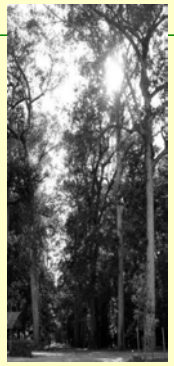
PROCEEDING
ARECOP PHASE III SECOND PTA MEETING
22-25 January, 2007, Chiang Mai, Thailand

APPENDIX 6

PRESENTATIONS ON CARBON FINANCING WORKSHOP

Session I



THE CARBON FINANCE FRAMEWORK

Minh Cuong LEQUAN, GERES, ARECOP Planning and Technical Advisory Meeting, 22-25th January 2007, Chiang Mai.

Session I. Carbon Finance Framework

- Kyoto protocol
- Greenhouse gases GHGs
- Flexible mechanisms
- Clean Development Mechanism
  - project cycle
  - Some Key Concepts
- Methodology issues
  - ***following presentations: Carbon markets, how to step in***

Kyoto Protocol - International Context

♦ Negotiation history of the Kyoto Protocol is as follows:

May. 1992 — Adoption of **the United Nations Framework Convention on Climate Change (UNFCCC)**
☛ The ultimate objective of the Convention is stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Mar. 1994 — Entry into force of the UNFCCC
International negotiations for setting quantified emission reduction targets of Annex I Parties for post-2000 have started.

Dec. 1997 — Adoption of **the Kyoto Protocol** at COP3
International negotiations for establishing operational rules for the Protocol, including the Kyoto Mechanisms have started.

Jul. 2001 — Political agreement on outline rules of the Protocol (**Bonn Agreement**) at COP6 bis
US Bush administration announced its withdrawal from the Protocol in March 2001.

Nov. 2001 — Adoption of legal documents of operational rules of the Protocol (**Marrakech Accords**) at COP7
1st meeting of the CDM Executive Board

Dec. 2003 — Adoption of operational rules for the Afforestation and Reforestation(A/R) CDM at COP9
Russian Federation ratified the Protocol in December 2004

Feb. 2005 — Entry into force of the Kyoto Protocol

Dec. 2005 — The 1st session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP1) in Montreal

Nov.2006 — The 2nd session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP 2) in Nairobi

Source: IGES (2006)

Kyoto Protocol - International context

- Reduce Greenhouse Gases 5.2% from 1990-2012
- Common but differentiated responsibility
- Annex 1 countries
- Non- Annex 1 countries

European Union			Economies in Transition (EIT)			Other Parties		
Party	Target	Estimated base-year emissions	Party	Target	Estimated base-year emissions	Party	Target	Estimated base-year emissions
Portugal	27.0%	65.1	Russia	0%	3,040.3	Iceland	10%	2.8
Greece	25.0%	107.2	Ukraine*	0%	919.2	Australia	8%	424.0
Spain	15.0%	288.7	Poland	-6%	565.3	Norway	1%	52.0
Ireland	13.0%	53.9	Romania*	-8%	264.9	New Zealand	0%	73.2
Sweden	4.0%	70.7	Czech	-8%	192.2	Canada	-6%	607.2
Finland	0.0%	77.1	Bulgaria*	-8%	157.1	Japan	-6%	1,223.0
France	0.0%	559.3	Hungary*	-6%	101.6	USA	-7%	6,135.6
Netherlands	-6.0%	211.5	Slovakia	-8%	72.9	Switzerland	-8%	53.2
Italy	-6.5%	521.1	Lithuania*	-8%	51.5	Liechtenstein*	-8%	0.2
Belgium	-7.5%	143.3	Estonia*	-8%	43.5	Monaco*	-8%	0.1
UK	-12.5%	745.5	Latvia*	-8%	31.1			
Austria	-13.0%	77.6	Slovenia*	-8%	19.2			
Denmark	-21.0%	69.7	Croatia	-5%				
Germany	-21.0%	1,225.0						
Luxembourg*	-28.0%	13.4						
EU	-8.0%	4,225.1						

Source: IGES (2006)

Greenhouse Gases (GHGs)

- Only six GHGs targeted
- GHGs have different Global Warming Potentials (TCO2eq.)
- Biomass combustion produces CO^2, CH4, N^2O
- Black Carbon and other GHGs not yet accounted

Source: IPCC (2001)

Flexible Mechanisms

• Emissions are the same where ever they occur.

• Annex-1 Parties : allowed to meet their reductions commitments cost effectively

• through 3 **market based mechanism** to reduce cost of emissions:

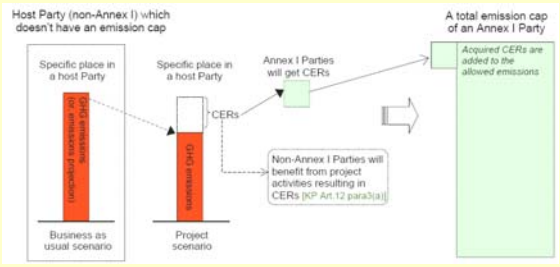
  • Emissions Trading (ET): acquire assigned amount units (AAU's) from other Annex I Parties

  •Joint implementation (JI): receive allocated Emission Reduction Units (ERU's) for projects that reduce GHG emissions in other Annex I Parties,

  •**Clean Development Mechanism (CDM):** Annex I Parties may create certified emission reduction (CER's) units through the implementation of projects to reduce GHG emissions in the territories of non-Annex I Parties

The Clean Development Mechanism (CDM)

CDM has two objectives:
1) Assist host countries with national sustainable development goals.
2) Mitigate GHG emissions .

