Carbon Markets for Improved Cooking Stoves

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Basic facts solid biomass based cooking energy

- **2.5 billion** depend on biomass for their daily cooking, 2,7 billion in 2030
- The **demand for biomass resources** – leading to deforestation, land degradation, desertification
- **Indoor air pollution** from solid fuel use is responsible for 1.9 million deaths every year (WHO, 2010)

Clean Cook Stove Technologies are more efficient and nearly smokeless

HH rocket stove

rocket stove for cantines

Industrilally produced rocket stove

Clean burning biomass stoves

Clean fuel (LPG, ethanol, plantoil, biogas, electricity)

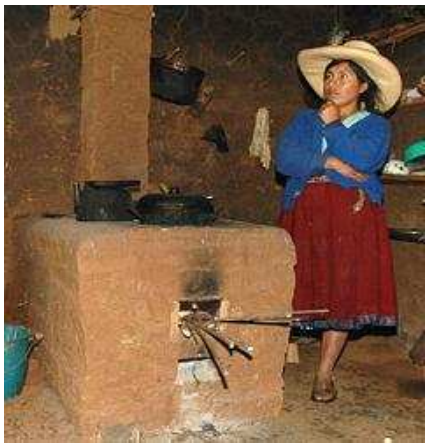
Improved Kitchen and Fuel Management

HH rocket stove

Plant oil cooker

Interventions needed for developing local stove markets

- **R&D** for stove adaptation and development
- **Training of stove producers** in technical and business skills
- Support in product **marketing**
- **Quality** control
- Long term and cross sector **awareness raising**



- **GIZ Experience** (based on approx 2 Mio stoves since 2005) **Costs per person: 5€**

Current stove market

- Global need: 500-600 Mio households

- GIZ: since 2005 approx 2 Mio stoves,
- Major European implementer (BSH, GERES, GIZ, PA, SNV, SF): 5.2 Mio

- **Goal of “Global Alliance for Clean Cookstoves”:**

  An additional 100 Mio homes use clean cookstoves by 2020

  (www.cleancookstoves.org)

Why dealing with carbon finance?

- **Carbon funding calls for very efficient stoves**
  - ➢ **Increased investments and attention to stove technologies and stove testing**

- **Carbon funding requires intensive monitoring of stove use**
  - ➢ **Intensive attention to users which helps changing cooking habits**

- **Carbon funding requests long term monitoring (>7years)**
  - ➢ **Long-term project perspective**

Why dealing with carbon finance?

- **Each improved stove saves at least 1 to of CO_2**
- **ODA budget needs:**

  A project disseminating 10.000 stoves costs

  10.000 * 5persons * 5€ = 250.000€

- **Carbon Funding possibilities (CER or VER):**

  assuming a price of 7 € per to of CO_2,

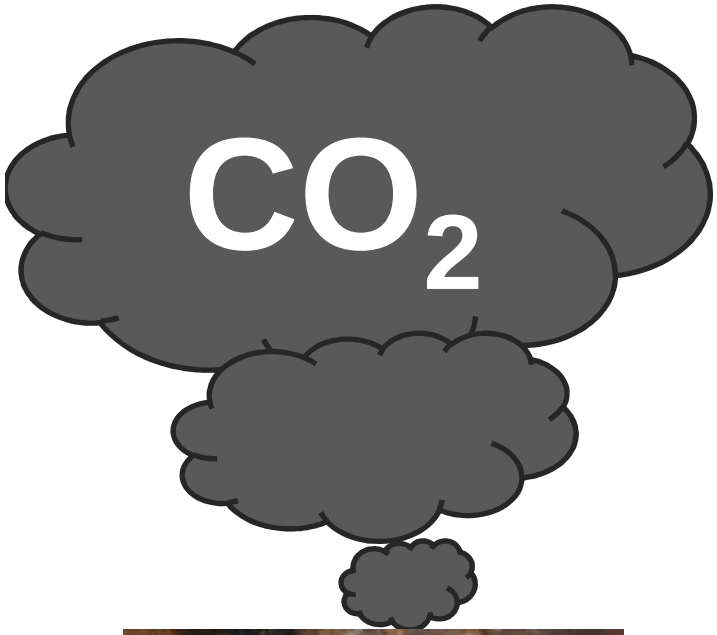
  a project disseminating 10.000 stoves

  would earn 70.000€ per year for at least 7 years

  (Total 490.000€)

