

# SAMSET brief on Carbon Trading

This briefing note has been designed for use by city officials and planners working in sub-Saharan Africa. It is a practical guide, which identifies easy to achieve energy interventions that will save money (for cities, businesses and households), promote local economic development, and enhance the sustainable profile of a city. This note is specifically aimed as a support tool to achieve the implementation of key interventions within municipalities across sub-Saharan Africa.

African municipalities need to be prepared to deal with an explosion in demand for services from burgeoning populations caused by two factors – high population growth in Africa as a whole, and rapid urbanisation. An interesting feature of population growth in sub-Saharan Africa is that it is expected to take place mostly in small and medium sized cities, rather than capitals (UN-Habitat, 2010). These changes are taking place at a time when many countries are devolving administrative powers to local governments, yet municipal authorities lack the skills and expertise to address challenges, to manage resources, and to implement and enforce policies.

Energy is only one of many services that municipalities need to address in the face of increasing urbanisation, but it is crucial to any form of urban development – planned or otherwise. People need energy as part of their every-day lives. The supply of energy is closely

linked to economic development, health and individual wellbeing, as well as to local and global environmental sustainability.

Recognising the emerging role of municipalities, with limited capacity, in addressing energy provision in urban centres, the “Supporting African Municipalities in Sustainable Energy Transitions” (SAMSET) project seeks to build capacity and develop a practical and effective knowledge exchange framework for supporting actors involved with municipal energy planning. This note is an output of the SAMSET project.

The purpose of the note is to give planners an idea of the range of energy interventions that it is possible for them to implement at the municipality level. It provides enough information to give a basic understanding of different energy technologies – enough to start making enquiries and engage in discussion. More detailed technical expertise will, however, be needed in order to design a bankable project.

Full guide can be found at [africancityenergy.org/uploads/resource\\_101.pdf](http://africancityenergy.org/uploads/resource_101.pdf)

More info can be found at [africancityenergy.org/](http://africancityenergy.org/)

More project info can be found at [samsetproject.net](http://samsetproject.net)

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## Overview

Carbon emissions have substantially increased in the last 50 years, as shown by the graph below. Carbon trading, or emissions trading, is a market-based tool to combat greenhouse gas emissions. Through cap-and-trade schemes, emissions allowances are distributed or auctioned off to members. In the European Union Emissions Trading System (EU ETS) it is compulsory for all factories (above a certain size) in energy intensive industries (e.g. oil refineries, steel and paper works) to participate in the scheme. Those who do not have enough allowances to cover their emissions must either make reductions or purchase another firm's spare credits. Those with extra allowances can sell them on the carbon market or bank them for future use. A successful scheme relies upon a

strict cap which decreases over time and can be either voluntary or mandatory.

Putting a price on carbon shifts the burden of environmental damage back to those who are responsible for it. A carbon price forces polluters to decide for

themselves whether they want to continue producing emissions and pay for it, or to stop polluting. As a result, reductions can be achieved in a flexible and low cost way. Putting a price on carbon also stimulates the development of clean technology and market innovation.

