



BMU's Cooperation with Sub-Saharan LDCs on Energy and Climate Change

*Martin Burian, GFA ENVEST
Hamburg, April 5th, 2011*





GFA ENVEST:

- Consulting Company focusing on CC Mitigation & Renewable Energy
- Development of CDM methodologies, CDM Projects, CDM Programme of Activities and Assistance in CDM Validation and Verification
- Implementation of Credit Facilities for RE, EE and CC Mitigation
- Clients: BMU, EBRD, EC, KfW Carbon Fund, power companies and other private sector institutions



BMU Activities in Africa on Climate Change



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

➤ International Climate Initiative

- Initiatives in the sectors of Renewable Energy, Energy Efficiency, REDD+ and International Emission Trading/Climate Policy
- 27 programs with a total funding volume of 58.9 million €



GERMANY'S
CLIMATE
INITIATIVE

➤ Many other Regional and National Programs

- German technical cooperation (GIZ)
- German financial cooperation (KfW)

➤ Study 'Involving African LDC in the Carbon Markets'

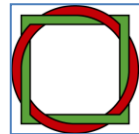
BMU Study: Involving African LDC in the Carbon Markets

➤ Twofold Objective:

- Bi-lateral cooperation between BMU and partner institutions
- Advice/input in the multi-national climate policy negotiations

➤ Implementation:

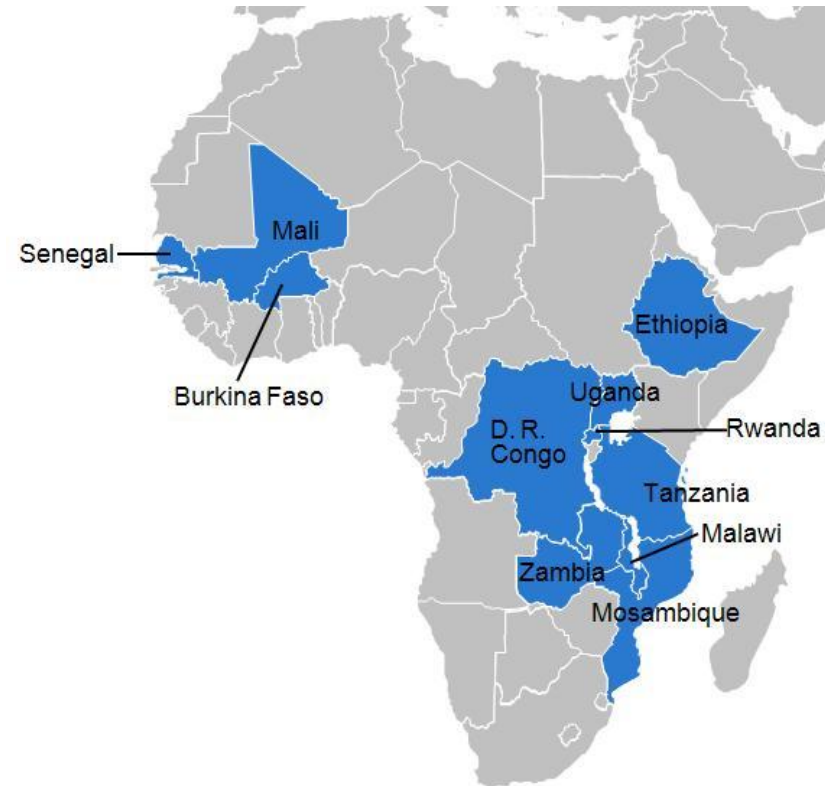
- Wuppertal Institute
- GFA ENVEST



Wuppertal Institut
für Klima, Umwelt, Energie
GmbH

➤ Focus on Selected LDCs

- Burkina Faso, DRC, Ethiopia, Malawi, Mali, Mozambique, Rwanda, Senegal, Tanzania, Uganda and Zambia



BMU Study: Involving African LDC in the Carbon Markets

➤ Study Design

- Evaluation of the Current Status of CDM Development in Africa
- Analysis of the Technical CDM Potential for 16 Sectors
- Evaluation of Barriers (Finance, Institutional)
- Conduction of 2 Country Studies and 6 Sector Studies
- Development of Recommendations for future Bilateral Co-operation

▪ Current State

- 2,344 reg. projects worldwide (5,444 incl. validation)
- Only 44 (143) are located in Africa (Africa: 1.9%)



▪ Why is this important?

