Implementing the First Gold Standard Cookstove Project in Tandem with Development of the Methodology

impactcarbon

Evan Haigler, Executive Director

Implementing Gold Standard Methodologies: Lessons learnt

Practitioners Workshop on AMS-I.E, AMS-II.G and AMS-I.C: CDM methodologies for household cooking energy supply

October 26 2009

First GS VER Project to be Registered

- Impact Carbon contributed to the development of the GS Methodology with JP Morgan Climate Care
- JPMorgan Climate Care invests and co-develops the project
- Household Ugastoves reduce fuel use by >30%
- 50,000 stoves have reached 300,000 people
- Families save over $80 per year on charcoal
- The project saves poor families $4 Million per year
- ~130,000 trees have been saved
- Each stove reduces 1.4 tons of CO_2/year
- Stoves stay in use more than 3 years
- ~70,000 tons of CO_2 emissions reduced by March, 2009*

Opportunities for New Large Scale Methodologies

CDM Fuel Replacement for NRB and Fossil Fuels

- Suppressed demand approach to NRB

CDM Efficiency for NRB and Fossil Fuels

- Suppressed demand approach to NRB

Gold Standard Voluntary Cookstove Methodology V.2

Large Scale Fuel Replacement

Small Scale CDM Project Size Limits

- AMS-I.C and AMS-I.E: 15 MWe or 45 MWth
- **Aggregate installed capacity**

Coal Replacement with biomass residues, China

- 70-100 million coal-fired stoves in rural China
- In 2020, rural coal consumption would be ~300 Mt, perhaps nearly 10% of Chinese coal consumption

Transaction Costs

- Disseminating 10 million stoves would require approximately:
- **500– 1,000 Small scale CDM projects!!**

	Stove 1	Stove 2
Power Capacity (kW)	4.2	2.0
Annual Biomass Consumption (t)	1.2	1.2
Annual Coal Discplaced (t)	1.9	1.9
Stoves allowed under SSC size limit	**10,700**	**22,500**
ERs/yr (tCO2e)	**38,000**	**80,000**

Large Scale NRB Efficiency

Small Scale CDM Project Limit

- AMS-II.G: 180 gWh/year
- Would allow for approximately 53,000 Ugastoves

In CDM, expanding Ugastove project would require:

- 1 new SSC project per year

Project parameters are the same

- Technology
- Baseline scenario
- NRB
- Geographies

Why SSC for NRB? Avoided Deforestation

Avoided deforestation (energy vs. land-use categorization)

- IPCC Guidelines classify the source of biomass burning as LULUCF (deforestation), not energy-related
- Avoided deforestation projects excluded from LULUCF CDM project-types by Marrakech Accords (COP 7, 2001) due to concerns about forest conservation projects

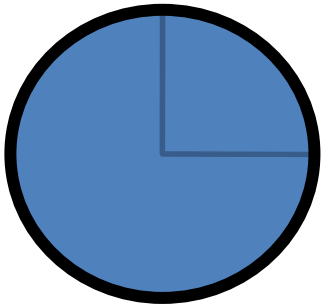
SUPPRESSED DEMAND: Household NRB projects are designed to reduce energy demand, not conserve forests

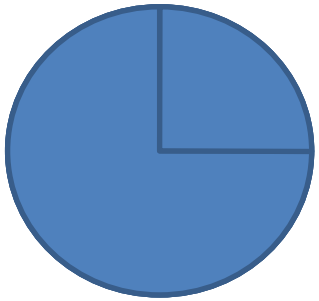
- Reduce emissions from energy use, not by conserving forest areas

