

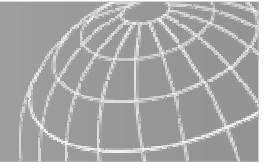
Sustainable Small Hydro Power Project of Activities Indonesia

Tagung 'Im Abseits der Netze', Bonn 12.1.2011

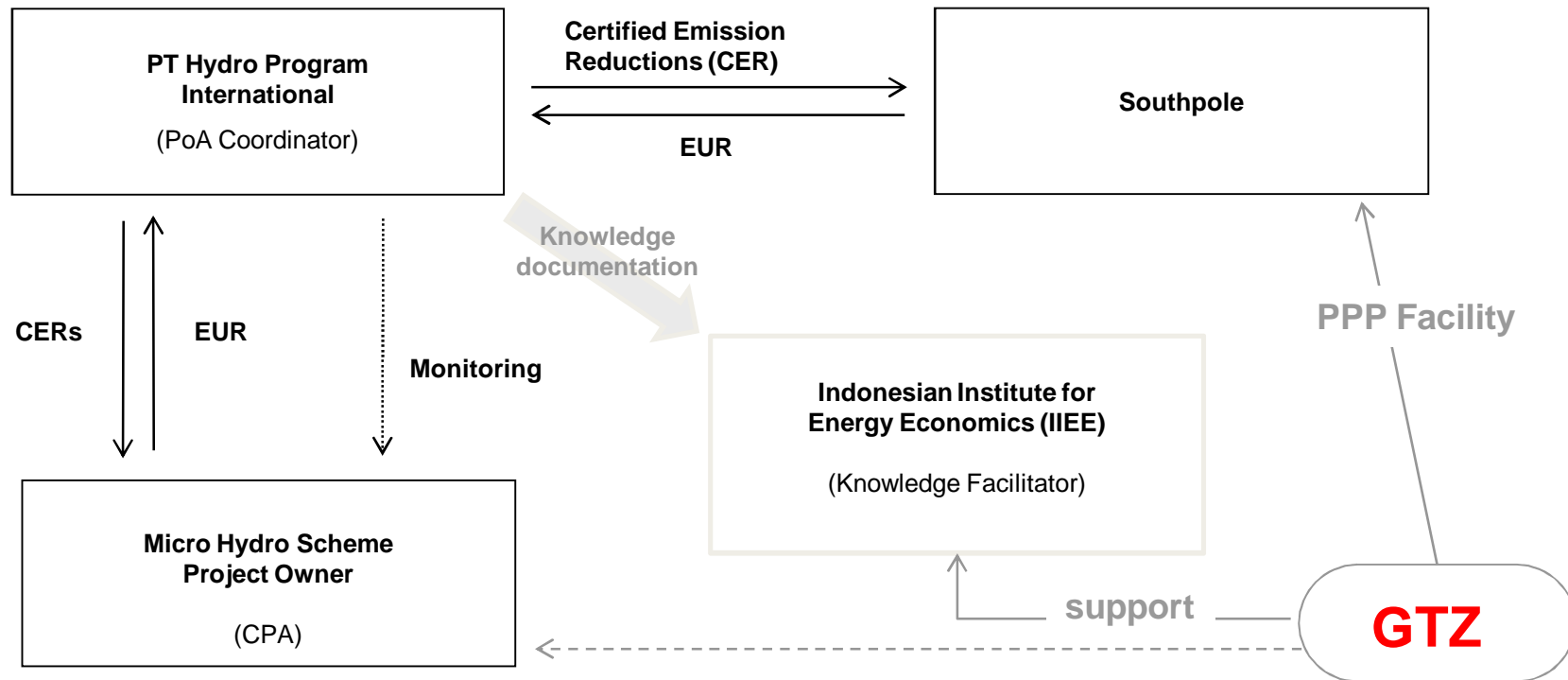
Mirka Bodenbender

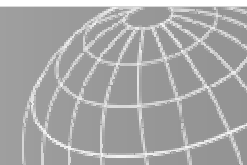
A cooperation between GTZ and South Pole Carbon Asset
Management





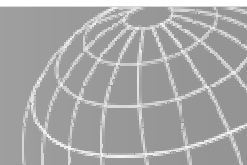
Project design





Data of the PoA project / status quo

Project Type:	Sustainable Small Hydro Power Project of Activities
PoA Coordinator:	PT. Hydro Program International (PT. HPI)
Project participant:	South Pole Carbon Asset Management Ltd.
DOE	Tuev Sued
Methodology:	AMS I.D version 15 (“Grid Connected Renewable Electricity Generation”)
LoA	January 2010
Validation	Jan/Feb 2010
Estimated reduction	5.201 CERs/annum (1st pilot CPA)
	Planned inclusion of 10 CPAs in 2010 (approx. 200.000 CERs/annum)



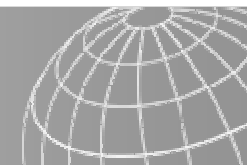
Financial viability of the PoA

ASSUMPTIONS FOR PROFITABILITY CALCULATION

Average (Avg.) plant load factor		40%
Avg. baseline on-grid	tCO ₂ /MWh	0.73
Avg. baseline at 50%/50%	tCO ₂ /MWh	0.85
Avg. Gold Standard CER selling Price	EUR/t	12.00
Avg. electricity price	EUR/kWh	0.035
Exchange rate	EUR/RP	12,000
Avg. installed capacity per plant	MW	1.50

Challenges

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of plants	-	10	20	30	30	35	35	40	40	40
Total contracted (MW)	-	15	30	45	45	52.5	52.5	60	60	60
Total produced power (GWh/a)	-	-	0	52.56	105.12	157.68	157.68	183.96	183.96	210.24
Total generated CERs (kt CO ₂ /a)	-	-	0.00	44.89	89.77	134.66	134.66	157.10	157.10	179.54



