The 2nd CDM Capacity Building Workshop in the Pacific Under the EC ACP MEA Project

Renewable Energy Based CDM Projects

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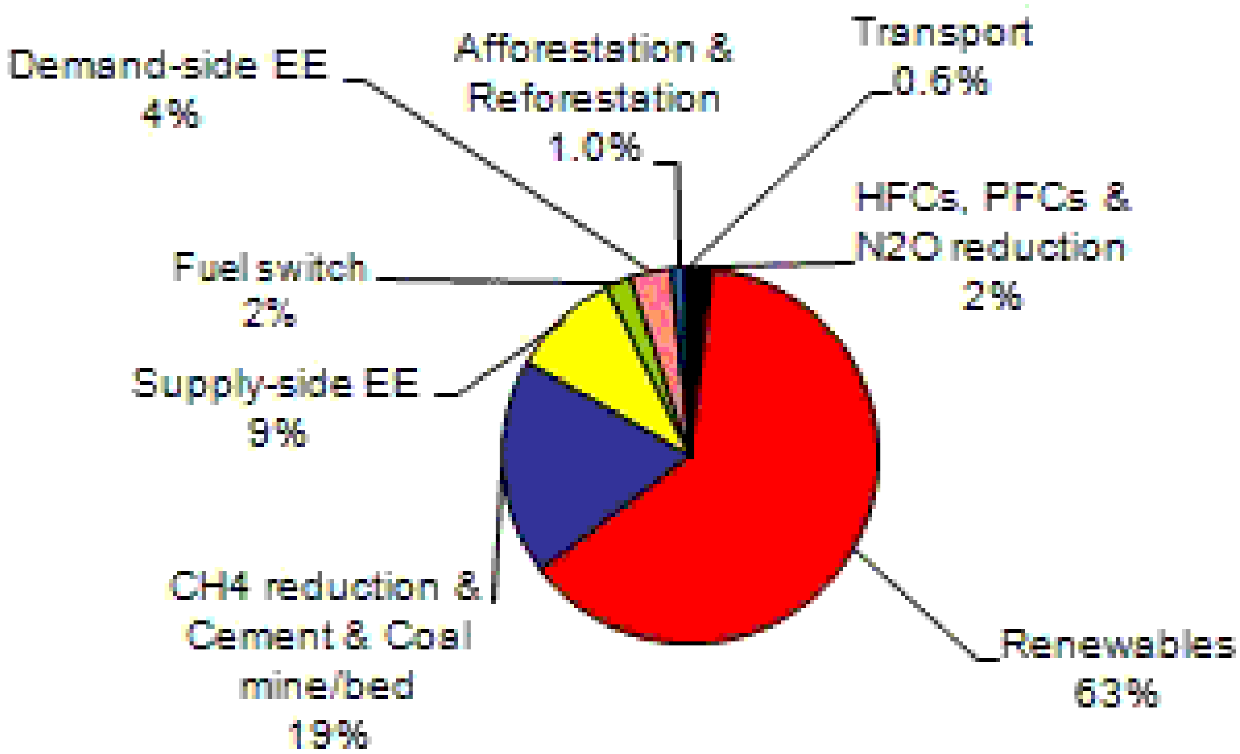
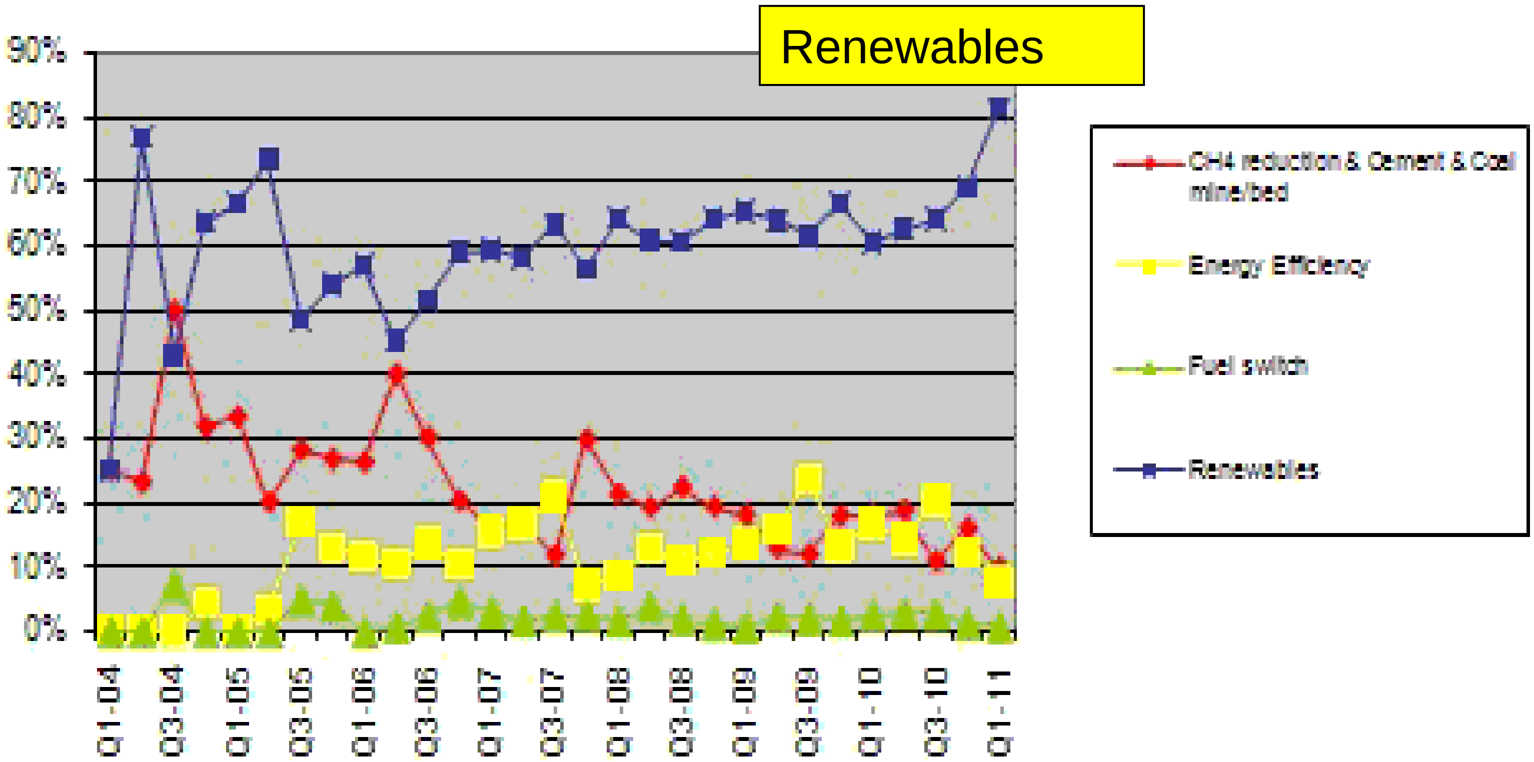
RE leads the Registered Project Types