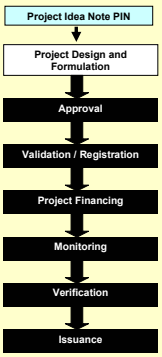


Source: IGES (2006)

Carbon Project Cycle

Project Design and Formulation	The project participant must complete a Project Design Document.
Approval	Host country should confirm project activity contributes to national sustainable development goals
Validation / Registration	An independent consultant (a designated operational entity, DOE) accredited by the Executive Board review the PDD and certifies that it meets requirements.
Monitoring	The project and results are monitoring on an ongoing basis
Project Financing	Project must receive up-front Investment
Verification	A DOE verifies the monitoring process
Issuance	The EB issues appropriate number of CERs to the accounts of the host country and/or project proponent

Project Design and formulation
The Project Design Document (PDD)

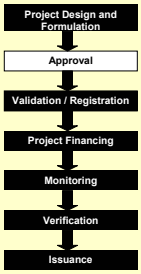


- PDD: 7 sections and 5 annexes
- 3 Annexes for small scale projects

A.	General description of project activity
B.	Baseline methodology
C.	Duration of the project activity/crediting period
D.	Monitoring methodology and plan
E.	Calculation of GHG emission by sources
F.	Environmental impacts
G.	Stakeholder comments
Annex 1.	Contact information on project participants
Annex 2.	Information regarding public funding
Annex 3.	New baseline methodology
Annex 4.	New monitoring methodology
Annex 5	Table of baseline data

Source: UNFCCC (2006)

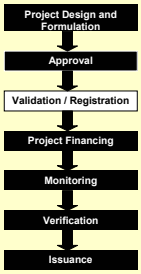
Approval- Sustainable Development Criteria



1. Environmental Protection and Improvement	3. Technology Transfer
1.1 Contribution to mitigation of global climate change	3.1 Transfer of appropriate and best available technology
1.2 Reduction in air pollution	3.2 Capacity building
1.3 Reduction in water pollution	4. Economic Benefits
1.4 Reduction in soil pollution	4.1 Use of local businesses and industries
1.5 Reduction in noise pollution	4.2 Share of project budget spent in-country
1.6 Biodiversity conservation	4.3 Reduced dependence on fossil fuels (energy projects only)
1.7 Sustainable use of land resources	4.4 Reduced dependence on imported energy (energy projects only)
1.8 Rational use of mineral energy	
1.9 Sustainable use of forest resources	
1.10 Sustainable use of water resources	
1.11 Archaeological, cultural, historical and spiritual heritage	
2. Social - Enhancement of Income and Quality of Life	
2.1 Poverty alleviation	
2.2 Provision of community infrastructure	
2.3 Stakeholder Consultation	
2.4 Access to community assets	
2.5 Equity in accessing the community benefits of project	
2.6 Creation of employment in country	
2.7 Impact on public health	
2.8 Gender equity	

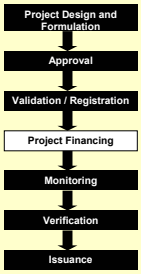
Source: DNA Cambodia (2006)

Validation/Registration



- Based on the PDD
- Independent evaluation of a project activity against the requirements of the project activity.
- Carried out by Designated Operational Entity (DOE).
- Registration is formal acceptance of the project by Executive Board or a project registry.

Project Financing



- Governments and private companies from annex-1 countries
- Unilateral – Project developed invests in project and banks emissions reductions.
- Bilateral – Investor receives ERs from project developer as part of Emissions Reductions Purchasing Agreement (ERPA).
- Multilateral – ERs are sold to a fund which manages a portfolio of projects on behalf of investors.
- Up-front investment possible as loans, grants or ER futures payments.

Monitoring

Project Design and Formulation
Approval
Validation / Registration
Project Financing
Monitoring
Verification
Issuance

- ERs cannot acquire value unless they can be independently audited
- Project participants collect and archive all relevant data to calculate ERs.
- In accordance with monitoring plan in the PDD such as:
  - Measuring anthropogenic emissions by sources of GHGs occurring within the project boundary
  - Identification and measurement of all potential sources of leakage.
  - Assess the environmental impacts of the project
  - QA and QC procedures for the monitoring process.
  - Documentation of all steps during the lifetime of the project.

Verification

Project Design and Formulation
Approval
Validation / Registration
Project Financing
Monitoring
Verification
Issuance

- Ex-Post determination of monitored emissions reductions
- Undertaken by DOE
- Assessment of achieved emissions reductions
- Conformance with monitoring plan in the PDD

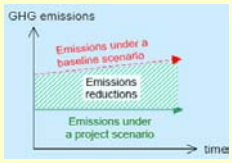
Issuance

Project Design and Formulation
Approval
Validation / Registration
Project Financing
Monitoring
Verification
Issuance

The Certified Emission Reductions (CERs) are issued by the Executive Board and equal to the verified amount of GHG emission reductions.