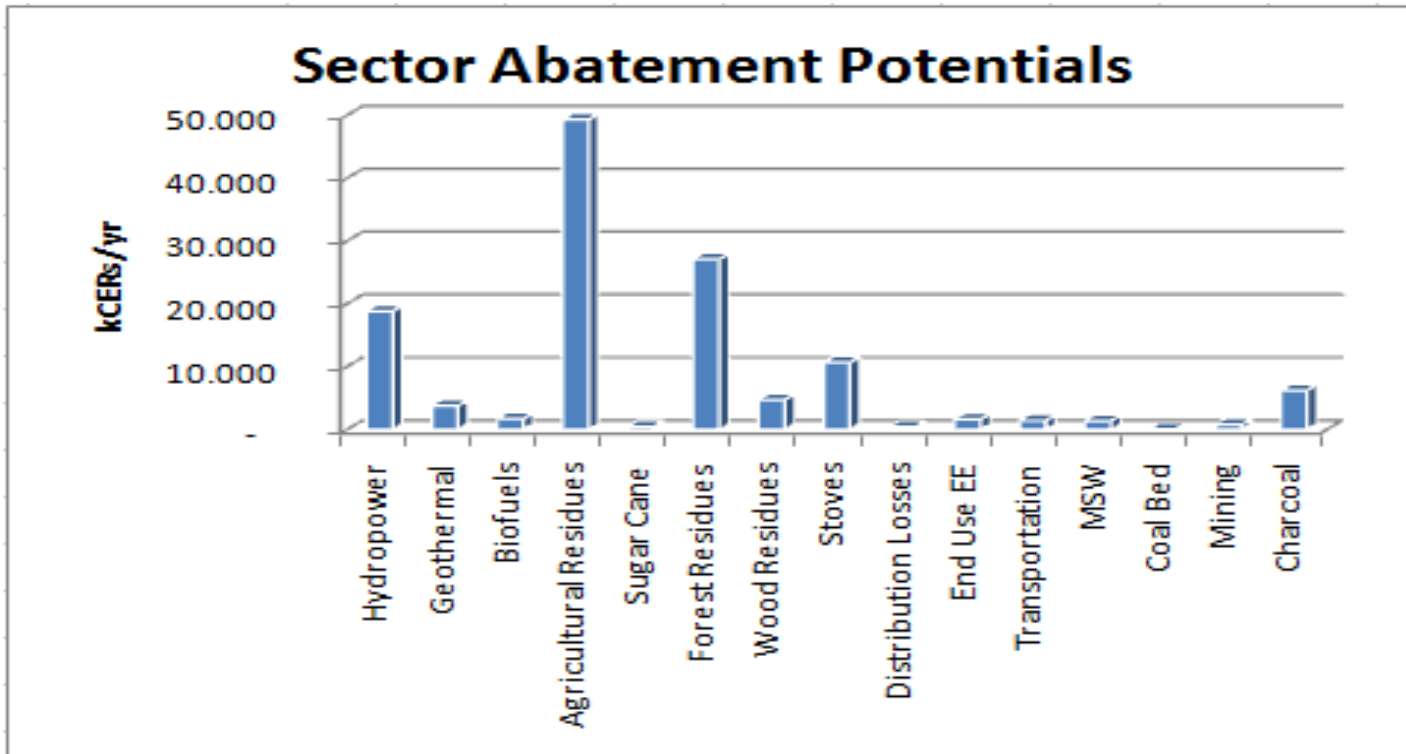
- 2,344 registered projects will generate 1.85 billion CERs up 2012 (Africa: 3%)
- Registered projects resulted in an total investment of 72.9 billion USD
- Registered projects resulted in a total of 196,989 MW installed capacity
- 1st Objective of the CDM
 - *Mr. Sethi: „... but until the potential of the mechanism is realized in the lesser developed countries, especially in Africa, we cannot rest”*



Technical CDM Potential

➤ Total Abatement Potentials

- 128.5 million CERs per Year
- 16 Energy – related Sectors



Example: “Potential of Forest- and Wood Residues”

➤ Definition of Forest and Wood Residues

- Forest residues: by-products of logging operations (branches, crown, etc.)
- Wood residues: by-products of sawnwood production (saw dust, slabs, bark, etc.)