http://cdmpipeline.org/cdm-projects-type.htm#2

Share of Project Types



http://cdmpipeline.org/cdm-projects-type.htm#2

Solar and Wind CDM Projects

Wind CDM projects

Country	Projects	MW
India	553	8264
China	754	43736
Mexico	22	2470
Brazil	21	1494
South Korea	13	371
Chile	7	274
Morocco	7	584
Cyprus	5	241
Egypt	4	406
Dominican Republic	4	129
Uruguay	3	74
Costa Rica	3	82
Nicaragua	2	63
Israel	2	34
Philippines	2	113
Ecuador	2	8
Thailand	2	62
Azerbaijan	1	50
Kenya	1	310
Panama	1	81
Mongolia	1	50
Jamaica	2	39
Colombia	1	20
Tunisia	1	34
Argentina	1	11
Vietnam	1	30
Sri Lanka	3	30
Cape Verde	1	28
Mauritius	1	18
Total	1421	59104

Solar CDM projects

Country	Projects	MW
South Korea	26	157
China	35	470
India	17	17
Thailand	5	463
Israel	3	225
United Arab Emirates	2	110
Rwanda	2	0.04
Morocco	1	8
Madagascar	1	
Chile	1	0.1
Tunisia	1	1
Lebanon	1	
Indonesia	1	
Total	96	1451

Source: cdmpipeline.org, 1st June 2011

CDM Projects in India and China

Project Type	INDIA			CHINA			
Biomass	389	20.40%		110	4.20%		
Cement	27	1.50%		27	1%		
EE households	46	2.60%		13	0.50%		
EE industry	105	6.00%		8	0.30%		
EE own gen.	140.00	8.00%		285	11%		
EE service	19	1.10%		0	0%		
EE supply side	51	2.90%		16	0.60%		
Fossil fuel switch	42	2.40%		37	1.40%		
Hydro	180	10.30%		1021	39.1%		
Landfill gas	29	1.70%		81	3.10%		
Methand avoidanc	50	2.90%		62	2.40%		
Reforestation	12	0.70%		3	0.10%		
Solar	21	1.20%		35	1.40%		
Transport	15	0.90%		6	0.20%		
Wind	628	35.80%		755	2.90%		
Total	1758	100%		2600	100%		

cdmpipeline.org accessed on 20/6/2011

Micro-scale RE projects

No Additionality requirements if :

- the project capacity is smaller than 5 MW-electrical .
- is located in SIDS or an LDC.
- If the project activity is an off grid activity supplying energy to households/communities (less than 12 hrs grid availability per 24 hrs day is also considered as off grid for this assessment)

Fiji RE Power Development

Potential Renewable Energy Projects by Independent Power Producers (IPPs)

<u>Viti Levu</u>

- FSC Rarawai – A new Power Station at FSC Rarawai Sugar Mill operating at 20-25MW on bagasse during the crushing season and hog fuel during other months
- FSC Lautoka – Potential for generation output to be made available by FSC throughout the year by 2012
- I-Viti – Plans for a 10MW Waste to Energy Plant in Sigatoka with anticipated commissioning by October 2013
- Pacific Renewable Energy – An 18MW dedicated wood-fired biomass power plant planned to be constructed in Lautoka- 2013

Source: FEA

Fiji RE Power Development

Vanua Levu

- FSC Labasa – FSC to develop a co-generation Power Station at the Labasa Sugar Mill, which has the potential to generate electricity throughout the year.
- Labasa Biomass –proposal for a 8.5MW biomass plant over a period of 5 years with the first 3MW to be commissioned by May 2012.

Planned CDM projects (Fiji)

- Labasa Biomass Power Station, Environmental Intermediaries & Trading Group Limited Fiji.

- Nadarivatu Hydropower Project Fiji Electricity Authority.

Source : UNFCCC

Planned CDM projects (PNG)

- Biogas recovery from wastewater treatment in HARGY OIL PALMS Ltd., palm oil mill.
- Warastone POME Methane Capture Project in West New Britain,
- Mosa POME Methane Capture Project in West New Britain,
- POME Methane Capture Project New Britain Palm Oil Limited (NBPOL)
- Numundo POME Methane Capture Project New Britain Palm Oil Limited (NBPOL)
- Kumbango POME Methane Capture Project New Britain
- Kapiura POME Methane Capture Project New Britain Palm Oil Limited (NBPOL)
- Hydro POA

Source : UNFCCC

Planned CDM projects (Samoa)

- Alaoa Hydro Power Project Electric Power Corporation Samoa

Source : UNFCCC

RE CDM- Barriers

- Technological
- Social
- Financial

•Some issues

•EU does not accept CERs from hydro projects larger than 10 MW unless the dam complies with World Commission of Dams guidelines.
•UNFCCC has a limit on surface area of reservoirs.
•Wind atlas for most of PICs are non-existent.
•Erection of wind turbines –an expensive exercise.
•Wind electricity- use it or loose it = should be the first energy dispatched to the grid= can create instability.
•Smaller wind turbines are difficult to source..
•Landfill methane projects-lucrative but have to be implemented quickly-gas in MSW peaks within a year of being covered.

