



Africa LEDS project: achievements & next steps – component 1

Democratic Republic of the Cong

BY

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Background of pilot actions



- ❖ Strengthen the transition to low-emission domestic energy options that could contribute to the implementation of LEDS in agriculture, forestry and waste management
 - Develop case studies to demonstrate how the shift to low-emission domestic energy options, including waste management, is conserving forest sinks; and
 - set up a collaborative dialogue framework with stakeholders involved in the transition to low-carbon energy options based on improved cookstoves, modern biomass fuels (briquettes and biogas based on biodegradable household waste and agricultural residues)

Background of pilot actions

❖ Five sites in Kinshasa was selected

Experiment sites	Location (Municipality)	type of demonstration
Higher Institute of Applied Techniques (ISTA)	Ndolo/ Barumbu	<ul style="list-style-type: none"> • Production of biogas; and • calorimetric test
Quartier KINGABWA	Limete	Production of biogas; assembly of improved stoves and production of briquettes
Quartier MBOLOKO	Matete	test of stove efficiency and acceptance level of new improved stoves and modern biomass fuels by household and small popular restaurants
Quartier MBIZA PIGEON	Mont Ngaliema	idem
Quartier BEAU-MARCHÉ	Barumbu	production of briquettes and the adoption of simple technology and low-cost fuel types

Deployment of biodigesters



This was carried out at ISTA

- i. The production of biogas is not very widespread in Kinshasa, only a few market gardeners are engaged in the production of fertilizers (digestate);
- ii. the demonstration focused on the assembly of the biodigester and the way to feed it (in raw material), generally dung (cow manure or pigs).
- iii. The exchanges with the operators and the projects identified made it possible to understand the context of deployment of the biodigesters and to highlight the strengths and the weaknesses of the biogas sector in the DRC.

Deployment of biodigesters

ISTA offers balloon biodigesters, partially buried while the Green Space Network offers it in plastic containers of 220 liters and is installing a 25m³ concrete fixed dome.

Exemple of production

Tank (m ³)	Inputs (liters)		capacity of production (m ³)		
	dung	water	biogas	digestate	average of biogas per day
10	60	90	4	2	1.3

calorimetric tests



The calorimetric tests carried out at ISTA showed that the Improved stoves allow the following:

- recovering 40 to 70% of the energy produced by burning wood for cooking food;
- save 42 to 62% of the wood used for cooking;
- save 40 to 62% of the money used to buy wood for cooking...

Type of stove	Investment cost (USD)	lifetime (year)	Quantity of fuels per month (kg)	Fuel cost (USD)	Annual expenditure (USD)
Traditional stove	5	0.5	1 sac de 35 Kg	22	274 [(5*2) + (22*12)]
Improved stove	10	2 à 3	10 Kg	6,6	89,2 [10 + (6,6*12)]
Briquettes	15	2 à 3	0,7 Kg/Jour (21 Kg/mois)	0,3 USD/Kg (6,3USD/mois)	75,6 [15 + (6,3*12)]

calorimetric tests

Comparison of Briquettes with other Fuels

	Heating Value (MJ / kg)	Efficiency of the stove (%)	Useful energy (MJ/kg)	Conversion factor (CF) (kg of fuel)
Briquettes	15.4	50%	7.7	1.00
Firewood	6.3	20%	1.3	6.11
Charcoal	27.0	25%	6.8	1.14
Kerosene	44.0	55%	24.2	0.32
Liquefied petroleum gas	49.0	60%	29.4	0.26

Production of improved stoves and efficient fuels



Kingabwa in the facilities of Green Space Network (NGO)

- i. Assembly and production of improved stoves and production of briquettes;
- ii. demonstration on the transformation of domestic waste into modern biomass fuel (briquettes), use of a simple manual grinding wheel;
- iii. production of biogas for simple domestic needs, including how to feed a simple biodigester (raw material), usually sawdust and manure (cow or pork manure);
- iv. Household exchanges focused on the management of household waste and its recovery in efficient fuels. This exercise helped to understand the context of household waste management and environmental sanitation

Production of biomass briquettes

BEAU-MARCHÉ (Municipality of Barumbu)

The purpose of the experiment was to organize small-scale households for the production of modern briquette fuels and the adoption of low-cost technology and efficient fuels:

- Production of biomass briquettes based on the management of household waste in the peri-urban context of Kinshasa.
- A manual press was mounted and the weekly waste of 10 households collected. clay as a binder (this requires a low level of technicality and investment)
- It also shows that the briquettes have a good behavior and give a good combustion, the availability of the binder and the best price of briquettes are major factors which favor its adoption.

Demonstration of the energy efficiency of different types of stoves



Conducted in the Mboloko and Pigeon districts.