CF offers enormous Potential for upscaling existing projects well beyond ODA-funding

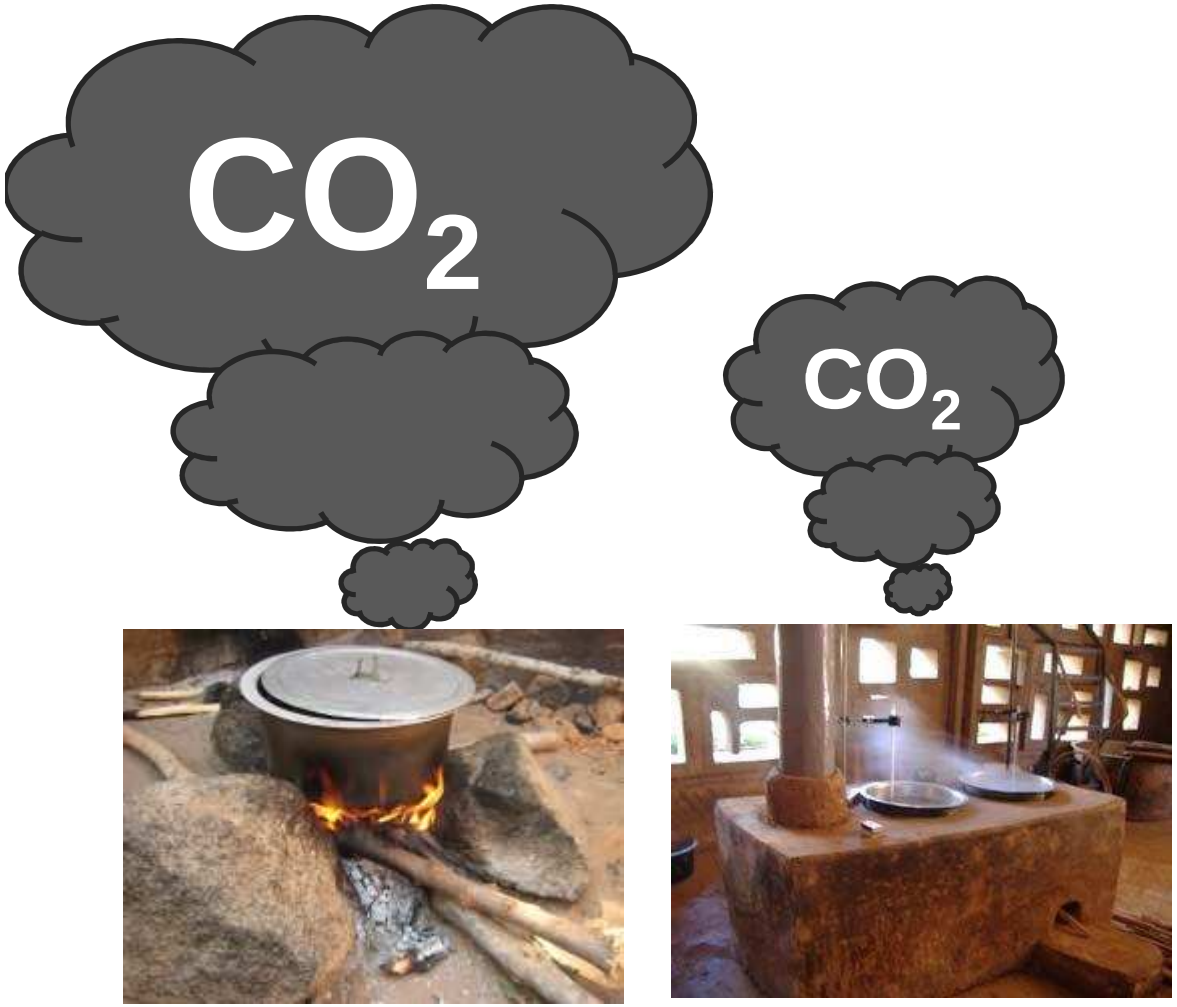
The Clean Development Mechanism



Project eligibility criteria

1. reduce greenhouse gas emissions (measurable and verifiable)
2. contribute to the sustainable development of the host country
3. emission reductions are additional to any that would occur in the absence of the project activity