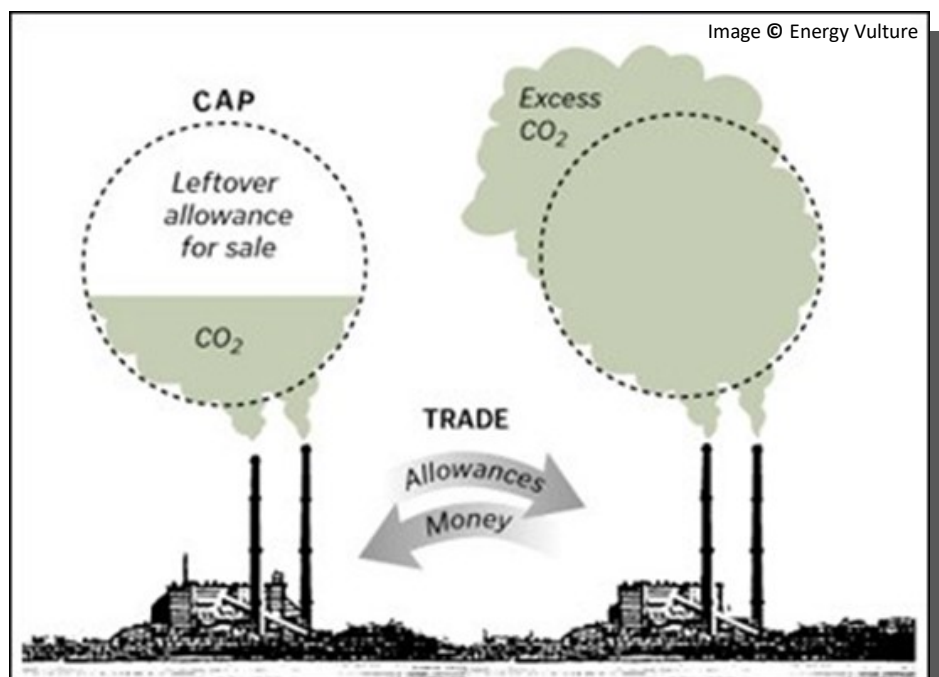


Image © Energy Vulture

### Case Study: Off-grid renewable energy for rural electrification in Mozambique managed by FUNAE

The goal of this PoA is to provide renewable electricity to rural villages in Mozambique through solar PV and mini-hydro systems. The small-scale off-grid renewable energy program is run by FUNAE (Fundo de Energia). FUNAE is committed to promoting greater access to energy in a sustainable and rational way, which contributes to the positive development of Mozambique. The project will enable the electrification of rural areas without current access to the grid. The programme therefore ensures the access to economically viable energy sources in a sustainable way.



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### Case Study: Renewable Energy CDM Programme of Rwanda

The purpose of Renewable Energy CDM Programme of Rwanda (RECPR) is to support the development and implementation of renewable energy projects in Rwanda. RETs implemented under the programme include hydropower, PV power and geothermal power with the aim of reducing fossil fuel based electricity generation and promoting renewable energy based power generation.

The Kyoto Protocol dominates the mandatory market, providing member countries with specific reduction targets. The European trading scheme (EU ETS) is mandatory across the EU and covers approximately 12,000 factories or utilities in 25 countries. Based on its targets, each member state sets its own emissions cap and then distributes allowances to individual firms. These allowances can then be traded across the EU.

Each carbon credit is equal to one tonne of carbon dioxide or equivalent gas. Individuals wanting to reduce their carbon footprint voluntarily can purchase credits on the carbon market. The image below shows a simplified version of the carbon market.

The ETS allows its members to earn credits by funding projects through two mech-

anism reduction (CER) credits which can be counted towards meeting Kyoto targets and traded on the carbon market. One credit is equal to one tonne of carbon dioxide.

The mechanism intends to stimulate sustainable development and encourage emission reductions, whilst offering industrialised countries some flexibility in how their targets are met. Currently there are over 7,700 registered projects under the CDM scheme.

#### Benefits of CDM projects include:

- Investment in climate change mitigation projects in developing countries
- Transfer or diffusion of technology in the host countries
- Improvement in the livelihood of communities through the creation of employment or increased economic activity.

Under the clean development mechanism (CDM), a programme of activities (PoA) is the implementation of a policy, measure or goal that reduces emissions. Under a PoA, emission reductions achieved by various individual activities or component project activities (CPAs) can be aggregated, without each one requiring registration.

Registered PoAs can include household-level activities, such as the installation of clean cookstoves and energy efficient light bulbs. Small-scale renewable energy projects, such as solar and hydro power are also included. Around 29% of all registered PoAs were located in Africa, as of 2013, compared to just 2% of standard CDM projects. Typically PoAs will last up to 28 years with an initial 7 year crediting period which may be renewed 3 times.

anisms: the Clean Development Mechanism (CDM) and Joint Implementation (JI). CDM allows industrialized countries to pay for emissions reduction projects in poorer countries that do not have emissions targets. By funding projects, industrialised countries earn certified emissions reduction (CER) credits to add to their own allowances. JI allows industrialised countries to fund projects in other industrialised countries.

### The Case

#### Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM) allows countries under the Kyoto Protocol to implement an emission-reduction project within a developing country. Projects can earn certified emis-

### Potential for Rollout

CDMs can be city or sector-wide. Many PoAs target a single municipality at a time, initially using small-scale methodologies. Projects within the energy industry significantly exceed all other sectors demonstrating high potential for roll out within sub-

Saharan Africa.

PoAs are more attractive and accessible, especially for developing countries which have not benefited from the CDM in the past. Compared to regular CDM project activities, POAs have many benefits:

- Transaction costs, investment risks and uncertainties for individual CPA participants are reduced.
- PoAs are managed on a regional level which speeds up the approval process.
- Access to the CDM is extended to smaller projects which would not be viable as stand-alone projects.
- Direct engagement of individual project developers in the CDM process is not required.
- Emission reductions can be continuously scaled up after PoA registration, since an unlimited number of CPAs can be added at a later stage.
- Many technologies with high co-benefits, e.g. on the household level, are supported by PoA.
- Specific regional policy goals can be effectively supported by accessing carbon finance through PoA.
- Monitoring and verification can be undertaken on a collective basis by utilizing a sampling approach.
- No registration fee is due for each CPA included after registration. Registration fees are based on the expected average emission reductions of the "actual case" CPAs submitted at the PoA registration.

As a result, PoAs under the CDM scheme have high potential in sub-Saharan Africa, particularly within the renewable energy sector.