Key Concepts - Baseline

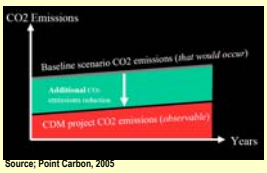
- The baseline is the scenario used to show the trend of anthropogenic GHG emissions in the Business as Usual (BAU) scenario.
- It basically shows what would be the future GHG emissions without the project intervention.
- It encompasses trends, demography, and most likely scenarios



Source: IGES, 2006

Key Concepts - Additionality

- Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.
  (Art. 12.5, Kyoto protocol)



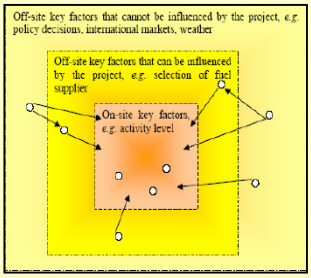
Source; Point Carbon, 2005

Source, UNFCCC (2005)

Key Concepts- Project Boundary and Leakage

Project Boundary

The project boundary encompassed all anthropogenic GHG emissions that are *significant* and *reasonably* attributable to the project



Leakage

Leakage refers to any GHG emissions that occur outside of the project boundary, as a result of the project. For example:

- Shifts of pre-project activity
- Competing use leakage

CDM Methodology Issues (1) – Small scale projects

- High transaction costs associated with the carbon project cycle.
- SSC projects are less able to absorb costs.
- Greater "development" dividend associated with SSC project activities.
- Simplified modalities and procedures to reduce transaction cost

Size	Type	Reduction (t CO_2 per yr)	€ / t CO_2
Very Large	Large hydro, geothermal, landfill methane	>200,000	**0.1**
Large	Wind power, solar thermal, energy efficiency	20,000 – 200,000	**0.3 – 1**
Small	Boiler conversion, DSM, small hydro	2000 – 20,000	**10**
Mini	Energy efficiency in housing & SME, mini-hydro	200 – 2000	**100**
Micro	PV	< 200	**1000**

Source: Michaelowa et al (2003)

CDM Methodology Issues (1) – Small scale projects

- Project activities may be **bundled** together to count as one project.
- A **single Designated Operational Entity** should validate, verify, and certificate a SSC project activity or bundled small-scale CDM project activities
- **Simplified Project Design Document -** separate Baseline study and Monitoring plan not required.
- SSC projects may use **Simplified Baseline and Monitoring Methodologies**

Small Scale Project activities

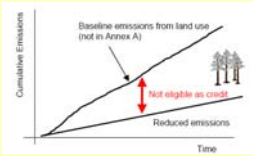
I. TYPE I - RENEWABLE ENERGY PROJECTS
I.A. Electricity generation by the user
I.B. Mechanical energy for the user
I.C. Thermal energy for the user
I.D. Renewable electricity generation for a grid
II. TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS
II.A. Supply side energy efficiency improvements - transmission and distribution
II.B. Supply side energy efficiency improvements - generation
II.C. Demand-side energy efficiency programmes for specific technologies
II.D. Energy efficiency and fuel switching measures for industrial facilities
II.E. Energy efficiency and fuel switching measures for buildings
II.F. Energy efficiency and fuel switching measures for agricultural facilities and activities
III. TYPE III - OTHER PROJECT ACTIVITIES
III.A. Agriculture
III.B. Switching fossil fuels
III.C. Emission reductions by low-greenhouse gas emitting vehicles
III.D. Methane recovery
III.E. Methane avoidance

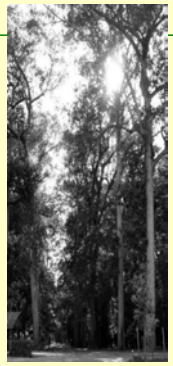
Limitation to xx GWh/year or yy MW

Methodology Issues (2) Non-renewable Biomass

- ICS reduce GHG emissions by reducing the consumption of non-renewable biomass
- Non-renewable biomass = avoided deforestation
- Only afforestation and reforestation are eligible as LULUCF activities
- Ongoing call for public inputs… decision expected at MOP 4.
- ICPs are **not yet** eligible in the CDM market

ICPs can be "pre-validated" in the voluntary Carbon market





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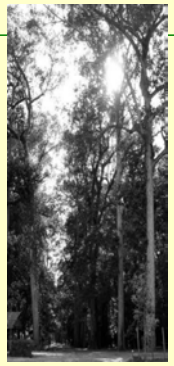


Session II

The Voluntary Market

Minh Cuong LEQUAN, GERES, ARECOP PTA Meeting, 22-25th January 2007, Chiang Mai.

EU ETS

forward price Dec. 2007

22 Jan 2007

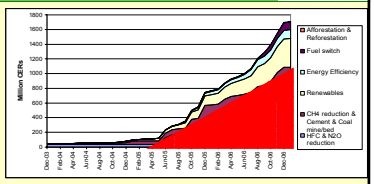
3.83 €/TCO2

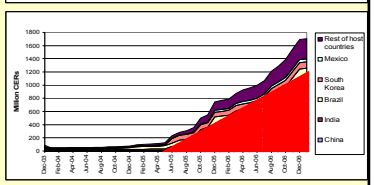
Session II. The Voluntary Market

- The CER market
- CERs versus VERs (Verified Emission Reductions)
- Standards
- Determining price

The CER market

- Majority of CER's are from large scale projects in China, India and Brazil.
- Small scale projects with high development dividends may not be viable:
  - High transaction costs
  - Methodological restrictions, e.g. non-renewable biomass.