The Clean Development Mechanism



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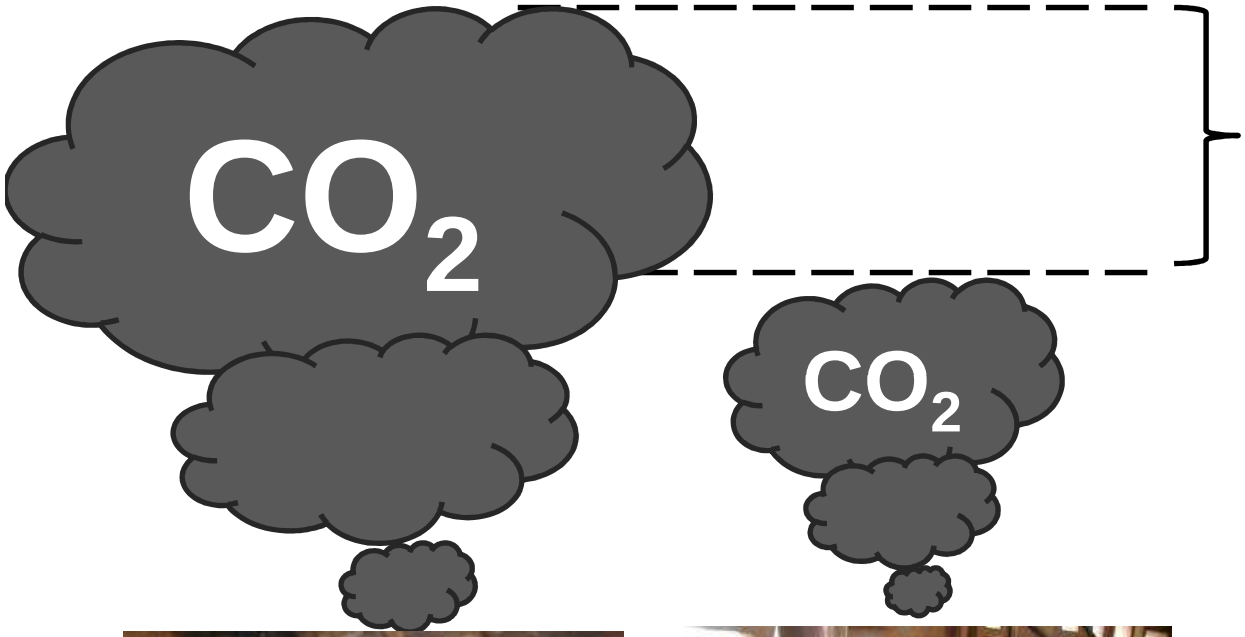

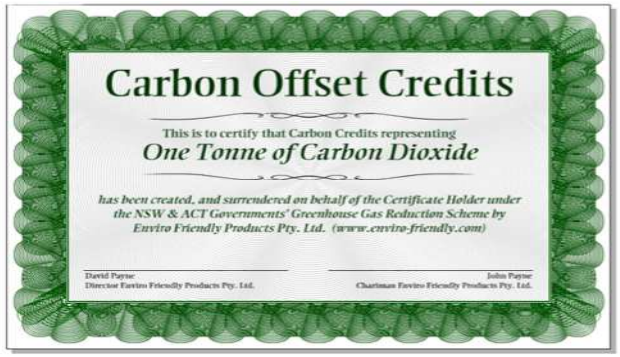

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Carbon Market Baseline Methodologies

		Methodology Name	Issues covered
AMS-I.E.	CDM	Switch from Non-Renewable Biomass for Thermal Applications by the User	**Displacing the use of non-renewable biomass by introducing new renewable energy end-user technologies.** Examples: biogas stoves and solar cookers.
AMS-II.G	CDM	Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass	**Efficiency improvements in the thermal applications of non-renewable biomass**. Examples: high efficiency biomass fired cook stoves and/or improvement of energy efficiency of existing biomass fired cook stoves.
Gold Standard VER	VER	Indicative Programme, Baseline, and Monitoring Methodology for Improved Cook-Stoves and Kitchen Regimes	**Switch from cook-stoves and kitchen regimes having significant green-house gas emissions to those having considerably less or zero emissions**. The baseline may involve the use of more than one fuel type and more than one stove type, and the switch to low emission regimes may involve a shift in the apportionment of fuel types and/or adoption of new fuels and cook-stoves.