The purpose was to compare the energy efficiency in the use of different types of stoves (traditional stoves versus improved stoves) and fuels (charcoal versus modern biomass - briquettes). This exercise showed that:

- nearly all of the population in these neighborhoods uses a traditional biomass fireplace for cooking and/or heating;
- although many models of improved stoves are available today, few have succeeded in replacing large-scale traditional open stoves with much higher performance (over 30% in fuel economy and a long service life, several years).

Demonstration of the energy efficiency of different types of stoves



- Traditional stoves consume a lot of wood energy and emit large amounts of harmful substances such as carbon monoxide and particulates.
- from the economic point of view, households and small restaurants make profits because they have reduced by one third or even half the amount of charcoal consumed
- The reduction of charcoal consumption is the main motivation for the purchase and use of an improved stove for 80% of the households that acquired it: this **reduction would be 35%** for a household, the consumption of charcoal (same requirement) from **16.7 kg/week** without improved stoves to **10.9 kg/week** with improved stoves

Demonstration of the energy efficiency of different types of stoves



Estimation of the global wood energy economy for some cities in the DRC (34%)

Cities	population	number of households (6persons per household)	rate of households concerned (90%)	expected consumption of households (16.7 kg/week)	consumption of households with use of improves stoves (10.9 kg/week)	economy in consumption wood energy (gain: tons/week)
Kinshasa	12071463	2011911	1810719,45	30239,01	19736,84	10502,17
Mbuji-Mayi	3367582	561264	505137,3	8435,79	5506,00	2929,80
Lubumbashi	2096961	349494	314544,15	5252,89	3428,53	1824,36
Kisangani	1602144	267024	240321,6	4013,37	2619,51	1393,87
Tshikapa	1450615	241769	217592,25	3633,79	2371,76	1262,04
Kikwit	1326068	221011	198910,2	3321,80	2168,12	1153,68
Kananga	1271704	211951	190755,6	3185,62	2079,24	1106,38
Mwene-Ditu	1252469	208745	187870,35	3137,43	2047,79	1089,65
Mbandaka	1187837	197973	178175,55	2975,53	1942,11	1033,42
Goma	1101306	183551	165195,9	2758,77	1800,64	958,14
Matadi	347053	57842	52057,95	869,37	567,43	301,94
Boma	527725	87954	79158,75	1321,95	862,83	459,12

Demonstration of the energy efficiency of different types of stoves



- The main obstacle to adopting improved stove is the economic logic of biomass cooking stoves for the poor.
- Traditional cookstoves are popular because they can be made for almost anything: traditional cookstoves can cost around US \$ 1. In addition, in many areas, fuel such as firewood and charcoal are available at lower prices.

Business creation opportunities



This process has enabled two organizations to assert themselves in the household waste management sector in Kinshasa :

- ❖ Green Space Network, NGO, specializing in the production of modern biomass briquettes;
- ❖ RECODEC, which is launching into the collection of household and similar waste and the establishment of the recycling sector. RECODEC has just received support from the Italian government to launch its work in the municipality of Gombe;
- ❖ We should also point out that, with the collaboration of the Forest Investment Program, the Congolese Alliance for improved stoves and efficient fuels has been revitalized and adopted its legal framework.

Feedback to policy

Through an exhibition of the results and the engagement of some non-state stakeholders, we have, in collaboration with some partners such as the Belgian Cooperation, the Italian Cooperation, the Municipal Administration of Gombe and the Sanitation Regie of Kinshasa (RASKIN), established a waste management network in the Gombe commune in Kinshasa. Two structures (NGOs) were supported in their action and were able to obtain subsidies to continue working in the management of household and similar waste:

- a structure (GSN) will handle the production of biomass briquettes;
- another (RECODEC) will be responsible for setting up a network of autonomous waste collectors and a sorting unit for their recovery.

Feedback to policy



The establishment of a high-level dialogue framework and an inter-ministerial consultative technical platform for the domestic energy sector encouraged the government to adopt strong guidelines for:

- better management of wood energy supply sources (firewood and charcoal);
- the promotion of alternative sources such as efficient fuels (briquettes and biogas); and
- the promotion of efficient cooking equipment (solar cookers, improved stoves) for boarding schools, hospitals, canteens, restaurants, etc.)

Conclusion



- ❖ DRC there is real potential and capacity for the transition to low emissions domestic energy options to complement LEDS development in agriculture, forestry, and waste management (agriculture and household bio-degradable waste).
- ❖ This included the production of improved stoves and the gasification process of biodegradable household waste and agricultural and agro-industrial residues, as briquettes and biogas (biomass).

Conclusion



- ❖ Integrated approaches to mobilize ministries (notably energy, forestry and agriculture) in their sectoral policies have been analyzed in order to reduce pressure on natural forests.
- ❖ the main actors, including the Ministries of Agriculture, Energy, Land, Forests, Environment, Transport, Finance and Planning, were informed and mobilized around the strategic pillars of NDC implementation, based on transition options to low-emission domestic energy sector identified in this study



Thank You!

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