraded thicket using the tool of carbon offsets. Although the carbon market fluctuates considerably, with prices of carbon credits varying between 5 dollars to over 40 dollars a ton, it can supply landowners with a viable income stream per hectare of restored sub-tropical thicket, providing an incentive to change land practices from goat husbandry to carbon farming.

The Gouritz Cluster Biosphere Reserve partnership developed a project called “Jobs for Carbon” in the Vanwyksdorp area of Kannaland municipality. The goal is to encourage carbon farming among local landowners as a sustainable use of sub-tropical thicket and a means of social upliftment, through job creation, and skills development. The project is in its early days and is testing and developing the business case for carbon offsets, with carbon credits being sold on the carbon market. If the project is successful it will achieve the following five goals:

- Restore 300 hectares of degraded sub-tropical thicket
- Create over 60 local jobs
- Build entrepreneurial skills and capacity to run restoration teams
- Provide knowledge about the potential and requirements for carbon credits, secured in South Africa, to be sold on the carbon market.
- Catalyse additional restoration work in the region

As demonstrated by the above example, biological sequestration can deliver a range of environmental (including biodiversity) and social benefits, and can potentially be an outcome of ecosystem restoration projects.



4 Implementation options and constraints

In terms of implementation options for offsets, the distinction between voluntary offset markets and compliance driven markets is essential. Although offset projects accomplished in terms of these markets may seem similar, the driving forces can be quite different. Voluntary markets are self-regulated and do not impose significant capacity requirements on the state. Voluntary Emissions Reductions (VERs) are usually cheaper than CERs, and may be purchased directly from the offset provider, although there are also voluntary offset exchanges built around particular offset verification standards that function as a mechanism for establishing a market-driven price.

Because they are voluntary, voluntary offset markets tend to be much smaller than compliance-driven markets. However, although biodiversity, wetlands and air quality offsets are largely implemented as a response to compliance requirements in South Africa, because they are developed on a case by case manner there is not a market for biodiversity, wetland or air quality credits. In the case of these offsets, such a market could be created by the use of financial offsets. It can be argued that financial offsets are only appropriate in cases where residual impacts are sufficiently low that the potential receiving environment for offsets does not need to be narrowly defined.

Unless carefully framed within the context of corporate social responsibility, it is possible that the business community would regard the imposition of financial offset requirements on projects that would otherwise have received environmental authorisation as a stealth tax on doing business. Even if regarded as a tax, it would be immune from the criticism leveraged by the community on the carbon tax for not being ring-fenced.

A policy framework that sought to create a market for projects generating a range of environmental offset credits would need to be supported by similar institutional arrangement as that which supports carbon credits and is outlined in National Treasury's Carbon Offsets Paper. South Africa would need to learn from international experience of conservation banking, for instance.

4.1 Conservation banking

Conservation banking involves providing the wherewithal to restore, rehabilitate or protect an ecological site for the purpose of providing offsets to mitigate development impacts. A conservation bank will take on the responsibility of providing the offset, by selling the required number of credits to the developer (WWF Biodiversity Offsets Policy 2012) and by using the funds generated to pay for the specified conservation activities.

There are a number of examples of conservation banking. In 1972, the United States Clean Water Act (1972) was the first act to introduce thinking around offsets that aimed for a no net loss of wetland acreage and function. Out of this act was formed the U.S. Wetland Mitigation Banks scheme, which is the oldest international offset trading program. This scheme encourages companies to restore wetlands, which are then sold as credits to developers whose projects have had a residual impact on wetland.

The offset banking process is regulated and structured by a mix of actors and institutions including developers, entrepreneurs, NGOs and national or local government departments.



The main role players and frameworks are:

- Developers whose projects have a residual impact below a certain threshold. If impacts are above a certain threshold the developers would need to develop, fund and monitor their own like for like, no net loss offset projects.
- Third party offset providers (including rural landholders, private conservation organisations and indigenous corporations) who invest in the protection and restoration of ecosystems and threatened species (Australian Government. Department of Sustainability, Environment, Water, Population and Communities 2012);
- The conservation bank who is the intermediary between the developer and one or more offset providers and sells credits, which act as proxies of ecological impact versus ecological gains.
- Decision maker, e.g. relevant government departments who regulate the process.

4.2 Stacking and bundling

Stacking and bundling are offset tools, linked to conservation banking, that offer some distinct advantages as well as risks. Their usefulness within the South African context remains contested.

Bundling is the combination of “more than one ecosystem credit type from the same area of land...into a single credit type” (Ingram 2012). The market is thus reduced to one ecosystem credit type. In contrast, stacking is where a seller receives multiple ecosystem service payments for services generated on a single area of land. Credits are thus sold separately into different markets.

There are three broad categories of stacking:

- Horizontal stacking is where more than one distinct management practice is implemented on non-spatially overlapping areas of land. This is the least controversial form of stacking as each management activity is credited only once.
- Vertical stacking is where a seller receives multiple payments for a single management activity. For example, both carbon and water quality credits are received for planting a riparian forest. This is the most typical form of stacking and is most closely aligned to the definition of stacking. It is however the most challenging and controversial type.
- Temporal stacking is where there is one management activity, but different offset credits are sold over time.

In offset banking, there is a danger that a single ecosystem service becomes the focus. This approach ignores the interconnected nature of ecosystems, counteracts an ecosystem based management approach that is better designed to achieve ecological function and integrity and could actually lead to greater degradation, as a focus on only one ecological service, undermines others (Ingram 2012).

Stacking and bundling approaches to offset banking provide tools to integrate multiple ecosystem services and values into environmental markets, and thereby achieve a greater ecological benefit. In summary, they provide financial incentives for more holistic management approaches to conservation.



4.4 Constraints

A cluster of concerns exist in relation to the potential for environmental offsets to corrupt environmental authorisation processes and undermine the enforcement of existing environmental legislation that also relate to concerns about the capacity of government in relation to monitoring and enforcement. It can be argued that government should focus on deficits in the enforcement of existing policy and legislation rather than introducing additional complexity.

Accepting that there is considerable pressure both from the private sector and within government itself for environmental authorisations to facilitate social and economic development, a countervailing argument can be made that environmental offsets bolster the integrity of the authorisations processes by providing stakeholders in the process with an alternative to minimising the significance of residual impacts in order to avoid blocking projects that provide housing, infrastructure, and jobs.

Building on this point, it can be argued that the extent to which any government function is financed and capacitated is strongly influenced by perceptions of the extent to which it contributes to national sustainable development imperatives. In providing a mechanism for unlocking both public and private sector investment in sustainable development, it can be argued that offsets are likely to lead to a strengthening of capacity in relation to environmental authorisations.

At the same time concerns about the potential for corruption of EIA processes, environmental licensing and the integrity of carbon budgets need to inform approaches to offsets. In terms of processes, this may underline the importance of public consultation in relation to the design and implementation of offsets. For instance it is probably desirable that a possible requirement for an environmental offset be identified at the start of the EIA process, and forms part of the public consultation process from the outset. Similarly, it can be argued that the requirement for consultation with interested and affected parties should form part of the standard methodologies for all environmental offsets.



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