Source: UNEP (2007)

Voluntary Market

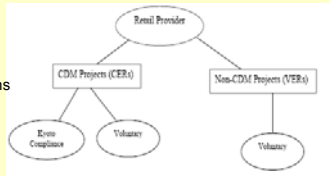
•Two categories of offset projects:

1) CDM – projects
- registered with CDM Executive Board
- generate Certified Emission Reductions **CERs**.

2) Non CDM – projects
- not seeking CDM registration
- not to be used for Kyoto or EU targets

These projects generate Verified Emission Reductions **VERs**

• The voluntary market:
  - non compliance buyers
  - companies, governments, NGOs individuals
  - traders/intermediaries



Source: Taiyab (2006)

	Total Project-Based Transactions	Compliance	Voluntary	Retail'
1998	17,976,526	0	17,907,446	69,080
1999	35,423,491	0	35,265,724	157,767
2000	17,094,425	387,933	16,507,407	199,085
2001	13,004,103	4,724,591	8,161,652	117,860
2002	28,776,967	14,676,748	13,893,209	207,010
2003	77,641,815	70,429,780	6,773,367	438,669
2004	107,010,089	104,600,758	2,299,050	110,281
2005 (Jan -April)	42,863,095	39,823,182	2,995,000	44,913
Total	339,790,524	234,642,992	103,802,856	1,344,675

Source, IETA,2005

Volumes transacted CER and VERS

	2004		2005		1stQ06	
	Volume ($MtCO_2e$)	Value (MUS$)	Volume ($MtCO_2e$)	Value (MUS$)	Volume ($MtCO_2e$)	Value (MUS$)
Compliance	107.07	543.59	368.30	2,665.31	79.12	906.14
of which						
CDM	*97.00*	*485.01*	*346.15*	*2,544.30*	*75.61*	*886.85*
JI	*9.10*	*54.19*	*17.78*	*82.41*	*3.29*	*19.29*
other	*0.96*	*4.39*	*4.37*	*38.59*	-	-
Voluntary and Retail Markets	2.92	5.57	6.05	43.03	0.08	0.55
TOTAL	**109.99**	**549.16**	**374.34**	**2,708.34**	**79.19**	**906.69**

M = million

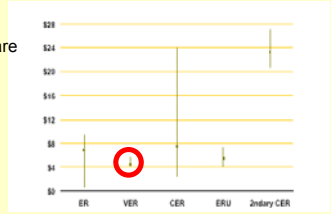
Source: World Bank (2006)

Verified Emissions Reductions

- Transaction costs are lower.
- Non-restricted e.g. non-renewable biomass projects are eligible.
- More scope to invest in small scale projects with high development dividends

But…

- Value of the VER is lower than the CER
- Credibility of emission reductions



Source: World Bank (2006)

Voluntary market standards

Buyer's Trust & Confidence

- Direct sales
- Independent third party verification (certificate of integrity)
  - body trusted by buyer
  - by DOE (CDM-registered designated operational entity)
- Protocol and criteria to certification entities and project developers.
- Gold Standard
- Voluntary Carbon Standard (VCS)

Delicate balance between simplicity, benefits and stringency

Determining price – **Quality**, Risk, Knowledge

Project design quality

- "Sustainable Development Criteria" (i.e. benefits)
- Methodologies
- Accuracy of baseline
- Depth of monitoring system

Determining price – Quality, **Risk**, Knowledge

- Reputation, stability, and capability of the project developer
- Stage in project cycle: seed or tree? OTC or futures?
- Implementation risks: if regulations, market, country situation change…
- ER quantity and delivery schedule: when is Carbon Finance needed ?
- Delivery assurance / non delivery, say, if the project underperforms…

• To address risks… Independent risk rating

- Provision against risk (monetary, or ERs from project pool)

- Share risk with buyer - Transfer risk to third party: hedging, insurance

Determining price – Quality, Risk, **Knowledge**

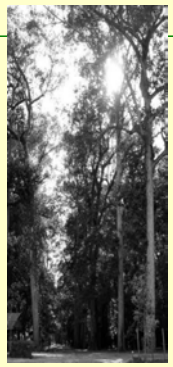
Cost of expertise

to prepare Carbon Finance documentation

- assess information gaps, conduct studies, define baseline and monitoring methodology
- to validate and verify

Buyers - sellers asymmetry

- access to the end buyers
- market intelligence

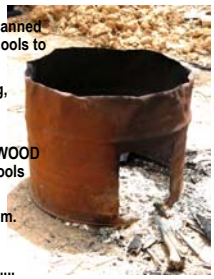


Thank you for your attention

Introduction

Background

- Most children of elementary school do not have enough meal before school, weaken their learning capacity.
- The UN-World Food Program (WFP) provides rice, canned fish, cooking oil, salt, rice bean, etc.. to support schools to prepare breakfast.
- Each school has to organize cooking every morning, hiring local cooks, procure cooking fuel, procure vegetables, etc.. for an average of 225 portion/day
- The only affordable and accessible cooking fuel is WOOD – somehow wood collection is a burden for the schools and the students as well.
- Heavy workload for the cooks, must finish at 7.00 a.m.
- Stoves used is not efficient – metal drum stove.....
- Each portion of breakfast requires 90 gram of wood....