The Carbon Market (09/2011) for cookstoves

CDM Projects (AMS II.G)

- Selling credits: 1 Nigeria
- Registered: 5
- In Validation: 5
- In pipeline; 31

Gold Standard Voluntary Market Projects

- Registered: 3
- Validated: 5
- Listed: 70!!!

Large scale interventions are easier plan, implement and monitor than

many small scale interventions.

Funding needed for ICS introduction via ODA or CF

ODA project

Training and mobilisation
Coordination of stove dissemination
Awareness
Promotion
Technology development
Monitoring

Carbon project

CPA Identification
Baseline information collection
Stove efficiency testing
Maintenance and quality assurance
CDM Monitoring and reporting
Design Documents preparation
CPA inclusion fee
Annual programme costs

Training and mobilisation
Coordination of stove dissemination
Awareness
Promotion
Technology development
monitoring

Case Study I (Data from 2009)

Efficient Woodfuel Stoves for Nigeria

Number of stoves in operation, large/small scale
Small scale, up to 11,000 stoves per year

Emission reductions
35,000 t CO2 per year over a period of 10 years
308,198 t CO2 in total until 2018

all information taken from CDM PDD
URL: http://cdm.unfccc.int/Projects/Validation/DB/23HQ9GTETWW0K8C0A6R4Q0BSMJJBFP/view.html

Pictures taken from http://www.i-h-l.org/?LHL-Aktiv:Nigeria:SAVE80-innovat

Case Study I (Data from 2009)

Efficient Woodfuel Stoves for Nigeria

Methodology

AMS II.G Compliance Market (CDM)

Status in Project Cycle

Validation completed, Registered October 2009, first CERs expected for 2010

Implementing Institutions

Nigerian Development Association for Renewable Energies (DARE),
Lernen-Helfen-Leben e.V., atmosfair gGmbH

Technology

Save 80 system (efficient woodfuel stove and heat retaining polypropylene box), imported from Germany and assembled in Nigeria (full production in Nigeria planned for later project stages)

all information taken from CDM PDD
URL: http://cdm.unfccc.int/Projects/Validation/DB/23HQ9GTETWW0K8C0A6R4Q0BSMJJBFP/view.html

Case Study II (Data from 2009)

Fuel-Wood Savings with Improved Cookstoves in Cambodia

Number of stoves in operation, large/small scale

Large scale, number of stoves in use is projected to increase from 116,450 in 2006 to 513,803 in 2012

Emission reductions

- 126,022 t CO2 **verified** for 2007
- PDD projected average 449,932 t CO2 per year over a period of 7 years; amount of ER is projected to increase from 175,683 t CO2 in 2006 to 614,537 t CO2 in 2010;
- the PDD forecasts a possible market saturation between 2010-2012 and hence emission reductions in these years of 488,533 t CO2 only
- Projected 3,149,527 t CO2 in total 2006-2012

Picture taken from http://www.bioenergylists.org/en/node/470

Case Study II (Data from 2009)

Fuel-Wood Savings with Improved Cookstoves in Cambodia

Methodology

Derived from AMS II.G with elements of GS V.01 (includes emission reductions during fuel production), Voluntary Market

Status in Project Cycle

Registered under Voluntary Carbon Standard (VCS)

Implementing Institutions

JP Morgan Ventures Energy Corporation (Climate Care), Groupe Energies Renouvelables, Environnement et Solidarités (GERES) Cambodia, Wood Energy Network of Cambodia (WENETCAM), Development and Appropriate Technology (DATe), Directorate of Energy, Ministry of Industries, Mines and Energy

Technology

Lao stove (one size fits households and institutional users)

all information on Cambodia Project taken from Verification Report (URL: http://www.jpmorganclimatecare.com/media/documents/pdf/Verification_0140A_Cambodia_070607.pdf) and PDD Dec 2006 (URL: http://www.co2solidaire.org/pdf/GERES_ICS-PDD.v5.pdf)

Why dealing with carbon finance?