Examples of RE based CDM projects

Renewable Energy –100 kW PV

File Edit View Insert Format Tools MegaStat Data Window Help RETScreen

Resource assessment

Solar tracking mode		Fixed
Slope	°	25.0
Azimuth	°	180.0

☑ Show data

Month	Daily solar radiation - horizontal kWh/m²/d	Daily solar radiation - tilted kWh/m²/d	Electricity export rate $/MWh	Electricity exported to grid MWh
January	5.83	5.15		13.01
February	5.71	5.30		12.09
March	5.33	5.29		13.31
April	4.69	5.04		12.28
May	4.28	4.99		12.57
June	4.00	4.86		11.89
July	4.19	5.01		12.69
August	4.59	5.11		12.96
September	5.14	5.26		12.93
October	5.87	5.56		14.10
November	6.04	5.38		13.21
December	5.95	5.17		13.07
Annual	**5.13**	**5.18**	**0.00**	**154.09**

Annual solar radiation - horizontal	MWh/m²	1.87
Annual solar radiation - tilted	MWh/m²	1.89

Photovoltaic

Type		mono-Si
Power capacity	kW	100.00
Manufacturer		BP Solar
Model		mono-Si - BP 5160 S (1 unit(s))
Efficiency	%	12.7%
Nominal operating cell temperature	°C	45
Temperature coefficient	% / °C	0.40%
Solar collector area	m²	787
Miscellaneous losses	%	1.0%

See p

Inverter

Efficiency	%	90.0%
Capacity	kW	100.0
Miscellaneous losses	%	0.0%

Summary

Capacity factor	%	17.6%
Electricity exported to grid	MWh	154.09

[RETScreen]

Emission analysis Renewable Energy –100 kW PV

○ Method 3 — 298 tonnes CO_2 = 1 tonne N_2O (IPCC 2007)

Base case electricity system (Baseline)

Fuel type	Fuel mix %	CO_2 emission factor kg/GJ	CH_4 emission factor kg/GJ	N_2O emission factor kg/GJ	Electricity generation efficiency %	T&D losses %	GHG emission factor tCO_2/MWh
Diesel (#2 oil)	100.0%	73.3	0.0020	0.0020	30.0%	10.0%	0.986
Electricity mix	100.0%	271.6	0.0074	0.0074		10.0%	0.986

☐ Baseline changes during project life

Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	CO_2 emission factor kg/GJ	CH_4 emission factor kg/GJ	N_2O emission factor kg/GJ	Fuel consumption MWh	GHG emission factor tCO_2/MWh	GHG emission tCO_2
Electricity	100.0%	271.6	0.0074	0.0074	154	0.986	152.0
Total	100.0%	271.6	0.0074	0.0074	154	0.986	152.0

Proposed case system GHG summary (Power project)

Fuel type	Fuel mix %	CO_2 emission factor kg/GJ	CH_4 emission factor kg/GJ	N_2O emission factor kg/GJ	Fuel consumption MWh	GHG emission factor tCO_2/MWh	GHG emission tCO_2
Solar	100.0%	0.0	0.0000	0.0000	154	0.000	0.0
Total	100.0%	0.0	0.0000	0.0000	154	0.000	0.0
				T&D losses			
Electricity exported to grid	MWh	154		2.0%	3	0.986	3.0
						Total	3.0

GHG emission reduction summary

	Base case GHG emission tCO_2	Proposed case GHG emission tCO_2	Gross annual GHG emission reduction tCO_2	GHG credits transaction fee %	Net annual GHG emission reduction tCO_2
Power project	152.0	3.0	149.0		149.0

Net annual GHG emission reduction 149 tCO_2 is equivalent to 27.3 Cars & light trucks not used

RETScreen

Example –Solar PV SS CDM Project (India)*

Project Description : 5 MW Grid connected Solar PV Power System in Sivagangai Village, Sivaganga District, Tamil Nadu

The DC electric power generated by the photo voltaic modules will be converted into 415V, 3 phase,50Hz, AC power in a number of outdoor inverters, and then stepped up to 11000V.

Project participant: Sapphire Industrial Infrastructures Private Limited (Private Entity)

Methodology employed : Grid connected renewable electricity generation , AMS I.D./Version 15/ EB 50

Additionality Criteria: Shown using Barrier Analysis (EB 35)

*Source :Project PDD @ cdm.unfcc.int

Investment barrier

A calculation of project profitability over project life time the Project IRR without considering the revenues from CDM works out to be **9.99%** as against the Benchmark of **12.75%.**

Barrier due to prevailing practice:

The high initial cost of solar energy systems which is a barrier in large scale utilization of solar energy systems, especially for power generation

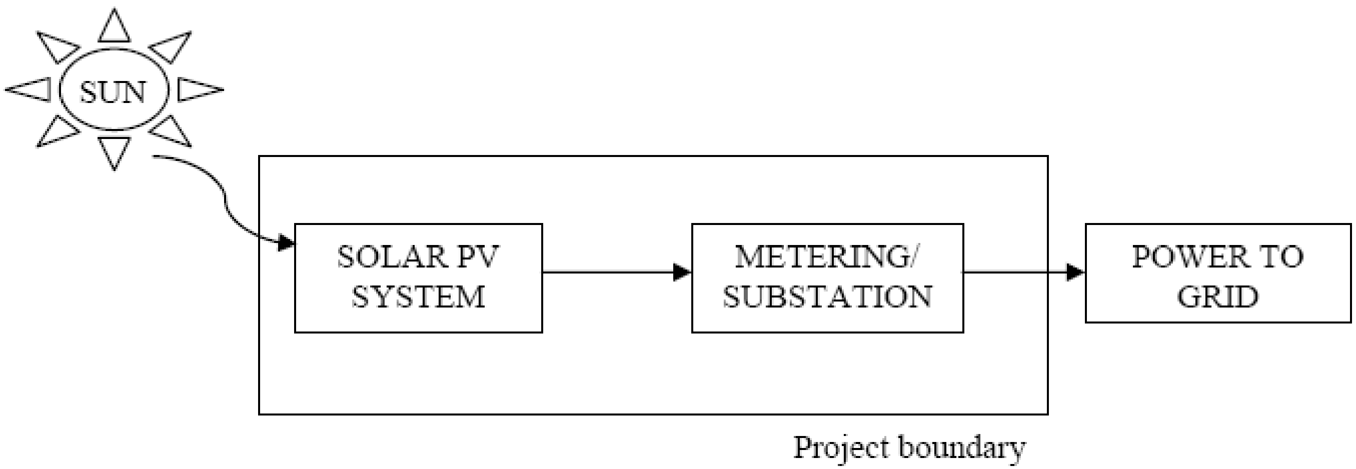
Technological barrier:

A less technologically advanced alternative to the project activity

involves lower risks due to the performance uncertainty.