CDM Methodological History

- 2 NRB methodologies for energy related projects approved at COP 9
  - I.C. "Thermal energy for the user", II.C. "Demand side energy efficiency programmes for specific technologies"
    - Led to projects in Nepal, India, the Philippines and Nigeria
- Without explanation, I.C. and II.C. amended in Sept. 05 by SSC WG to exclude NRB baselines.
  - Only 2 Nepal projects registered in time and represent 94,000 tCO2e/yr
- COP11/MOP1 Montreal re-expressed support, issuing mandate to CDM EB to develop an NRB meth.
  - 2 meths developed, but not approved on grounds of leakage and perverse incentives to create NRB baselines for Ers
- Further lobbying at COP/MOPII in Nairobi led to renewed pressure from COP/MOP on CDM EB
  - EB submitted 2 new meths at Bali, and approved at EB's 37th meeting (1/30 – 2/1/2008)
    - AMS I.E. (switch from NRB in thermal applications by the user) and AMS II.G. (energy efficiency in thermal apps of NRB)
      - Size limits: 45 MWh installed capacity or less than 60 GWh energy savings per year
      - Limit increased to 180 GWh for II.G.

NRB Suppressed Demand

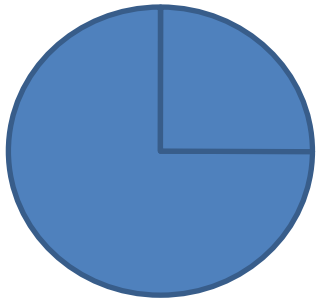




Timber Logging

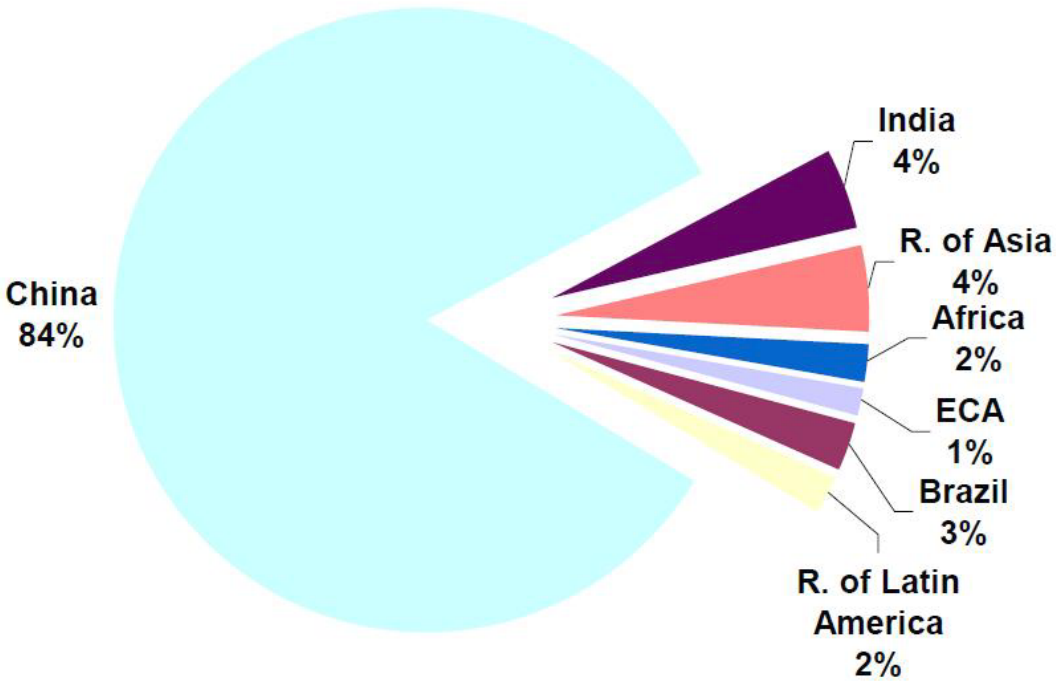
Baseline Stoves

Project Stoves

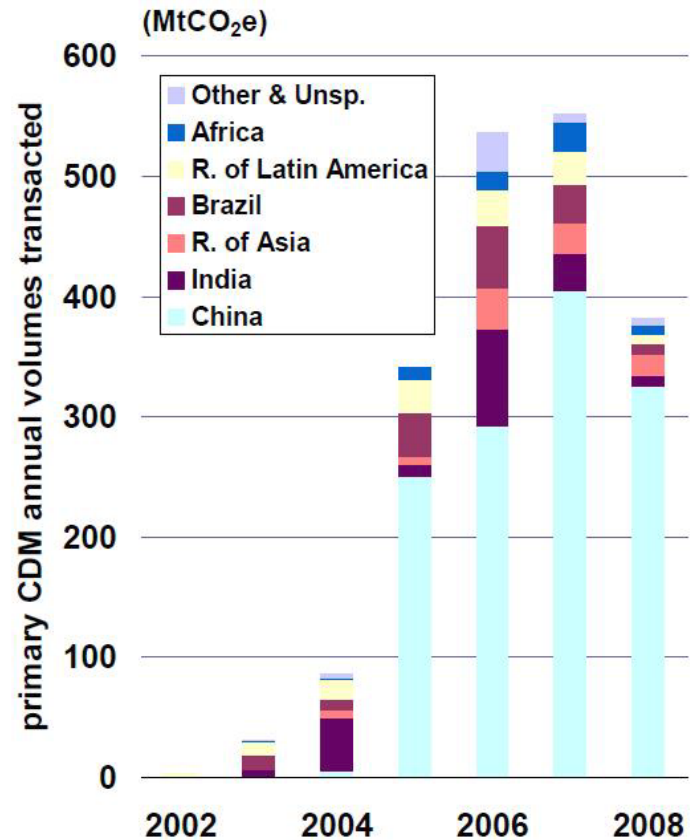


CDM Regional Barriers

The CDM EB has mandate[1] to explore options to address "...systematic or systemic barriers to the equitable regional and subregional distribution of CDM project activities..." (decision 7/CMP.1, paragraph 33)



2008
(as a share of volumes supplied)[68]



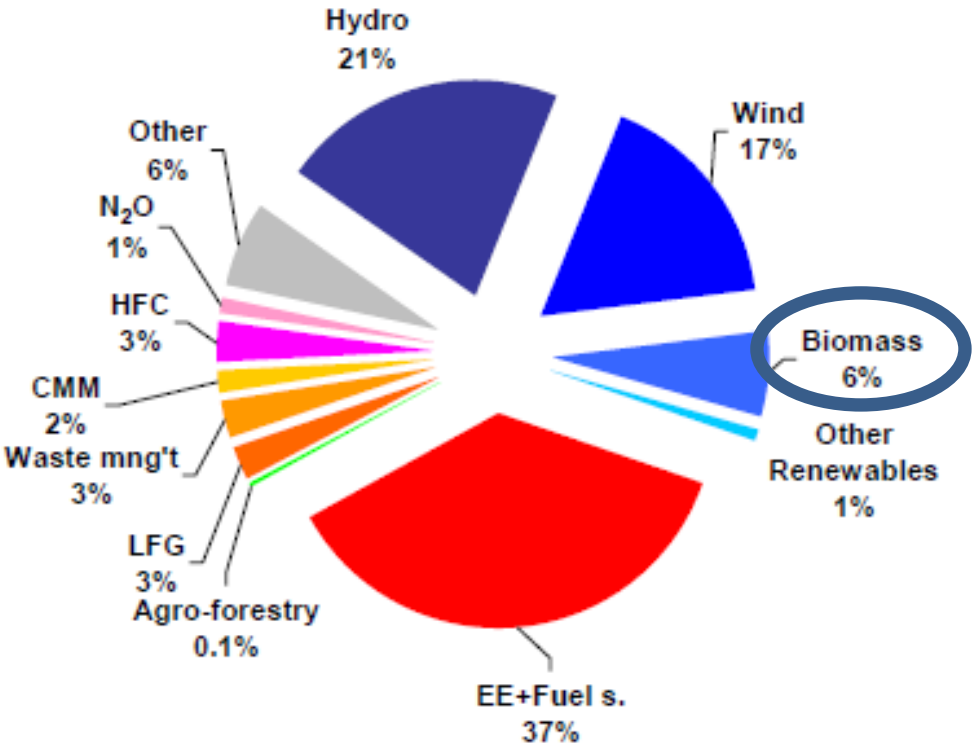
2002-2008

Source: State and Trends of the Carbon Market 2009, World Bank

CDM Project Types

Volume from household biomass efficiency (cookstoves): 0!