Perhaps the biggest threat to carbon trading schemes is the collapse in the price. Critics argue that there are inherent contradictions in the pricing of carbon units, and that huge price fluctuations deter investment in renewable energy and energy efficiency.

## Implementation Barriers

A number of potential challenges exist with the implementation of PoAs.

The success of a PoA largely depends upon the organisational and managerial capabilities of those involved. Identifying institutions that can fulfil the requirements of a PoA and that have the appropriate capabilities, experience and capacities have already proven to be one of the main challenges, especially in LEDCs.

Most PoAs require that the Coordinating Entity is able to show bankability to potential financial institutions, investors, CER buyers and CPA developers. This obviously poses a challenge for LEDCs.

There is limited practical experience of the pitfalls and challenges of PoAs.

It may take longer to get a PoA registered than to get approval for a CDM single project.

## Implementation

### The Kyoto Protocol

Under the Kyoto Protocol, members with industrialised or transitional economies receive specific reduction targets.

The treaty has committed 37 industrialised countries plus the European Community to reducing their 2012 emissions by an average of 5%

## Case Study: Biomass Energy Conservation, Malawi & Rwanda

The Biomass Energy Conservation (BEC) PoA is a voluntary initiative led by Hestian Innovation Ltd. The purpose of the PoA is to promote sustainable development and the reduction of greenhouse gas emissions from non-renewable biomass fuel through the dissemination of improved household cookstoves in Malawi and Rwanda. Each CPA will consist of a number of improved cookstoves, such as the Chitetezo Mbaula or Canarumwe stoves, or others as specified in each component project activity design document

## Case Study: Cape Town Landfill Gas Extraction and Utilisation

The main goal of the PoA is to establish a CDM framework to which landfill gas utilisation projects can be added to promote the recovery and utilisation of renewable resources over the Republic of South Africa. Other goals of the PoA are:

- Contribute to sustainable development within South Africa.
- Expand the use of renewable energy technologies in South Africa.
- Reduce uncontrolled emissions of greenhouse gas (GHG) to atmosphere.
- To recover renewable energy and reduce further the GHG emissions by displacing fossil fuels.
- Reduce other potentially adverse environmental effects of uncontrolled LFG emissions.

Image© Mariannhill Landfill



against 1990 data. The second commitment period was agreed in 2012, under this agreement 34 industrialized countries and the European Community have committed to reducing their emissions by at least 18% by 2020 against 1990 levels.

### The Adaptation Fund

The UNFCCC Adaptation Fund (AF), established in 2001, aims to finance concrete climate adaptation projects and programmes in developing countries through the Kyoto Protocol. These are countries that are particularly vulnerable to the effects of climate change. The AF funds large scale projects (millions of US\$) in sectors including agriculture, water, and disaster risk reduction. The Adaptation Fund's main source of income is through the CDM. The AF gets 2% of proceeds from CDM project activities.

### The Nairobi Framework Partnership (NFP)

Under the Paris Climate Change Agreement, the Nairobi Framework Partnership (NFP) supports developing countries in the preparation and implementation of climate change mitigation projects. These projects are known as Nationally Determined Contributions (NDCs).

Established in 2006, the NFP attempts to increase participation in the CDM, particularly within sub-Saharan Africa. Since then, the CDM has become a multi-billion dollar source of funding for sustainable development. This demonstrates a UN-led partnership of linking government action to the private sector in the developing world.

### The CDM Loan Scheme

The UNFCCC has a loan scheme for countries with less than 10 registered CDM projects. At the request of those under the Kyoto Protocol, this scheme was established by the

secretariat of the UNFCCC and provides 0% interest loans to cover expenses associated with CDM projects.

These expenses may include:

- Development of project design document (PDD).
- Validation of the PDD by a Designated Operational Entity (DOE).
- Verification by a DOE of the first issuance of Certified Emission Reductions (CERs).

Projects applying for a loan must be generating at least 7,500 CERs per year (projects in Least Developed Countries (LDCs)), and 15,000 CERs per year (non-LDCs) and have a high likelihood of being registered by the UNFCCC.

### The Paris Agreement

The main aim of the Paris Agreement is to strengthen the global response to the threat of climate change. It aims to keep this century's global temperature rise below 2 degrees Celsius (above pre-industrial levels).

To support the actions of developing countries, appropriate financial flows, a new technology framework, and an enhanced capacity building framework will be implemented.

### Case Study: Ethiopia – Clean Cooking Energy Program

The Ethiopia – Clean Cooking Energy Program is a nationwide PoA which targets poor and vulnerable households who are reliant upon wood fuels for cooking. The main purpose is to provide improved energy access to such households, whilst simultaneously reducing greenhouse gas emissions from the exploitation of non-renewable biomass (NRB) resources and from fossil fuels.



Image © UNFCCC

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