Introduction

The Project

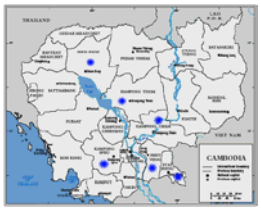
Fixed Stove Dissemination to support School Feeding Program in 429 elementary schools in 6 provinces

Constructed by 12 NGOs, CEDAC, DORD, AHRDHE, DKC, HCDO, PADEK, COWS, CARITAS, NAPA, CADET, APA and OKRCD

Organized by WENetCam,

Technical support by CFSP

Funded by TNT



Introduction

The Stove

Material:	Termite soil, rice husk, straw
Production:	Owner-built stove
Size:	210 x 92 x 84 cm
Specification:	Fixed
Price:	Approx 80,000 Riels per burner including the price of bricks, chimney, and labor cost.
Main Users:	Large capacity cooking - Hospital, Pagoda, Industry, Orphanage, etc
Fuel:	Split Fuelwood
Efficiency:	30 - 45 % Water Boiling Test

Introduction

The Stove

Material:	Metal covered baked clay
Production:	Potters & stove artisans
Size:	55 cm diameter, 60 cm height
Specification:	Portable
Price:	50,000 to 60,000 Riels per unit (US$ 12.4 – 15)
Main Users:	Large capacity cooking – mostly restaurants
Fuel:	Split Fuelwood & Charcoal
Efficiency:	37 % Water Boiling Test

Introduction

Achievement

# of schools benefited	429 schools
# of students benefited	148,248 pupils
#of Fixed Stove	482 units
# of XXL NLS	102 units
FW saved by Fixed Stove	1,657,193.4 ton per year
FW saved by XXL NLS	75,165.5 ton per year
CO_2 saved by Fixed Stove	2,724.4 ton per year
CO_2 saved by XXL NLS	123.6 ton per year
Total CO_2 reduction	2,848 tCO_2 per year

Introduction

The Cook's Perspective

"The new stoves are much better than the drum stoves..."

- It's more comfortable for me to cook because all the heat goes to the wok and less smoke.
- It uses less fuel, fuelwood has to come from 50 km away and costs US$10 for one stere (one stere = 650kg). We used to use four stere a month and now we only use two.
- It takes less time. I used to wake up at 2.30 am and cook until 5.30 or 6 am. Now I can wake up at 4 am.
- The drum stoves were hard to cook with because they didn't cook the rice evenly, some parts would be burnt and other parts weren't cooked at all.
- I used to have to stay close to the drum stoves in order to feed them fuel. Now I can spend more time making better food for the kids"

Mr. Lol Lang (left), Cook, Khnar School, Tbong Khmum District, Kampong Cham province

Introduction

The Educator's Perspective

"Why do we prefer these new stoves? ... It's simple. They cook more food, they cook faster, they use less wood and we've had no problems with them"

Mr Mov Pha, Principal, Khnar school, Kampong Cham province.

Pupils at breakfast time in Khnar School, Kg. Cham Province

Leakages

Leakage is defined as the net change of GHG emissions which occurs outside the project boundary, and which is measurable and attributable to the CDM project activity

- GHG emitted from transportation means, including motorbikes, cars, airplanes, outboard engines, etc..
- Utilization of electricity (if the power plant does not use renewable energy) in the project.
- Utilization of air conditioning, cold storage, room heater, refrigerator...
- Consumption of office supplies; especially paper, petro-chemical products, etc...
- Wood for stove testing purpose

Monitoring

Baseline

Information Needed	Method	Sources & Report
Proof of unsustainable forest extraction	Research	Wood Energy Baseline Study for Clean Development Mechanism (GERES, IGES, CCCO – 2006)
Needs Assessment	Study	School Needs Assessment of SFP-WFP (WENetCam 2006)
Sources of fuel wood	GIS Analysis	Landsat photo 1989, 2003; Land use map of Cambodia; School coordinate data base
Fuel needed for cooking and fuel mix	Study	School Needs Assessment of SFP-WFP (WENetCam 2006)

Monitoring

Baseline

Information Needed	Method	Sources & Report
Real Fuel Consumption with hard wood	Test – Fuel Consumption Test	FCT on School (Drum) Stove (GERES, 2006)
Real Fuel Consumption with rubber wood	Test – Fuel Consumption Test	FCT on School (Drum) Stove (GERES, 2006)

Monitoring

Additionality

Information Needed	Method	Sources & Report
Quality of stove installed	Quality Control	Monitoring report of ICS construction for SFP (WENetCam, Jun, Aug, Nov 2006)
Real Fuel Saving with hard wood	Fuel Consumption Test	FCT on Improved School Stove (GERES, 2006)
Real Fuel Saving with rubber wood	Fuel Consumption Test	FCT on Improved School Stove (GERES, 2006)
Users' feedback	Survey	WENetCam monitoring report

Monitoring

Additionality

Information Needed	Method	Sources & Report
Database of Improved School Stove	Applying school serial number	Data base of School Stove – SFP-WFP

