



# 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 financiers
  
- “ 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 1980s (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

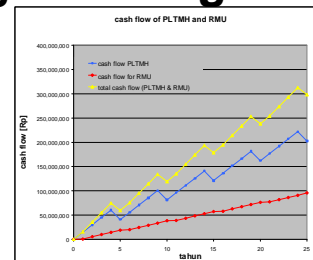
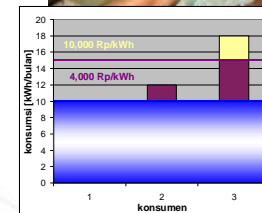
- “ (almost) all projects are government funded (local government, national government)
  - . Traditionally power supply in Indonesia is government task
  - . Small schemes, 5-40 kW
  - . Remote areas, few opportunities for productive use, no grid-interconnection
  - . (almost) only household clients,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



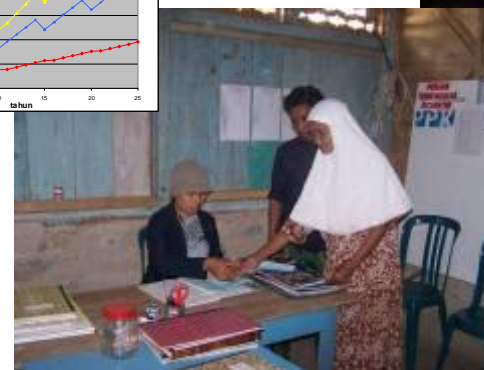
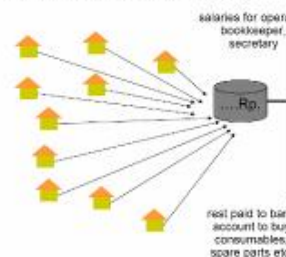
little private sector interest

- “ 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

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



tariff payments and connection fees



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

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

## 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, NGOs, 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 Eol 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?