A proposed <5 MW CDM RE project in SIDs does not need to include Additionality criteria section.

Project Boundary



*Source :Project PDD @ cdm.unfcc.int

Emission Reduction

Years	Estimation of annual emission reductions in tonnes of CO_2 e
2010 – 2011	7866
2011 – 2012	7866
2012 – 2013	7866
2013 – 2014	7866
2014 – 2015	7866
2015 – 2016	7866
2016 – 2017	7866
Total estimated reductions (tonnes of CO_2e)	**55062**
Total Number of crediting years[2]	7
Annual average of the estimated reductions over the crediting period	**7866**

Grid Emission factor (Combined Margin)

Particulars	Details	Remarks
Operating Margin (tCO_2/MWh)	0.9875564	-
Build Margin (tCO_2/MWh)	0.8179232	-
Combined Margin (tCO_2/MWh)	**0.9451481**	Weighted Average considering 75:25 weightage on OM & BM respectively

*Source :Project PDD @ cdm.unfcc.int

Formulae Used

Baseline Emissions:

$BE_y = EG_{BL,y} \times EF_{CO2}$ (1)

Where,

BE_y is the baseline emissions in year y, tCO_2

$EG_{BL,y}$ is the energy baseline in year y, kWh

EF_{CO2} is the CO_2 emission factor of the grid in year y (tCO_2/kWh).

Project emission (PE_y):

There are no project activity emissions as this is a renewable project activity.

(RE emission=0)

Leakage (L_y):

Leakage due to transfer of equipments from another activity:

The equipments installed in the project activity are not transferred from any other activity. Hence leakage for this part is zero.

Emission Reduction Calculations

Emission reduction (ER_y):

The emission reduction achieved by the project activity is the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = BE_y - (PE_y + L_y)$$

Power load factor

Emission factor

Emission reduction calculations:

EG_y = 5MW*19%*365days*24 hrs = 8322MWh

Using EF_y = **0.9451481** tCO2e/MWh

We get baseline emissions = BE_y = 7866tCO2/annum

Since project emissions and leakage emissions= 0

The annual Emission reduction = 7866t CO_2

Biofuels and CDM

Approximately 500 litres of biodiesel or 800 litres of ethanol used in developing country/economy in transition

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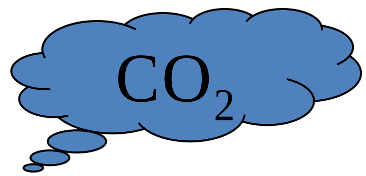

Emissions reductions of 1 tonne CO_2

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1 CER for biofuel producer

Source: Eco-securities

Possible Biomass CDM projects

- Bagasse based electricity generation
- Programmatic CDM- Biogas digesters
- Coconut oil blended diesel for transport
- Coconut oil based Biodiesel production

Biomass Methodologies

CDM approved methodologies which could be applied to biomass energy utilizing biomass feedstock solid waste

Methodology	Description
AM 0036	Fuel switch from fossil fuels to biomass residues in boilers for heat generation – Version 2.1
ACM006*	**Grid-connected electricity from biomass residues (includes AM4 & AM15)**
AMS-I.A.	Electricity generation by the user v.13
AMS-I.C.*	**Thermal energy for the user with or without energy**
AMS-I.D.*	**Grid-connected renewable energy connection**
AMS-III.E	Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment

Source: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

Note: *Preferred methodological choice for bagasse CDM projects based from IGES CDM Project Database

Biofuel Methodologies

Current CDM approved methodologies applicable to biofuels

Methodology	Description
AM 0047	Production of biodiesel based on waste oils and/or waste fats from biogenic origin for use as fuel
AMS-III.T	*Plant oil production and use for transport applications*

Note: **AMS** refers to **S**mall **S**cale CDM Methodologies

A sample of Biofuel CDM Proposals

Meth. No.	Title / Description	GHG reduction	Host country	Remark
69	30 TPD Biodiesel project using oil seeds from jatropha and pongamia in Andra Pradesh, India	26 ktCO2	India	C
82	Baseline methodology for the production of sugar cane based anhydrous bio-ethanol for transportation using LCA	53 ktCO2	Thailand	C
108	Biodiesel production and switching fossil fuels from petro-diesel to biodiesel in transport sector	26 ktCO2	India	C
109	Sunflower Methyl-Ester Biodiesel Project in	33 ktCO2	Thailand	C
129	Generalized baseline methodology for transportation biofuel production project with LCA	33 ktCO2	Thailand	C
142	Palm Methyl Ester – Biodiesel Fuel (PME-BDF) production and use for transportation	218 ktCO2	Thailand	C
180	BIOLUX Benji Biodiesel Beijing Project production of waste cooking oil based biodiesel for use as fuel	123 ktCO2	China	A
185	Khon Kaen Ethanol Project	40 ktCO2	Thailand	B
223	Biodiesel Project	205 ktCO2	South Africa	C
224	Manufacturing of Biodiesel from Crude Palm Oil and Jatropha Oil	60 ktCO2	India	C
228	AGRENCO Biodiesel project in Alta Araguala	335 ktCO2	Brazil	WIP
233	Palm Methyl Ester – Biodiesel Fuel (PME-BDF) production and use for transportation in	143 ktCO2	Thailand	WIP

Note: A = Approved by the Executive Board (EB); B = Project participants / EB must make some changes; C = Rejected / new Project Design Document (PDD) must be submitted; WIP = work in progress

Methodologies for Programmatic Biofuel CDM projects

- This methodology can be revised to be used for a programme of activities (PoA) under programmatic CDM.