Ugandan energy supply is 93% biomass (FAO)



2008
(as a share of volumes supplied)

Source: State and Trends of the Carbon Market 2008, World Bank

Monitoring and Evaluation

Scalable methods are available now for

- NRB
- GHG Emissions
- Project Fuel Savings
- Baseline Surveys

Methods are

- Cost-effective
- Statistically significant and representative
- Field-based

CDM Small Scale; NRB Emission Factors

CO2 Emissions Factor

(kg of CO2 per TJ on a Net Calorific Basis)

Wood	Kerosene	LPG
112,000	71,900	63,100

% reduction, compared to wood

0%	36%	44%

Proposed Next Steps

Coordinated Methodology Development

- Stakeholder Input: CDM Meth Panel, Research Groups, Project Developers, M&E Orgs, Implementing Partners, and others

Considerations

- Large scale
- NRB treatment (WISDOM and benchmarks)
- Full emissions accounting (non-fossil EFs, non-CO2, fuel production)
- Benchmark Additionality
- M&E approaches (cost effective, statistically rigorous, field-based)

Development Resources

- Secretariat, UN Foundation?, matching contributions from project developers

Appendices

Coordinated Methodology Development

- Background research / due diligence with input from wide range of stakeholders
- Working group meetings
- Draft methodology and peer review
- CDM Executive Board review and approval
- Validation of flagship demonstration project

Current Methodologies

CDM

- SSC I.C. *Thermal energy for the users with or without electricity*
- SSC I.E. *Switch from Non-Renewable Biomass for Thermal Applications by the User*
- SSC II.C. *Demand-side energy efficiency activities for specific technologies*
- SS II.G. *Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass*

Voluntary Gold Standard

- Methodology for Improved Cook-stoves and Kitchen Regimes V.01 *Indicative Programme, Baseline, and Monitoring Methodology for Improved Cook-Stoves and Kitchen Regimes*

Precedence for Large Scale Meths

CDM AM0036 *Fuel switch from fossil fuels to biomass residues in boilers for heat generation*

- 3 approved projects >200,000 tCO_2e/yr expected

Methodologies for decentralized project-types

- AM0031 *Bus rapid transit*
- AM 0046 *CFL distribution*
- AM 0070 *Domestic refrigerators*

Program of Activities

- Future opportunities for scale and replication, but methodology is needed

AMS-II.G Project Size Calculation

Project Start Year:	2010	**Fuel Type: Charcoal**
Stove Days in Inventory:	0	
Non-Renewable Biomass:	91%	

Emissions Factors	**(kg/TJ)** [1]	**Fuel Type**	**GWP** [1]
CO2	71500	Jet Kerosene	1
CH4	0		21
N2O	0		310

(1) See Reference tab for source information

Fuel Consumption	**(kg/stove-day)**
Baseline	3.09
Project	1.96
Savings	1.13
Percent Savings	37%
Stove Efficiencies	
Old Stove	10%
New Stove	16%
Efficiency Improvement	58%

Stoves and Carbon Volumes Calculation

Variable	**Value**	**Units**
CDM small scale limit	180	GWh per annum
NCV [1]	29.5	TJ/Gg
Converted NCV	0.00819	GWh/ton
Tons of Fuel Countable	21,966	metric tonnes
Combined EF [1]	65,065	kg CO2e/TJ
Combined EF by mass	1.9194	tCO2e/t_fuel
Calculated CDM small scale ER limit	**42,162**	**tCO2 per annum**
Estimated Annual Fuel Savings per Stove	**0.4140**	**tonnes/household-yr**
Installed Stoves	**53,056**	**stoves**

(1) See Reference tab for source information

AMS-I.C Project Size Calculation

Project Start Year:	2010
Stove Days in Inventory:	0
Non-Renewable Biomass:	100%

Emissions Factors	**(kg/TJ) (1)**	**Fuel Type**	**GWP (1)**
CO2	94600	Other Bit. Coal	1
CH4	0	Other Bit. Coal	21
N2O	0	Other Bit. Coal	310