- **Potential** for upscaling existing projects well beyond ODA-funding, enforcing strict monitoring

- **Risk** of market distortion / loss of reputation of stove projects through unsustainable project approaches

Challenges

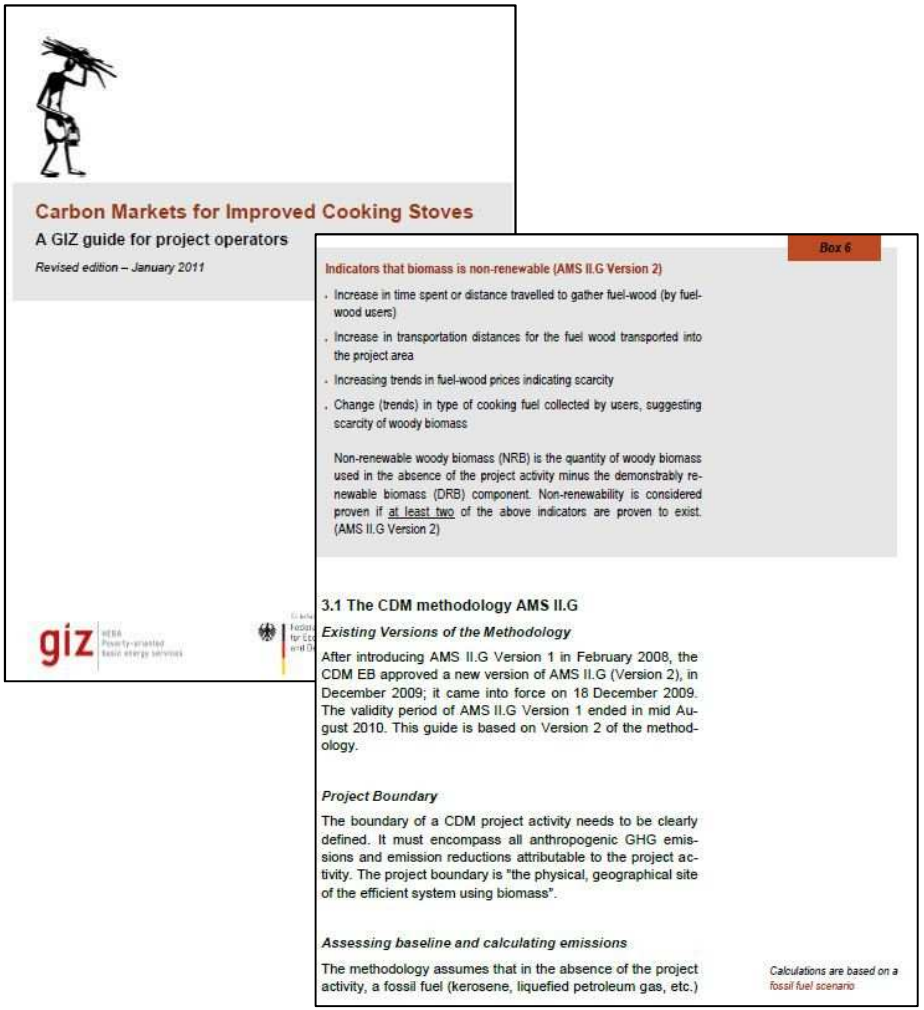
- Lack of **up-front financing**: issuance of first carbon credits can take up to 2 years or longer
- Elaborate administrative and monitoring procedures require good management **capacities** from local stakeholders
- **Little local initiative/ownership** for carbon projects
- **Dubious players** in the market
- Incorporating principles of **sustainability**

GIZ‘s involvement

- **Scaling-up** sustainable GIZ approaches through carbon funding: initial support for selected carbon finance projects based on GIZ projects (PIN/PDD), e.g. SADC PoA
- **Advice / Awareness** creation for GIZ project staff & local partner organisations on carbon finance issues
- **Guidebook** „Carbon Markets for Improved Cooking Stoves – A GIZ Guide for Project Operators”
- Emission Reduction **Calculation Tool** (MS Excel)
- Feeding GIZ‘s experience into the **international discussion**: e.g. participation in the Global Alliance for Clean Cookstoves Working Group on Carbon Finance
- **End-to-end solutions for credit buyers**, including project development assistance and emission credits trading assistance (GIZ International Services)