- Emissons due to pre-project activities and change of biomass usage should be included.

Biofuel vs. Solid Biomass:CO_2 reduction

- bioethanol from sweet sorghum to substitute fossil fuels could reduce ~ 65-94 mil t CO2/y
- could reach to ~ 300 mil t CO2/y if solid biomass would be used for power generation

Therefore, utilizing solid biomass (bagasse) for power generation is 3 times more effective in reducing CO2 emissions and generating CERs than converting ethanol to fuel.

LAMNET Brochure

For Sugarcane ??

Plant oil- Biofuel CDM Methodology : AMS- IIIT

- Deals with production of plant oils and their use for transport applications in diesel vehicles.
- In case of blending, plant oil must be mixed with pure diesel not biodiesel.
- Plant oil must fulfill quality standards specified.
- Double counting of CERs not allowed (among producers , retailers and users)
- Only the CO_2 displaced by non-usage of diesel are considered.
- Project participants must demonstrate that area used for biofuel plants is not a forested area or has not been deforested in the last 10 years.
- Any biomass or waste produced during the oil production process should not be stored so as to generate methane through anaerobic digestion.
- This is a small-scale project methodology applied to projects that reduce less than or equal to 60 kT of CO_2 .

Project Activity Emission calculations

Project Boundary: The geographical area of production, cultivation and processing of biofuel + the area where the fuel is blended and sold.

•Project activity emissions are emissions related to cultivation of oil crop and production of oil **-“ Field to Wheel Emissions”.**

•Emissions from energy use for processing should be counted .

•N_2 O emissions due to fertilizer applications and/or from nitrogen in crop residues (above or under ground) should be counted.

Project Emission Calculations

For each oilseed/plant oil type “k” the project emissions shall be calculated separately.

$$PE_y = \sum_k PE_{PO,k,y} \quad (1)$$

Where:

PE_y	Total project emissions from plant oil production (tCO_{2e}/ton plant oil produced) in year “y”
$PE_{PO,k,y}$	Project emissions from plant oil production of crop “k” (tCO_{2e}/ton plant oil “k” produced) in year “y”

$$PE_{PO,k,y} = \frac{PE_{FA,k,y} + PE_{OFP,k,y}}{H_{k,y} \times OY_{k,y}} \quad (2)$$

Where:

$PE_{OFP,k,y}$	Project emissions from energy use for oil-seed processing (e.g. pressing and filtering) of crop “k” in year “y” (tCO_2)
$PE_{FA,k,y}$	Project emissions of N_2O in cultivation of crop “k” in year “y” (tCO_{2e})
$H_{k,y}$	Harvest of crop “k” in year “y” (ton crop)
$OY_{k,y}$	Oil yield of crop “k” in year “y” (ton oil/t crop)

Emission Calculations

Total baseline emissions are determined as follows:

$$BE_y = FC_{D,y} \times NCV_D \times EF_{CO2,D}$$

Where:

BE_y	Baseline emissions in year "y" (tCO_2e)
NCV_D	Net calorific value of diesel (GJ/ton)
$EF_{CO2,D}$	CO_2 emission factor diesel (tCO_2e/GJ)

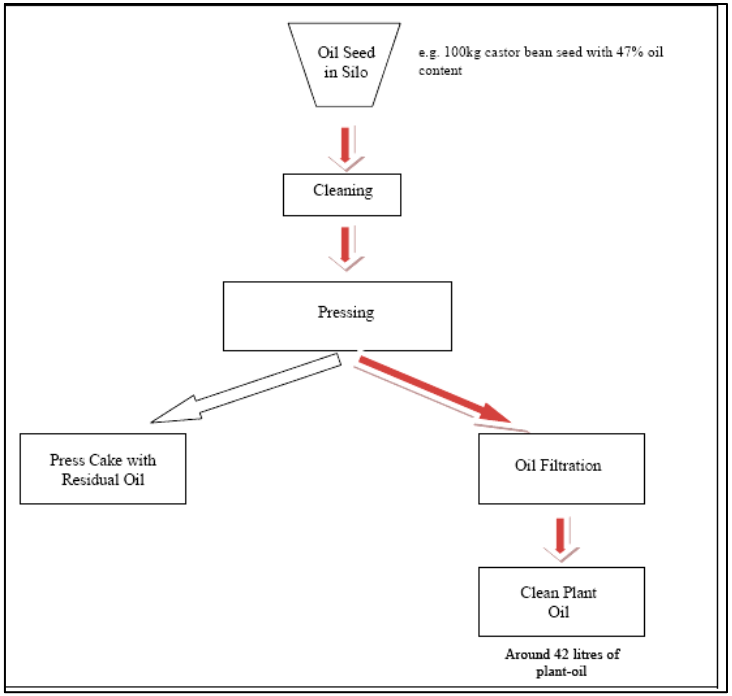
The emission reduction by the project = Difference between the baseline emission and the sum of project emission and leakage

$$ER_y = Be_y - Pe_y - LE_y$$

Example:Plant Oil CDM

Project : Plant-Oil Production for Usage in Vehicles, Paraguay

•To substitute diesel fuel in transport with vegetable oil (Bio fuel)- Castor oil from castor, Crambe and Oilseed radish plants.



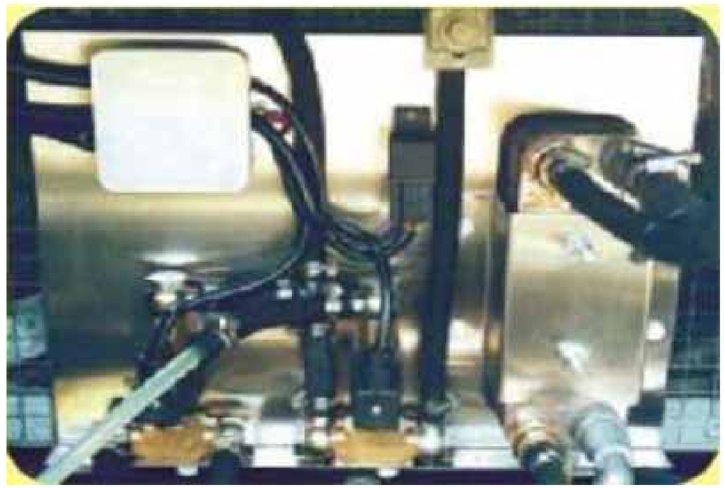
Process overview

Project registered

December 2010

Source PDD – cdm.unfccc.int

Plant Oil CDM (contd.)