(1) See Reference tab for source information

Fuel Savings per stove	Biomass	
Daily fuel savings:	3.23	kg/stove-day
Estimated Annual Fuel Savings per Stove	**1.18**	tonnes/household-yr

SSC Size Limit	**Value**	**Units**
CDM small scale limit	45	MW th/annum
Power Capacity per Installed Unit	4.2	KW
Calculated CDM small scale stove limit	**10,714**	**stoves**

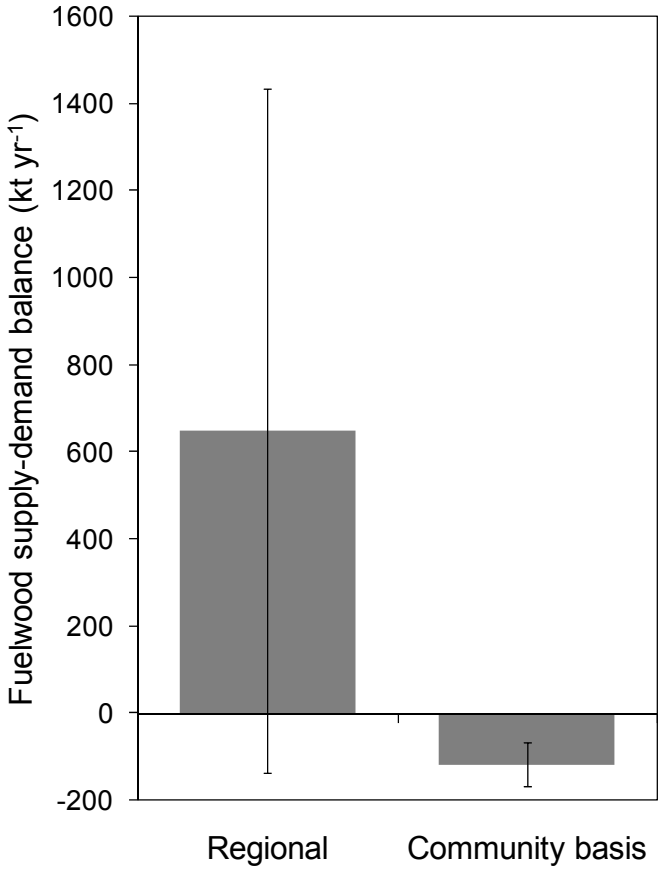
ER Calculation	value	unit	description
$B_{biomass,PJ,y}$	1.18	ton/stove-year	Estimated Annual Fuel Consumpti
$NCV_{biomass}$	15.4	TJ/Gg	Net Calorific Value (NCV)
η_{PJ}	41%		Improved stove efficiency
	10,714	stoves	Installed stoves
	0.001	Gg/ton	Conversion factor
$HG_{PJ,y}$	**80.534**	**TJ**	**Net thermal energy provided**
η_{BL}	20%		Baseline stove efficiency
$EF_{FF,CO2}$	94,600	kgCO2/TJ	Baseline fossil fuel CO2 emisic
	0.001	(ton/kg)	Conversion factor
BE_y	**38,093**	**tCO2/yr**	**Baseline emissions**
PE_y	0	tCO2/yr	Project emissions
ER_y	**38,093**	**tCO2/yr**	**Emission reductions**

C-WISDOM

C-WISDOM is a GIS-based model that estimates the fraction of non renewable fuelwood consumption in a stove project community-by-community using supply/demand analyses. This is essential as CO_2 emission can only be counted from non-renewable fuel that otherwise would be reintegrated into the biosphere.

Required inputs:

Supply side: Land cover data from remote sensing; Fuelwood growth estimates

Demand side: Spatial distribution of fuelwood consumption; supply/Demand spatial relationship; infrastructure e.g. road and tracks network; igital Elevation Models

Output: Community-based supply/demand fuelwood balance allowing quantification of non-renewable fuel consumption. The figure to the right demonstrates that C-WISDOM's community-level analysis results in a negative fuelwood, balance leading to non-renewable fuel consumption, while a regional-level analysis indicates renewable consumption.