Business models for (MHP) village grids
- two EnDev case studies -

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Developing micro hydro village grids: 2 challenges

- Overcome the investment barrier
  - Relatively high investment costs but reliable, robust and (very) long term operations without major reinvestments
  - Most investments are (fully or partially) publically financed, because of
  - (in case of isolated village grids) high investment, low return
  - (in case of grid interconnection schemes) high risk perception of private financers

- Safeguard sustainability:
  - a minimal level of design and installation
  - A properly run micro hydro business
  - sufficient cash flow to maintain operations (running costs, loans)
  - ownership in case of village operated schemes

- Two case studies:
  - Public business model: EnDev Indonesia
  - Private business model: EnDev Rwanda

Community ownership model
EnDev Indonesia

- Opportunities for micro hydro in Indonesia are huge. Maybe thousand or more schemes could contribute to the electrification of remote areas.

- Micro hydro sector is slowly developing
  - Government projects,
  - State utility projects
- Relatively many failures, therefore
- *Energising development Indonesia* focuses **sustainability** of projects
  - GTZ activities since 1980's (technology transfer, turbine manufacturing, project implementation)
  - EnDev 1 (2005-2009); upscaling of implementation, up to 90 schemes, 65.000 people.
  - EnDev2 (2009-2013); further upscaling to 200-400 schemes, 175.000 people.

Financing model

- (almost) all projects are government funded (local government, national government)
  - Traditionally power supply in Indonesia is government task
  - Small schemes, 5-40 kW
  - Remote area's, few opportunities for productive use, no grid-interconnection
  - (almost) only household clients, low tariffs (1,5-2 US$/month flat rate, by number of light bulbs or appliances)

→ little private sector interest

- schemes are all community owned and operated
  - Tariffs only need to cover running costs, not the investments
  - Nevertheless ownership, proper training, clear and transparent rules are crucial for long term sustainability

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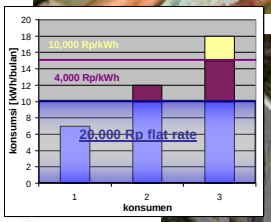
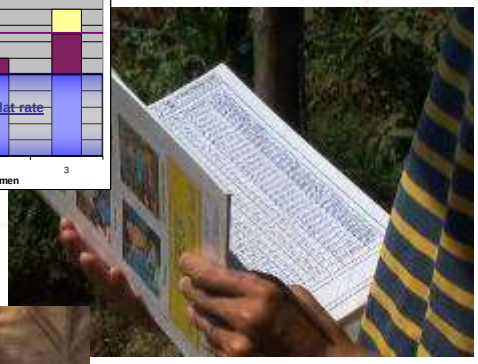
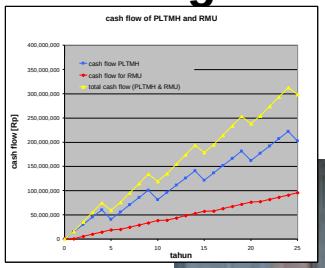
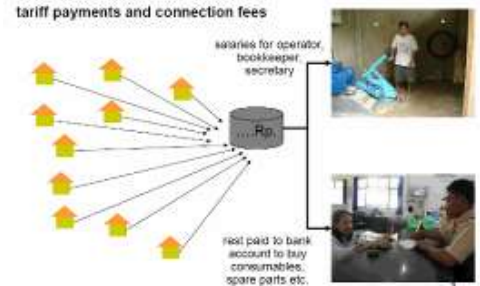
1. Supporting **community preparation** and active participation in MHP development
2. Facilitating suitable **institutional & legal set-up**
3. Safeguarding **technical quality** through support in site identification, feasibility, design, etc.
4. Introducing **operation, maintenance and management** procedures
5. Introducing principles of good **business administration:** tariff-setting, billing, savings, etc.
6. Promoting **productive, income-generating use** of electricity









Main challenges

- Participatory character of decision making
- Deciding on (operational) cost recovering tariffs and sanctioning system for non-payments
- Proper management and operations
- Capacity distribution
- Development of productive use

Toolkit www.mhpp.org/downloads
-Standardized site assesment and feasibility study formats
- examples of tariff systems
-Standardized bookkeeping and accounting tools
-Training packages
- Institutional setup

- Improve local manufacturing
- Building local capacity for sustainable project implementation

Private ownership model
EnDev Rwanda

- Developing private entrepreneurship for investing in and operating micro-hydro schemes
- Call for proposals from private sector in 2005, 2007
  - EnDev provides 30-50 % investment subsidy, technical assistance, business support, etc
  - Entrepreneurs responsible for financial closure (equity (15%) and loans), construction, permits, etc
  - Basic condition: new access is provided to rural households, social infrastructure, productive use
  - Strong involvement of MinInfra (permits, PPA, pricing)

Tedious process

	submitted	Contract negotiations	Contracted	Commissioning expected (2009)
1 call for proposals **(2005)**	15	6	4	2
2nd call for proposals **(2007)**	5	2	1	1
total	20	8	5	3
Succes rate	15% (3/20)	38% (3/8)	60% (3/5)	

Consortia of local business men, NGO's, social institutions (hospital), local and foreign investors

Main challenges

- Lack of own funds and collateral
  - Additional partners and personal collateral proved a solution (in some cases)
- Unwillingness of banks to finance projects
  - Very high collateralization and guarantee funds (AfDB)
- Lack of expertise (technical and managerial)
  - In house training and regional experts as needed
- (Civil) engineering design errors
  - Intervention/support from national utility Electrogaz
- Financial fraud
  - Receipt checks , financial and technical audits
- Lack of regulatory frameworks (permits, PPA's, pricing)
  - Ad hock contracts and networks

Further observations

- Grid interconnection and/or a large consumer (tea factory, hospital) is very welcome to increase project revenues and to make private financing successful
- Proper management and accounting systems are crucial
- All 3 successful projects propose new schemes provided financing (subsidies, loans) can be arranged. Next to that a EoI early 2009 provided 7 serious additional candidates
- Full private financing remains difficult
  - Involving venture capitalists could improve both financing structure and business skills, and reduce the need for subsidies
  - But expected RoI is (very) high

Concluding remarks

Investment barrier

- The success of privately funded micro-hydro schemes depends on the possibility for grid interconnection or large productive use consumers.

Sustainability

- Community cooperation (cooperatives) in Indonesia is much more outspoken than in Africa. This is fundamental for ownership. Is the community owned business model appropriate for Africa too?