Duel fuel (Diesel/biofuel)kit

- Estimated emission reduction ; 17,188 tCO_2 /annum
- Financing: Fully private finance - no Annex 1 public funding
- Methodology ; Version 1 of AMS-III.T.: Plant oil production and use for transport applications

Municipal Solid Waste (MSW) Based Power project

Methodology : AMS-III.G., AMS I.D.(<15 MW)

Methane from the Landfill

250 m^3 gas per tonne of waste

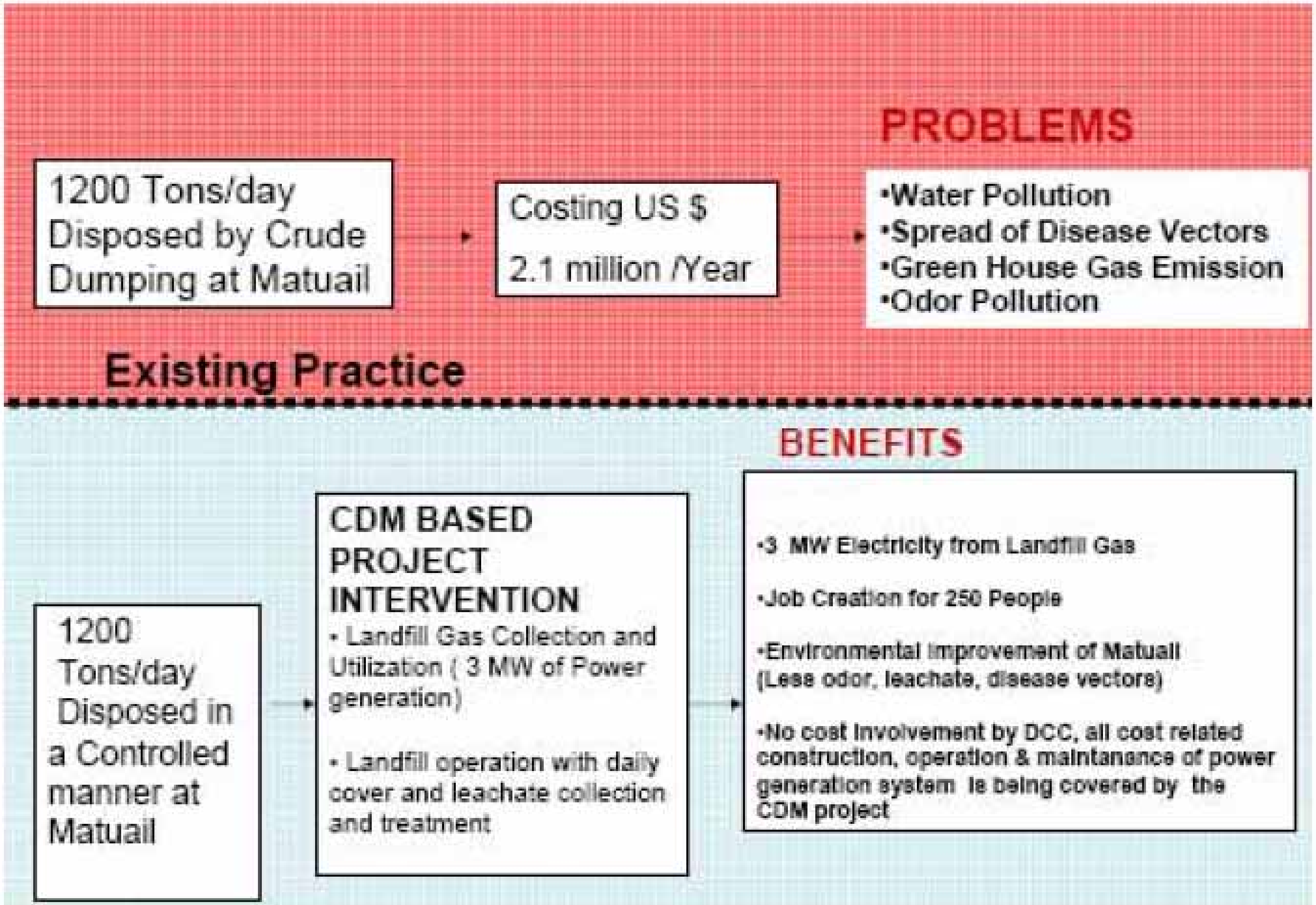
One tonne of waste = Gas production 100 times its volume

Suva: 24,500 tonnes MSW annually

Nadi : 8176 tonnes MSW annually

Lautoka : 17,556 tonnes MSW annually

MSW Power project-Bangladesh

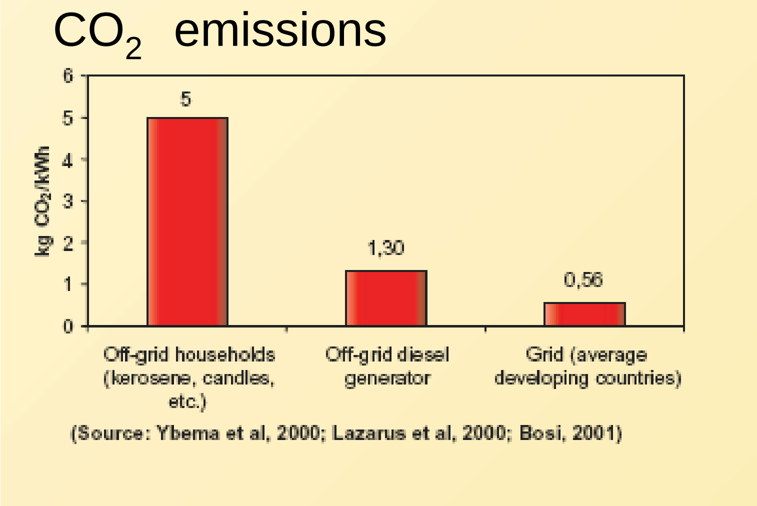


Source:Waste concern

PV Solar Home Systems in the CDM

Streamlined Procedures for Solar Home Systems in the Clean Development Mechanism

SHS mitigation potential



Standard CO_2 values

An analysis of activities in eight countries conducted in the first phase of the project shows that 250 kg CO_2 per system per year represents a conservative global average abatement value for SHS installations. Most emissions savings are from reduced kerosene lighting and candle use.