Monitoring

Leakages

Scope of Leakages	Monitoring Method	Sources & Report
Fuel consumption	Plan & Monitoring	Car & motorbike log book; Travel & Mission Plan; Travel & Mission Support Claim; Weekly Plan; Receipts
Traveling in public transportation	Plan & Monitoring	Travel & Mission Plan; Mission Support Claim; Weekly Plan; Receipts;
Utilization of fossil fuel for other purposes	Plan & Monitoring	Weekly Plan; Monthly Budget Plan; Receipts;
Electric power consumption	Data recording & Monitoring	Electric bill; Receipts

Monitoring

Leakages

Scope of Leakages	Monitoring Method	Sources & Report
Air conditioning, cooling, etc...	Data recording & Monitoring	Usually integrated in the electric power bill
Paper consumption	Data recording & Monitoring	Office supplies request form; Receipts
Fuelwood & consumption in stove testing	Data recording & Monitoring	Weekly Plan; Monthly Budget Plan; Receipts; Reports of stove tests

or just follow the leakage default value – 15% of CO_2 emission reduction

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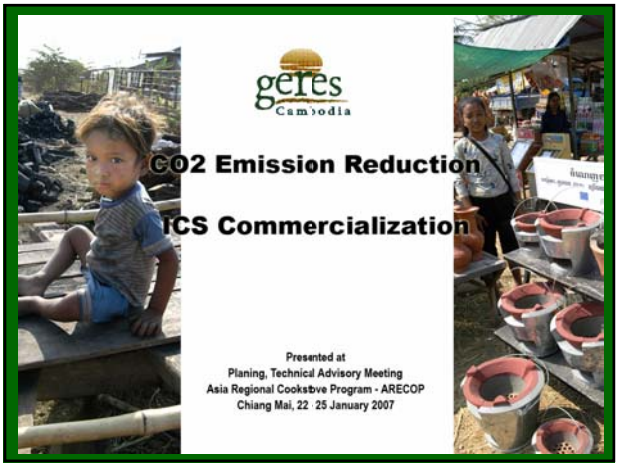
** Thank you*



Introduction

Background

Biomass based cooking fuel - fuelwood and charcoal - remain highly demanded for many reasons.

Forest is the main sources of charcoal raw material - and is extracted without proper management and the extracted volume is beyond the forest yield

Pressure to Cambodian forest is getting higher; threatening biodiversity reserves, affecting watersheds, causing river siltation etc....

GERES developed three approaches to response to the forest pressure:

- Demand side - Introduction of improved cook stove to reduce fuelwood and charcoal consumption
- Lower Supply side - Up-grade the quality of charcoal to improve energy conversion efficiency
- Upper Supply side - Energy plantation and sustainable forest management to secure sustainable wood supply

Introduction

Response to the Demand Side

New Lao Stove Commercialization

New Lao Stove (NLS) is an improved cook stove design, usually charcoal fueled, adopted from the famous Thai Bucket Stove.

Introduced to Cambodia in 1999, disseminated through commercialization since 2000.

Thoroughly monitored since 10th May 2003.

NLS dissemination is intending to substitute traditional stove to reduce charcoal consumption for cooking.

Reduction of forest pressure from demand side.

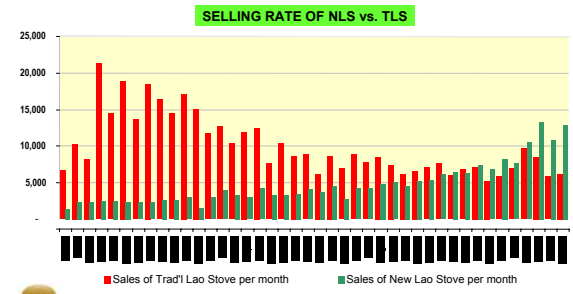
Introduction

The Project

Cambodia Fuelwood Saving Project

Introduction

Achievement - Selling Rate



Introduction

Comparison of NLS & TLS

NLS	Aspects	TLS
Baked clay	Material	Baked clay
Full body height	Metal cover	Partial
Semi-mechanical	Production	Manual, artisan
Full body height, 2 cm	Insulation	Lower half, 1 cm
Charcoal	Fuel	Multi
29%	Efficiency	25%
12 kg	Weight	3 – 8 kg
Multi sizes	Pot size	Limited sizes
2.5 to 4 USD	Price	1 – 2 USD
3 years	Lifetime	1 year

Introduction

Comparison of NLS & TLS

NLS	Aspects	TLS
11 mm	Pot rest	22 - 26 mm
35 – 40 mm thickness	Grate	~ 15 mm thickness
37 holes of 18 mm	Grate holes	Uncertain

NLS Benefits

Dissemination Actors

Actors	Profit of TLS/Unit	Profit of NLS/Unit
PRODUCERS	600 KHR	2,000 KHR
MIDDLEMEN	500 - 700 KHR	1,000 - 1,500 KHR
RETAILERS	500 - 700 KHR	1,500 - 2,000 KHR

Case of Ms. Sim Sour
She was producing traditional stove, since 2002 producing ONLY NLS. She enjoys more profits and gets higher monthly income.

