

Nigeria: Mayon Turbo Stove Project



**Carbon Finance
and CDD**



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Nigeria MTS Project

Project developers: Partnership between REAP Canada and the Centre for Household Energy and the Environment (CEHEEN)



- 8 targeted states in South-Central Nigeria
- Maximum 20,500 stoves sold/yr
- Reduces 740,138 tCO₂equiv over ten years
- CDCF may purchase 414,000 tCO₂equiv through 2015, generating @ \$2.5 million in ER revenues

In a nutshell (or rice hull..)

- Introduction of Mayon Turbo Rice Hull Stoves into 61,500 households in the southern central states of Nigeria: Benou, Ebonyi, Edo, Ekiti, Enugu, Kogi, Nassarawa and Taraba.
- On average, 6 fabrication center will scale up by approximately 650 stoves per year to eventually produce an estimated 3,400 stoves annually.
- Each stove consumes 1.87 tons of Rice Hull per year.
- Total Project Cost: US\$ 3.2 million.
- Methodology: Small scale project activity: avoidance of methane production from biomass decay through controlled combustion category (IIIE).
- Basic feasibility study completed in 2005; Project could commence 3 months after advance payment is received.
- Project Developer/Sponsor: REAP – Canada will be the lead agency responsible for project management. CEHEEN, their Nigerian profit sharing partner will assist in managing the project, conducting the workshops and marketing the stoves. Local workshops producing and marketing the stoves will receive a share of the ERs.

MTS Summary

- Each stove uses 1.87 tonnes/yr of rice hull
- Under small scale category (III.E) 61,500 cookstoves per program
- Yearly maximum of 115,005 tonnes, project total of 746,710 tonnes of rice hull
- Reduction of 113,993 t CO_{2e}/yr at peak instalment, project total of 740,138 t CO_{2e}



Cooking Fuel Emissions

	Consumption (kg)	Carbon Emitted in t CO ₂ equivalent			Total Baseline
		CO ₂	CH ₄	N ₂ O	
Fuelwood	1470	N/A	0.19	0.06	0.25
Kerosene for Fuelwood	5.6	0.02	6.5 x 10 ⁻⁴	1.4 x 10 ⁻⁴	0.02
Kerosene	88	0.27	0.01	2.1 x 10 ⁻³	0.28
				Total	0.53
Rice Hull	1870	N/A	0.15	0.09	0.24

Rice Hull 0.24 t CO₂equiv
 Current Fuel Use - 0.53 t CO₂equiv
 - 0.29 t CO₂equiv



Assumes consumption based on 90% displacement with MTS, with 50% primary woodfuel users and 50% primary kerosene users

GHG Mitigation Concept

Avoidance of methane production from biomass decay through controlled combustion (III.E adopted in September 2005)

- Project avoids the production of methane from biomass that would have otherwise been left to decay as a result of anthropogenic activity
- Decay is prevented through controlled combustion, releasing less methane into the atmosphere.
- Reduce anthropogenic emissions by sources, and directly emit less than 15,000 tCO₂e/yr