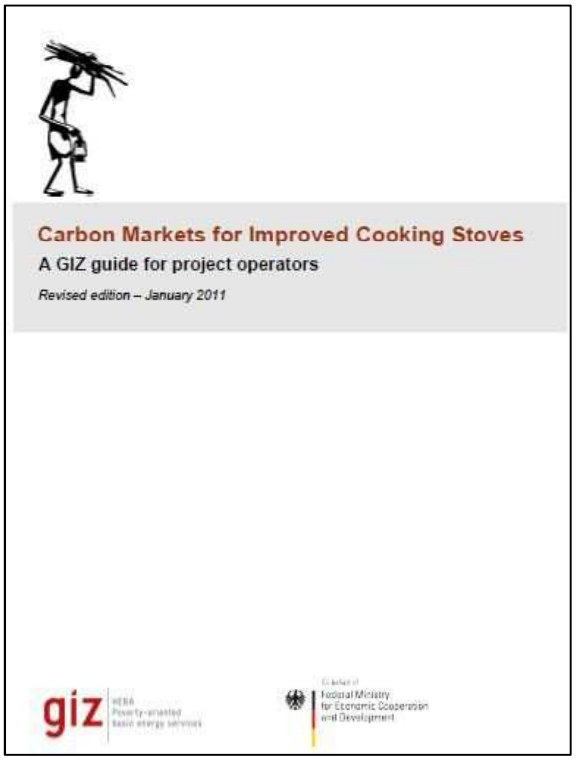
Handbook: “Carbon Markets for Improved Cooking Stoves”

- Guide on procedures and methodologies for carbon market activities with improved cooking stoves
- In-Depth guidance for projects using the CDM AMS II.G and Gold Standard V.02 methodology
- Revised Edition 01/2011
- Updated/revised on a regular basis: www.gtz.de/HERA



Handbook: “Carbon Markets for Improved Cooking Stoves”

1. Overview and Background
2. Project Cycle
3. Baseline Methodologies
    1. The CDM methodology AMS II.G
    2. The Gold Standard methodology V.02
    3. Which methodology delivers more?
4. Implementation
    1. Roles and responsibilities
    2. CDM Programme of Activities (PoA)
    3. Use of Carbon Revenues
    4. Costs and revenues of stove projects
5. Frequently Asked Questions



ER Excel Calculation Tool

GIZ-HERA Emission Reduction Calculation Tool (1.3) for AMS-II.G version 2

Last Tool-Update: July 2010

Basic Parameters			
Please fill in green cells!			
			unit
Starting year of project operation	2011	?	date
Expected project duration	10	?	years
Biomass-fuel type	fire-wood	?	
Estimated stove lifetime	3	?	years
Projected fossil fuel	LPG	?	
Quantity of biomass used per baseline appliance and day	4	?	kg/d
Stove Testing Method	WBT	?	
Efficiency old stove derived from a WBT	12	?	%
Efficiency new stove derived from a WBT	20	?	%
fNRB	80	?	%
Quantity of Biomass used per baseline appliance and year	1.46		t/a
Net Calorific Value Biomass	15.00		MJ/kg
Emission Factor projected Fossil Fuel	63		t Co2/TJ
Biomass savings per stove and year	0.58		t/a
Emission reductions per stove and year	0.44		**t Co2/a**

CDM-Small-Scale Limit for project scenario (max. energy savings 180.000 MWh/a)			
Net Calorific Value Biomass	4.17		MWh/t
Baseline Energy Generation per appliance	6.08		MWh/a
Energy-Savings (1-ηold/ηnew) in %	40		%
Energy Generation per appliance (new)	4.87		MWh/a
Energy Savings per appliance (new) and year	1.22		MWh/a
Small-Scale-Limit in No. Of stoves in Use per year	1,47,945		stoves
Small-Scale-Limit in emission reductions per year	65,318		t CO2/a

Summary Emission Reductions			
Average Emission Reductions per year	62,252		**t CO2/a**
Total after 10 years	6,22,521		**t CO2**
Total full project duration	6,22,521		**t CO2**

stove sales schedule	
ase fill in stove sal	
year	stove sales
2011	10,000
2012	20,000
2013	40,000
2014	50,000
2015	70,000
2016	70,000
2017	70,000
2018	70,000
2019	70,000
2020	70,000
total	5,40,000

stove usage schedule	
year	stoves in use
2011	10,000
2012	30,000
2013	70,000
2014	1,10,000
2015	1,60,000
2016	1,90,000
2017	2,10,000
2018	2,10,000
2019	2,10,000
2020	2,10,000
2021	1,40,000
2022	70,000

estimation of ERs		
year	ERs in t CO2	accumulated
2011	4,415	4,415
2012	13,245	17,660
2013	30,905	48,565
2014	48,565	97,131
2015	70,641	1,67,772
2016	83,886	2,51,657
2017	92,716	3,44,373
2018	92,716	4,37,089
2019	92,716	5,29,805
2020	92,716	6,22,521
total	6,22,521	