A standardized reduction factor should be developed for SHS CDM projects

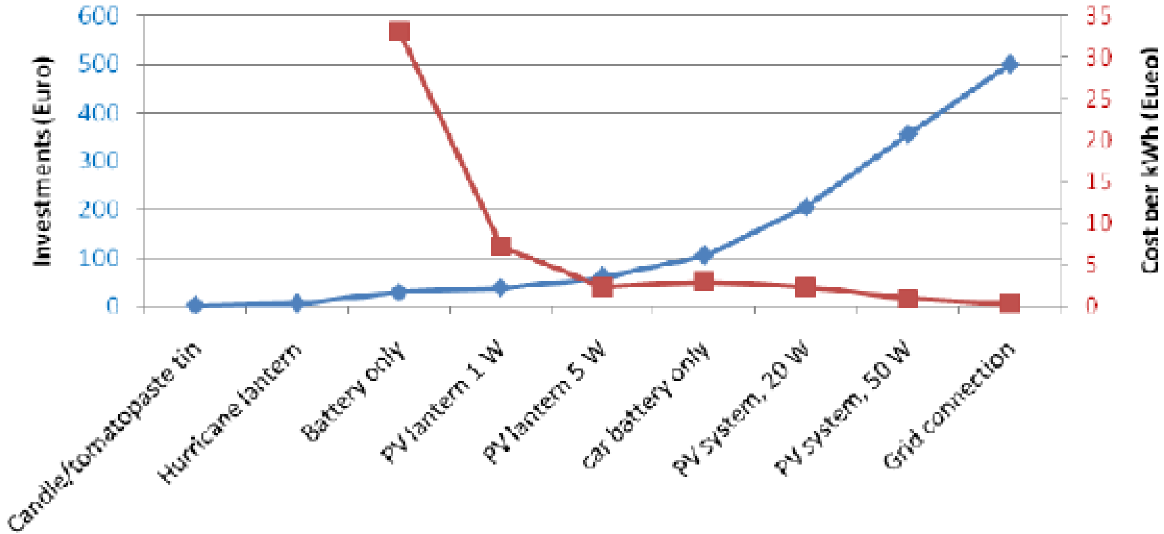
ECN

Efficient Lighting-CDM project

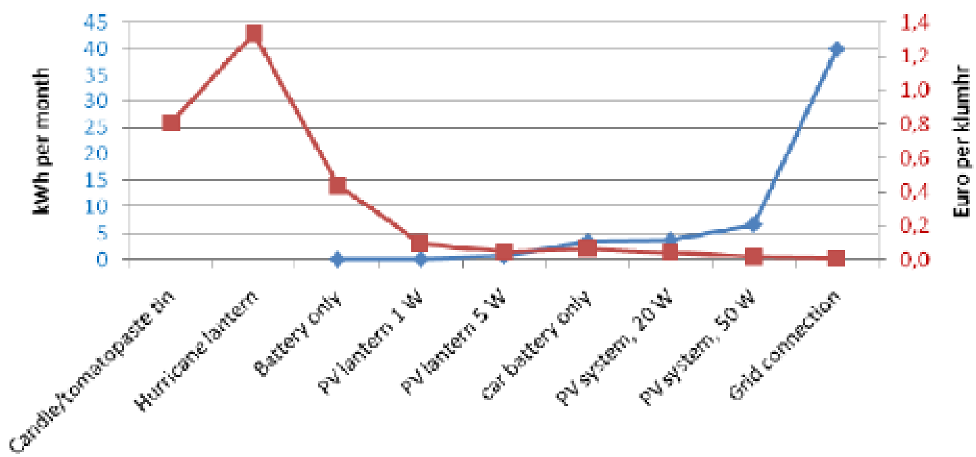
- Simplified methodology for kerosene lamps replacement
- Lumina project

Cost Of Lighting-Poor pay more

Investments and kWh costs



Cost of Lighting (Euro/klmh) and kWh Usage



Source ; EnDev

REDS project: baseline calculations

- Project capacity 0.9 MW : Type I Small scale project
- Baseline: kerosene consumption per lamp per hour in 98 households: 0.16 l /lamp per day
- Baseline emissions : CO_2 emission factor: 2.68 kg CO_2 per litre kerosene (IPCC values)
- 59.45 litres/ lamp/year corresponding to 46,484 tcO_2 per year (60,000 households)

The project displaces kerosene lamps with Solar LED/CFL lights

LED Lighting CDM project

New Methodology , AMS III .AR

Substituting fossil fuel based lighting with LED based lighting.

Can be applied if the batteries are charged :

- by a renewable energy system (solar, wind etc.)
- by a standalone (diesel) system or mini grid
- by a grid connected to regional/national grid

LED Lighting

LED standards

•Minimum lamp life 5,000 hours

•Minimum one year warranty

• Illumination level: Task light –20lux , Ambient light-4 lux @ 1 m

•No more than 5 lamps per house or business

•GHG reduction – less than 60 tonnes CO_2 annually

Baseline Lamp

Should directly consume fossil fuel (e.g. kerosene lamps)

LED lighting

Default annual baseline emission factor

Fuel use rate = 0.025 liter/hour

Utilization rate = 3.5 hours/day

Days/year =365

Fuel emission factor =2.4kgCO_2 per liter.

SS RE CDM Projects -Examples-

Atul Raturi

CDM and SD

"CDM projects offer opportunities for creating synergies between climate change policies and SD policies that encompass major national development priorities. These combined policy goals may be supported through a process in which potential CDM projects are screened against chosen SD criteria representing economic, social, and environmental aspects that host countries find important."