Forest Residues

Forest Residue CDM Potential								
Nr.	Country	Nr. of Projects	Roundwood Production (mio. m3)	Forest Residues (mio. t/yr)	Electricity Generation (in GWh/yr)	Installed Capacity (in GW)	kCERs/yr	Total Investment (in mio USD)
1	Burkina Faso	-	-	-	-	-	-	-
2	DRC	291	73	15	15.024	1,91	6.029	2.670
3	Ethiopia	381	96	19	19.633	2,50	8.174	3.490
4	Malawi	23	6	1	1.150	0,15	460	200
5	Mali	-	-	-	-	-	-	-
6	Mozambique	72	18	4	3.691	0,47	1.486	660
7	Rwanda	21	6	1	1.124	0,14	849	200
8	Senegal	-	-	-	-	-	-	-
9	Tanzania	94	24	5	4.873	0,62	3.433	860
10	Uganda	155	39	8	8.063	1,02	6.019	1.430
11	Zambia	32	8	2	1.648	0,21	664	290

Source: URC 2010 was used for calculating average project size, AMS ID was used for default emission value of diesel generator, GEFs are taken from section 2.3, other from de Gouvello et al. 2008

➤ Findings

- 27 mio. CERs/yr, 7GW installed capacity and 9,800 mio. USD investment need
- Ethiopia has biggest potential (2GW, 8.2 mio. CERs/yr)

Table 16: Sawnwood CDM Potential

Nr.	Country	Nr. of Projects	Processed Roundwood (in mio. m3)	Wood Residues (mio. t/yr)	Electricity Generation (GWh/yr)	Installed Capacity (in GW)	Emission Reductions (in kCERs/yr)	Total Investment (in mio. USD)
1	Burkina Faso	-	-	-	-	-	-	-
2	DRC	23	3,7	1,27	2.163	0,27	868	380
3	Ethiopia	19	2,9	1,02	1.734	0,22	722	310
4	Malawi	3	0,5	0,18	308	0,04	123	60
5	Mali	-	-	-	-	-	-	-
6	Mozambique	8	1,3	0,46	778	0,10	313	140
7	Rwanda	3	0,5	0,17	293	0,04	221	50
8	Senegal	-	-	-	-	-	-	-
9	Tanzania	14	2,2	0,76	1.280	0,16	902	230
10	Uganda	20	3,2	1,10	1.880	0,24	1.403	330
11	Zambia	5	0,8	0,29	494	0,06	199	10

Wood Residues

Source: URC 2010 was used for calculating average project size, AMS ID was used for default emission value of diesel generator, GEFs are taken from section 2.3, other from de Gouvello et al. 2008

➤ **Findings Wood Residues**

- 13 GW installed capacity, 4.75 mio. CERs/yr with investment needs of 1.51 billion USD
- Uganda has highest potential (1.4 mio. CERs/yr) followed by Tanzania and DRC 0.9 mio. CERs/yr)

Municipal Solid Waste

➤ Approach

- Investigation of waste volumes in African countries (correlation waste – GDP, organic share), all landfills below 100,000t/yr have been excluded