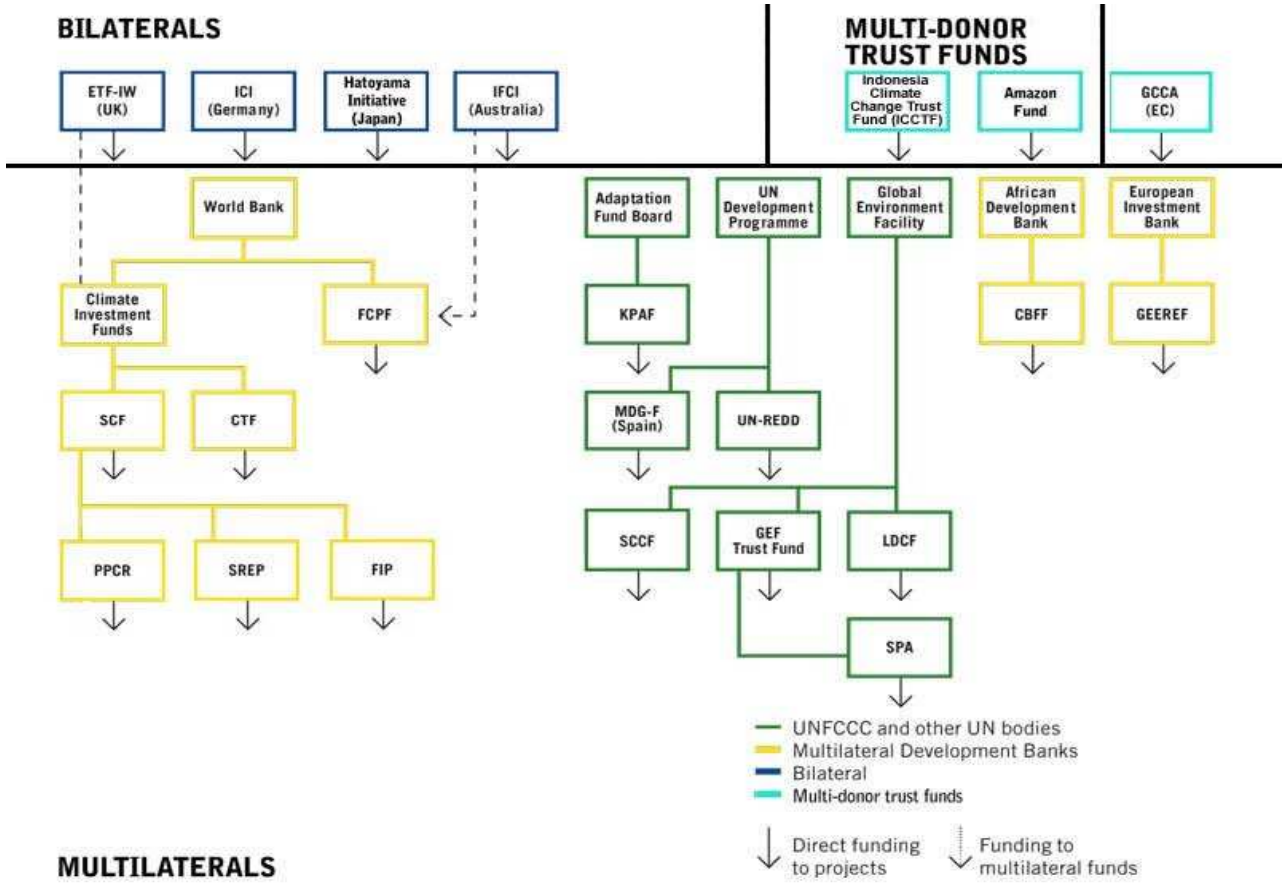
green	= input
grey	= calculation
blue	= output

Carola Griebenow, Michael Blunck, Monika Rammelt, Robert Heine

www.GTZ.de/HERA

Will climate funds offer better opportunities??

Current situation



- Zunehmende **Heterogenität** der Fonds, Anforderungen, Modalitäten und Zugangsmöglichkeiten, aber auch neue **Chancen (geplanter Int „Green Fund“: 100Mrd USD/Year**

Thank you for your attention

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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www.giz.de

The handbook and calculation tool are available at www.gtz.de/HERA (→ further information)