	Traditional	NLS
Selling rate per month	400 - 600 units	1,200 units
Profit per unit	500 KHR	2,000 KHR
Average net income/month	300,000 KHR	2,400,000 KHR
	75 USD	600 USD

NLS Benefits

Fuel Saving

The average consumption of a family burning charcoal with Traditional Lao Stove is 2.12 kg/day/family or 773.8 kg/year/family

When the family use NLS, it can save 21.76% of charcoal or 0.46kg/day/family or 168.38 kg/year/family

97.6% of NLS users are families burning charcoal as cooking fuel

The average consumption of a family burning wood with Traditional Lao Stove is 2.775 kg/day/family or 1,013 kg/year/family

When the family use NLS, it can save 21.49% of wood or 0.596kg/day/family or 217.67 kg/year/family

2.4% of NLS users are families burning wood as cooking fuel

NLS Benefits

Users

	Cooking cost with Traditional Stove		
1	Price of Traditional Stove	5,000	KHR
2	Average charcoal consumption per day	2.12	kg per day
3	Price of charcoal	500	KHR per kg
4	Charcoal cost per year	386,900	KHR
	Total cost	391,900	KHR per year

	Cooking cost with Improved Cook Stove		
1	Price of Improved Cook Stove	13,000	KHR
2	Average charcoal consumption per day	1.66	kg per day
3	Price of charcoal	500	KHR per kg
4	Charcoal cost per year	301,782	KHR per kg
	Total cost	314,782	KHR per year
	Money saved from charcoal per family	77,118	KHR per year
	Money saved from charcoal per family	19.28	USD

NLS Benefits

Money Saving

Period	no of ICS sold (in unit)	cumulative of family using ICS	Unspent money to buy charcoal (in USD)
Year 1	15,881	12,505	81,103.04
Year 2	36,116	40,943	543,521.18
Year 3	51,912	81,818	1,252,374.07
Year 4	96,657	156,132	2,171,839.95
Money saved from charcoal (in USD)			4,048,838.25

NLS Benefits

Environment

Given
Utilization rate is 1.27 units NLS/family
Replacement period is 36 months
Conversion ratio wood - charcoal is 6.54

Period	NLS Sold in the period	Wood saved by families in ton of wood			CO_2 emission reduction
		Burn wood	Burn charcoal	Tot. saved	
Year 1	15,881	23	4,276	4,298	7,067
Year 2	51,997	151	28,655	28,806	47,357
Year 3	103,909	349	66,026	66,375	109,120
Year 4	193,757	664	125,668	126,331	207,689
Total	365,544	1,186	224,624	225,811	371,233

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- Wood and charcoal for stove testing purpose

Monitoring

Baseline

Information Needed	Method	Sources & Report
Proof of unsustainable forest extraction	Research	Wood Energy Baseline Study for Clean Development Mechanism (GERES, IGES, CCCO – 2006)
Volume of charcoal flow to Phnom Penh	Research	Study on charcoal and fuelwood flow to Phnom Penh (GERES, 2006)
Conversion ratio of wood to charcoal	Research	Traditional Kiln Test (CFSP, 2004)
Potential fuel saving of NLS	Test, Adapted Water Boiling Test	Adapted Water Boiling Testing report (CFSP, 2002)

Monitoring

Baseline

Information Needed	Method	Sources & Report
Lifetime of NLS & TLS	Research	Improved Cookstove Lifetime Survey Report (GERES, 2006)
Net fuel saving of NLS	Test, Household Fuel Consumption Test	Household Fuel Consumption Test Report (CFSP, 2003)
NLS equipment ratio in a household	Study	Study on NLS Users in 5 Urban Settlements (DATe, CFSP, 2003)
Ratio of HH burning charcoal & fuelwood	Study	Study on NLS Users in 5 Urban Settlements (DATe, CFSP, 2003)

Monitoring

Additionality

Information Needed	Method	Sources & Report
Net fuel saving of NLS	Test, Household Fuel Consumption Test – every six month	Regular Household Fuel Consumption Test Report (CFSP)
NLS equipment ratio in a household	Study	Study on equipment ratio in 7 provinces (CFSP, 2005)
Durability of NLS	Study	Improved Cookstove Lifetime Survey Report (GERES, 2006); Cambodia case study – ICS dissemination (WINROCK, 2005)

Monitoring

Additionality

Information Needed	Method	Sources & Report
Quality of NLS	Regular AWBT, Quality Check,	Regular AWBT report; Scoring Sheet of NLS standard;
Mould calibration	Regular test	Regular clay testing (once in 3 months for new producers, once in 6 months for full run producers)
Sales of NLS per producer per month	Log-book, monthly monitoring	Database of NLS sales per producer per month, monthly sales report
Charcoal quality – calorific value	Laboratory test	Calorific value test result, LUACOB – UIT Tarbes, France (2004, 2006)