Financial viability of the PoA

Challenges

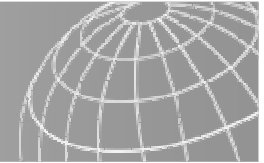
COST COMPONENTS		UPFRONT (EUR)	ANNUAL (EUR P.A.)
Fixed Costs	Project design and PoA development	100,000	-
	PoA Validation	50,000	-
	PoA Monitoring and Verification (M&V)	-	45,000
	CDM fees	50,000	
Variable costs	CPA Inclusion (incl. validation, in case the project proponent assumes liability for erroneous inclusion of a CPA)	2,000/CPA	-
	CPA Inclusion (incl. validation, in case the DOE assumes liability for erroneous inclusion of a CPA)	10,000/CPA	-
	CPA M&V cost (automatic reporting)	-	800/CPA
	CDM Fees collected by the UNFCCC for administration (excluding 2% of the CERs that are paid into the Adaptation Fund)	-	USD 0.25 per CER
	Gold Standard Fees	-	2% of CERs



Financial viability of the PoA

Challenges

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total revenue generated through CER sales	0	0	0	539	1,077	1,616	1,616	1,885	1,885	2,155
20% share of the total CER revenues to CME	0	0	0	108	215	323	323	377	377	431
Co-Financing (grants)	60	60	-	-	-	-	-	-	-	-
Total Revenues	60	60	0	108	215	323	323	377	377	431
PDD Costs	50	50	0	0	0	0	0	0	0	0
PoA Validation Costs	10	40	0	0	0	0	0	0	0	0
CPA Inclusion Costs	0	20	40	60	60	70	70	80	80	80
Fixed PoA M&V Costs	0	45	45	45	45	45	45	45	45	45
Variable CPA M&V Costs	0	0	8	16	24	24	28	28	32	32
CDM Issuance Fees	0	0	0	5	10	15	15	17	17	20
GS Issuance Fees	0	0	0	11	22	32	32	38	38	43
PoA Management Costs CME	25	25	25	30	30	30	30	30	30	30
Total Costs	85	180	118	167	190	216	220	238	242	250
Cash Flow	-25	-120	-118	-59	25	107	103	139	135	181



PoA for small-scale off-grid MHP

Challenges

Chances:

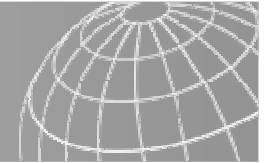
- Utilizing the revenues of CERs for operation, maintenance and repair of the MHP schemes – thus significantly increasing the life-span of the installments
- Supporting sustainable new access to electricity in remote areas

Barriers:

- CO2 reduction: with 400 MHP (10-15 kW) included in PoA only approx. 8,000 – 14,000 CERs annually
- Monitoring MHP schemes often in very remote areas (up to 2 days by horse/motorcycle away from closest town), no reasonable technical solution (kWh-meters) applicable yet

Conclusion:

- Efficient and reasonable monitoring & verification model for such small and geographically scattered schemes biggest bottleneck
- Even with 400 sites included CO2 reduction not attractive enough for PoA

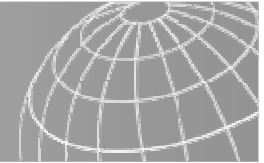


CDM PoA related issues – international level

- Validation process from the negotiation until the signing took almost 1 year (starting from February 09) due to the liability issue and high price quotation
- High upfront cost of developing a PoA
- Lack of experience in developing PoAs - impossible to predict the time it will take to register a PoA

CDM PoA related issues – national and sector level

- Lengthy process for LoA due to inexperience and cautiousness of DNA with PoA as a new mechanism
- Uncertainty about Grid Emission Factor – DNA published only for 2 island grids without publishing relevant data

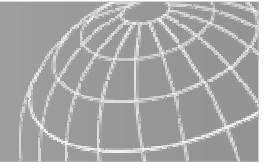


Cooperation

- Stakeholder management – not to underestimate
- Create and maintain good cooperation partnerships with CPA owners and sector stakeholders (public, private, NGOs)
- **PoA coordinator = central role**

Steering

- One central, focus entry point
- **Competency and motivation for the 'driver seat' needed** – steering through CDM process
- Combination of CDM and sector expertise essential for successful steering

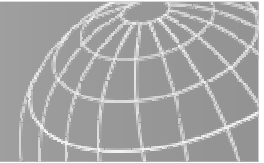


Strategy

- **Clear, but flexible strategic approach needed**
discussion of feasibility to include off-grid necessary but 'time consuming' / test to change AMS 1D to include 'mini grids'
PoA coordinator / CDM process supporter = central role

Processes

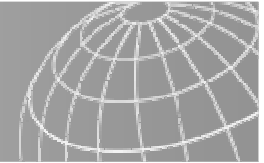
- **"gut Ding will Weile haben"**
- Lengthy processes caused by external as well as internal lacks
LoA more than 12 months due to inexperience of DNA reg PoA
- Patience and long breath



Learning

Success factors

- Learn from other projects and implementation about successful and less successful strategies (methodologies, CDM processes – national and international etc)
- **Fearless learning needed**
- Exchange actively successes but also failures



LAST but not least...

- PoA is an interesting instrument for sector development – increased awareness among small-scale hydropower project developers.
- CDM PoA is suitable for IPPs feeding into the national grid or small island grids on a commercial base.
- PoA is not suitable yet for very small-scale rural off-grid electrification plants (5-20kW).
- A strong commitment from the PoA coordinator is needed to accompany the process.
- CDM PoA is still in a testing phase – PoA experts are needed for PoA DD development.