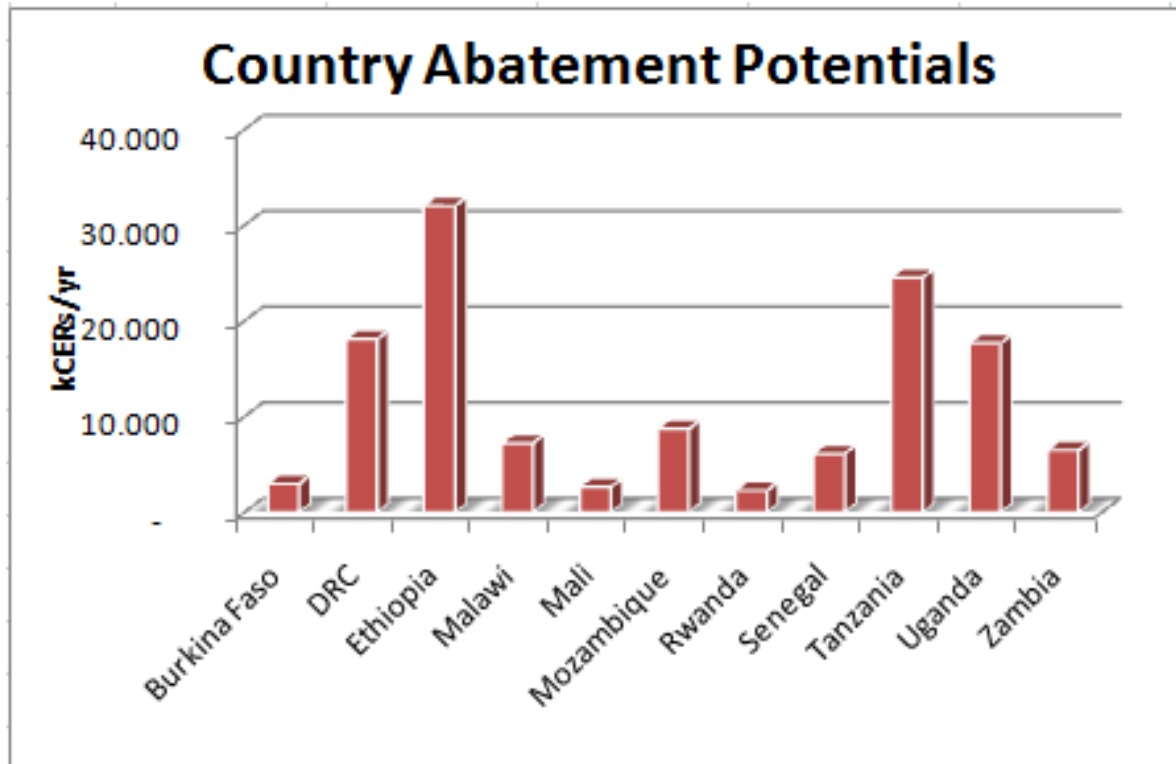
MSW Emission Reduction Potential					
Country	City	Organic Waste (in t)	Potential Reductions (in kCERs/yr)	Electricity Output (in GWh/yr)	NPV Carbon Revenues (in mio. USD)
Burkina Faso	Ouagadougou	109,5	58	13.5	5.2
DRC	Kinshasa	877	467	108.9	42.2
	Lubumbashi	157	84	19.6	7.6
	Mbuji-Mayi	157	84	19.6	7.6
Ethiopia	Addis Ababa	266	142	33.0	12.8
Malawi	Lilongwe	64	34	7.8	3.1
Mali	Bamako	115	60	14.0	5.4
Mozambique	Maputo	100,5	53	12.3	4.8
Rwanda	Kigali	64	33	7.9	3.0
Senegal	Dakar*	177	93	21.5	8.4
Tanzania	Dar Es Salaam	265	140	32.5	12.6
Uganda	Kampala	137	72	16.8	6.5
Zambia	Lusaka	130	63	14.6	5.7

- 13 Project opportunities, 1.38 mio CERs, 322.1 GWh/yr
- Investment costs amount to 8.2 / 11.0 mio. USD
- Many project opportunities may be financed through *CR*



➤ Outlook

- Overall huge CDM Potential with 128.6 million CERs/yr
- Ethiopia (30.0 mio CERs/yr), Tanzania (24.5), DRC (18.1) and Uganda (17.7) have the highest potentials





Thank you for your Attention!

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Investments per Sector

- Investment Analysis shows:
 - Wide range of abatement costs from 0.09 to 1,718 USD/CER
 - Median is 15.11 USD/CER
 - Low abatement cost -> high share in Africa
 - High costs -> Low share
 - Negative correlation between costs and share in Africa

Project Type	Total Investment Costs (in mio. USD)	Total CERs (over 10yr)	Abatement Cost (in USD/CER) (over 10 yr)	Share in Africa (in %)
HFCs	73	816.964.660	0,09	-
N ₂ O				
Abatement	468	478.599.719	0,98	7%
Wind	509	392.630.564	1,30	1%
Coal Bed CH ₄	555	140.772.760	3,94	0%
LFG	1.392	283.308.151	4,91	9%
CH ₄ Avoidance	660	123.415.395	5,35	1%
Fugitive	903	88.306.983	10,22	13%
PFCs and SF ₆	363	32.590.810	11,13	0%
Forests	65	4.633.620	13,99	30% / 36%
EE Own Gen.	3.853	234.809.897	16,41	1%
Energy Dist.	12	665.060	17,83	0%
Biomass				
Energy	3.552	170.385.205	20,85	3%
Geothermal	546	18.347.300	29,76	13%
EE Households	113	3.333.490	33,82	13%
Fossil Fuel				
Switch	9.267	268.609.620	34,50	9%
Hydro	21.946	625.781.507	35,07	1%
EE Industry	744	16.679.538	44,62	1%
EE Supply Side	2.830	36.837.233	76,84	3%
EE Service	81	587.788	138,22	0%
Transport	437	3.050.130	143,34	0%
CO ₂ capture	60	236.880	252,80	0%
Solar	8.167	4.751.340	1.718,82	7%