Joergen Fenhann and Miriam Hinostroza in CDM Imformation and Guide Book

SS RE CDM projects

EE Efficiency

⦿ 60 GWh/year

Renewable energy

⦿ 15 MW (electrical) or

⦿ 45MW (Thermal)

Other Activities

⦿ 60 kT CO_{2e} /year reduction

- Simplified methodologies and PDD
- No Addionality requirements for Micro projects (⦿ 5 MW electrical)

Indicative transaction costs

Activity	Cost (large-scale, US$)	Cost (small-scale, US$)	Type of cost
Planning Phase			
Initial feasibility study, i.e. Project Idea Note (PIN)	5,000–30,000	2,000–7,500	Consultancy fee or internal
Project Design Document (PDD)	15,000–100,000	10,000–25,000	Consultancy fee or internal
New methodology	8,000-30,000	6,500-10,000	DOE fee
Validation	8,000–30,000	6,500–10,000	DOE fee
Registration fee (advance on SOP-Admin – see below)	10,500–350,000[20]	0–24,500[21]	EB fee
Total CDM-specific costs – planning phase	38,500–610,000	18,500–117,000	

Source- CDM Guideline

Indicative transaction costs (contd.)

Activity	Cost (large-scale, US$)	Cost (small-scale, US$)	Type of cost
Construction Phase			
Construction, plant & equipment	Variable, depending on project type		Contractors fees
Installation of monitoring equipment	Usually minimal relative to total plant & equipment cost		Contractors fees
Total CDM-specific costs – construction phase	Usually minimal relative to total plant & equipment cost		
Operation Phase			
UN Adaptation Fund Fee	2% of CERs	2% of CERs	EB fee
Initial verification (incl. system check)	5,000–30,000	5,000–15,000	DOE fee
Ongoing verification (periodically)	5,000–25,000	5,000–10,000	DOE fee
Share of Proceeds to cover administration expenses (SOP-Admin)	The fee paid at registration is effectively an advance that will be 'trued up' against actual CERs issued over the crediting period (if different to emission reductions projected at registration). SOP-Admin is not capped.		EB fee
Total CDM-specific costs – operation phase	Variable – minimum 2% of CERs plus 5,000/year (if verification undertaken annually)		

Zero for SIDS

SS CDM –Example (Biomass)

Biomass Bundled Project (Tamilnadu, India)

- Project : 5 Biomass Gasifiers (Bundled)
- Capacity : 1 MW each
- Baseline : Regional Grid mix
- Emissions reduction : Approx. 25, 000 t CO_{2e} / Year
- Crediting Period : 10 years
- Project Developer : Southern Green Power Pvt. Ltd
- Internal rate of return :

    With CDM Project : 15.6 %

    Without CDM project: 13%

SS CDM –Example (Solar)

Project :LG Solar Energy Taean Photovoltaic Power Plant Project (South Korea)

A 13.772 MW grid connected PV system

Project participant: Private entity : LG Solar Energy

Crediting period : 7 years

Methodology **AMS-I.D**. ver. 15 - Grid connected renewable electricity generation

Emissions reduction : 12,275 t CO_{2e} per annum

Source: PDD @cdm.unfccc

SS CDM –Example (Wind)

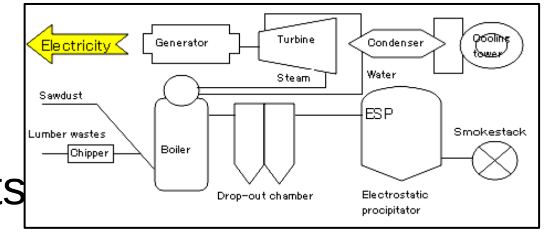
- **Project : 10.2 MW wind farm for the Lafarge cement factory;Morocco.**
- **Category : 1-D : Renewable energy production for the grid;**
- **Project promoter : LAFARGE – private company; Annex –1 part- France**
- **Date registration : Sept.2005**

- **Crediting period : 2007-2016**
- **Emissions reduction : 28,651 per annu**

Source: PDD @cdm.unfccc

SS CDM –Example (Biomass)

•Project: Biomass Power Plants Using Waste Wood Chips & Sawdust – Indonesia.



•Capacity : 4 MW

•Methodology: TYPE 1- Renewable Energy Projects generation by the user'

- Baseline : Existing diesel generators
- Emissions reduction : Approx. 14,602 t CO_{2e} / Year
- Crediting Period : 7 years
- Project Developer : PT. Rimba Partikel Indonesia ,
  Sumitomo Forestry Co., Ltd

Some issues

•EU does not accept CERs from hydro projects larger than 10 MW unless the dam complies with World Commission of Dams guidelines.
•UNFCCC has a limit on surface area of reservoirs.
•Wind atlas for most of PICs are non-existent.
•Erection of wind turbines –an expensive exercise.
•Wind electricity- use it or loose it=should be the first energy dispatched to the grid= can create instability.
•Smaller wind turbines are difficult to source..
•Landfill methane projects-lucrative but have to be implemented quickly-gas in MSW peaks within a year of being covered.

Small RE CDM- pitfalls-Example

“ Mexican hog farmers inadvertently signed a contract with carbon brokers that left them with no portion of the CDM revenues. This contract gave almost all of the first ten years’ worth of revenues from CERs to the project developer and carbon consultant in exchange for providing flare and biodigester equipment. After that period, the farmers were under the impression that the CER revenues would belong entirely to them. However, the carbon consultant opted for the ten-year crediting period, which is non-renewable. After this time period, another PDD and costly project cycle must be completed to earn additional revenues. And the new baseline after ten years includes the existing methane capture project. So, unless upgrades to the project are made, no CERs will result after the first ten-year crediting period.”

From: E. Lokey:Renewable Energy Project under CDM-A guide for latin America.

Post 2012 Demand

Table 2.1

POTENTIAL DEMAND FOR INTERNATIONAL OFFSETS

Country	Percentage reduction on 2005 levels	Mt CO_2-e 2013-2020
European Union	14	1,696
United States	17 (power sector only)	1,111
Australia	10	332
Japan	25	879
Canada	17	73
New Zealand	28	65
South Korea	4	98
Other	—	26
Total	—	**4,280**

Source: Turner, 2010.

THANK YOU