Monitoring

Leakages

Information Needed	Method	Sources & Report
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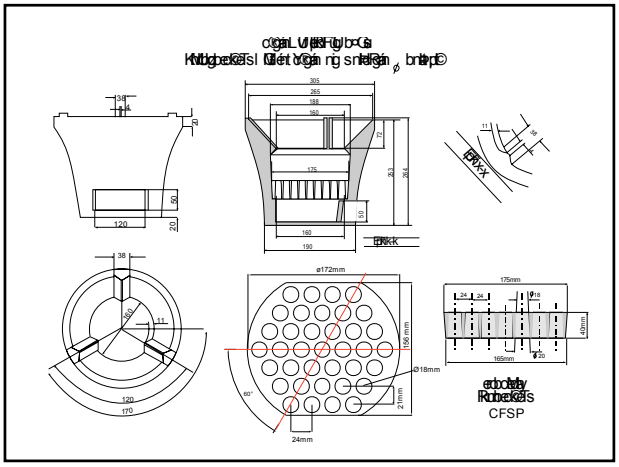
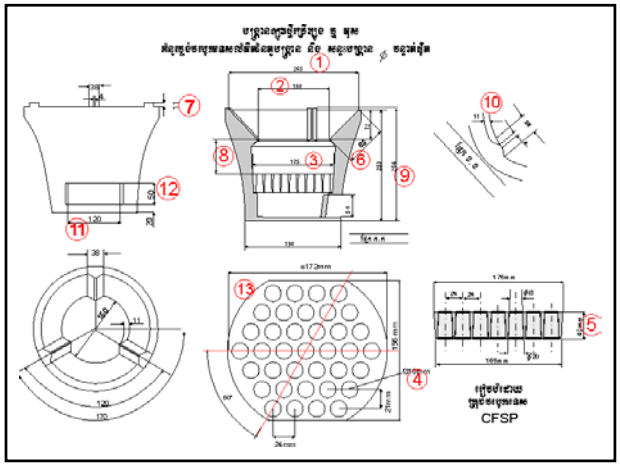




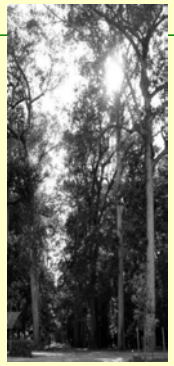
Score of Quality Control

X-5mm	X-4mm	X-3mm	X-2mm	X-1mm	X	X+1mm	X+2mm	X+3mm	X+4mm	X+5mm
0	1	2	3	4	5	4	3	2	1	0

17.5	17.6	17.7	17.8	17.9	18	18.1	18.2	18.3	18.4	18.5
0	1	2	3	4	5	4	3	2	1	0

NLS #1

		September 8, 2006					
		Scores of sample					
		1	2	3	4	5	
1	Port rim internal dia. (top)	4	4	5	4	5	22
2	Dia. of lower pot rim	3	4	3	4	4	18
3	Dia. of base of combustion chamber	5	5	5	5	5	25
4	Air hole diameter in mm	4	4	4	4	4	20
5	Grate thickness	3	3	3	3	3	15
6	Length of slope	4	4	4	4	4	20
7	Port rest height	4	4	4	4	4	20
8	Combustion chamber height	4	5	5	4	4	22
9	Stove body height after fixing insulation	4	3	3	3	3	16
10	Slope pot rest thickness/height	3	4	3	3	3	16
11	Ash hole (air inlet) (L)	4	3	3	3	3	16
12	Ash hole (air inlet) (W)	4	3	3	3	3	16
13	Grate hole number	5	5	5	5	5	25
		51	51	50	49	50	
						Average score =	50.2
						Standard Deviation =	0.8367
						Batch Production Score =	77.2



Session V

Elements for group discussion

Cambodia Carbon Facility

Regional Outreach

Minh Cuong LEQUAN, GERES, ARECOP PTA Meeting, 22-25th January 2007, Chiang Mai.

Group Discussion – CCF Outreach

- Problem statements
- Experience piloted in Cambodia
- Proposed international framework
- Way forward / Open questions

Problem statements

- CDM transaction costs prohibitive
- CDM methodologies inadequate
- Complex and costly procedures

=> so far, CDM fails to address energy-poverty issues

Voluntary market – at the condition of ER Quality- but…

- knowledge and human resources of developers usually insufficient
- financial capacity not commensurate with consultancy costs
- risk sharing and market knowledge insufficient for balanced negotiation with buyers

Experience piloted in Cambodia

- Identified with DNA as organization involved in RE and EE
- 4 PIN, 2 PDD (School stoves, NLS) done
- Negotiation with Audit companies, Carbon buyers completed
- PDDs planned: palm sugar stoves, char briquette, biofuel.
- Support from World Bank (8 months: November'06 – June'07):
  - Seed grant to setup the Carbon Finance instruments/procedures, for international outreach
  - No resources **yet** to support international outreach further

Proposed international framework: facilitating Carbon Finance for SD projects

- GERES Cambodia would like to **serve** SSC project developers to towards Carbon Finance
  - access with quality ERs to sell
  - in fair and transparent conditions
- Access => Helpdesk / Technical Assistance
  - capacity building
  - on-job training
  - hotline
- Fairness => web-based clearing house
  - project ratings
  - documentation
  - market information

Way forward, open questions 1/3

Do you plan to seek Carbon Finance? yes / no

Do you need assistance ? yes / no

For what project(s) ?

What kind of assistance ?
preliminary capacity building

methodology
conduct baseline studies/research
setup monitoring system

find carbon buyers
assess / mitigate risks
negotiate with carbon buyers
manage Carbon assets

Way forward, open questions 2/3

How to sustain the Carbon Helpdesk functions ?

Technical Assistance

preliminary capacity building

methodology
conduct baseline studies/research
setup monitoring system

Support to ER Marketing

find carbon buyers
risk assessment / mitigation
negotiate with carbon buyers
manage Carbon assets

Way forward, open questions 3/3

How would ARECOP / members like to support the Carbon Desk?

consultancy fee

membership

donor funding

→ GERES remains independent 3rd party

success fee (percentage of VERs sales)

share of VERs

→ GERES considered project partner