Additionality and ER estimate

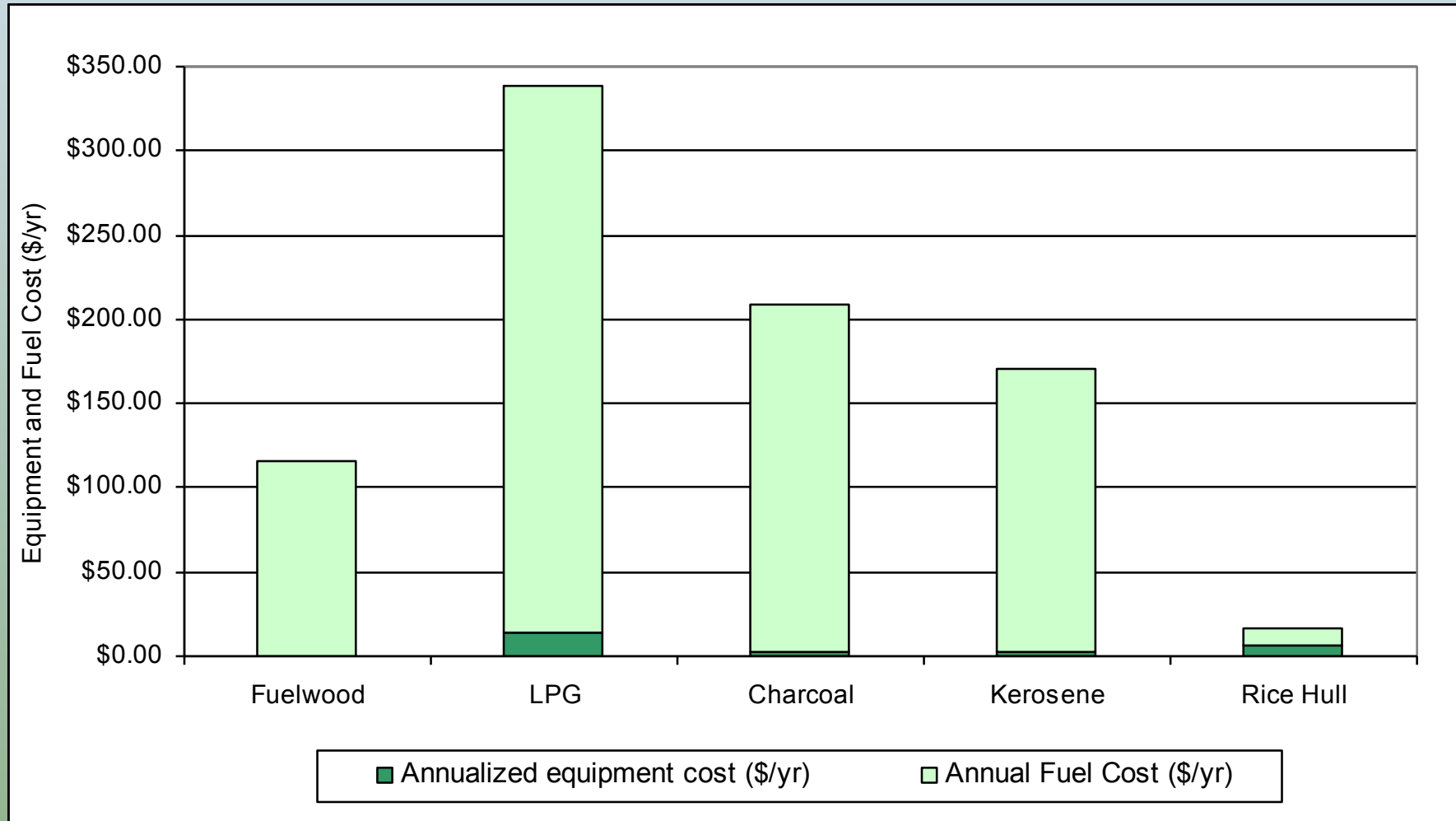
Additionality is based on technical and commercial barriers to implementation:

- The project is not feasible without the ER revenues.

ER estimate:

- 740,138 tons CO₂e in the full life time of the project up to 2015. We will purchase 414,000 tons CO₂e through 2015 of which 70% will be before end-2012.
- Annual ER in full production 113,993 tons CO₂e

Projected Cost of Cooking In Nigeria*



*2005

Stove Payback

	Capital Cost of Equipment (\$)	Annual Fuel Cost (\$/yr)	Payback time for MTS (weeks)
Fuelwood	-	\$116.26	9.1
LPG	\$56.00	\$324.28	3.0
Charcoal	\$2.30	\$206.44	4.3
Kerosene	\$7.41	\$168.12	3.6
Rice Hull	\$18.50	\$10.00	-

Assumptions:

1. Fuelwood buyers use the three stone method of cooking
2. Firewood users use kerosene to assist fire starting.
3. Fuel cost associated with rice hull is for transport and is \$10/yr.

Financial Information

	Net Present Value	Estimated FIRR	Project Actor	Financial Contribution <i>(in millions USD)</i>	%
		<i>(%)</i>			
No Carbon Fund	-1.0	0%	Equity <i>(Sponsor)</i>	.055	1.7
With Carbon Fund	0.2	19.7%	World Bank 25% upfront payment	0.62	19.3
			Funding gap	2.5	78

The Shell Foundation has been approached as a short term financier.

Community Benefits

Beneficiary Community

- The project will introduce the Mayon Turbo Rice Hull Stove (MTS) into 61,500 rural Nigerian households in the main rice-producing regions of the country.
- The average household income for both urban and rural areas in the central states in Nigeria are \$1200 USD and \$450, respectively.

Principal Community Benefits:

- The project will significantly reduce the time spent by women on fuelwood collection
- Employment generation: the project will provide 40 full-time jobs in the manufacturing and delivery of stoves and materials in each of the project communities. Another 50 part-time and full-time jobs are anticipated to be created, mainly for women, in the distribution of the stoves.
- Economic empowerment: The annual cost of cooking per household is expected to decrease from approximately \$120 /yr for kerosene and purchase of fuelwood to roughly \$10/yr for the MTS system (more than a 90% reduction).

Other Community Benefits:

- Reduction in exposure to indoor smoke for women and children is estimated at 70%
- The project will eliminate the risk of kerosene explosions.
- The project will strengthen manufacturing and marketing skill of the rural communities, and provide opportunities for small and medium scale enterprises to become involved in stove sales and in the distribution and retailing of fuel.