

IEA International Energy Agency





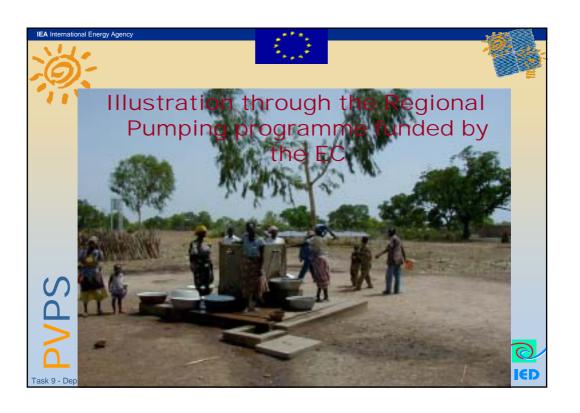
The Regional Solar Pumping
Programme in the Sahel
and Community Applications
INSTITUTIONAL & FINANCIAL
issues

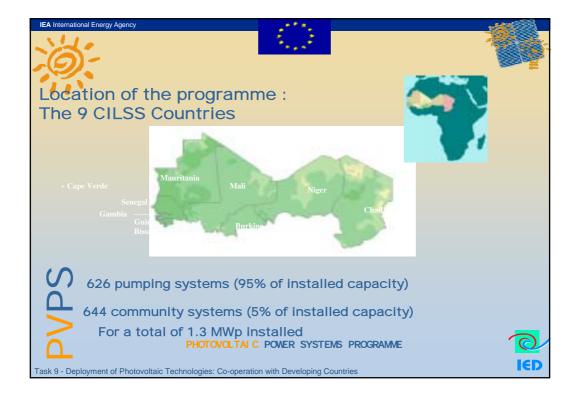
PVPS

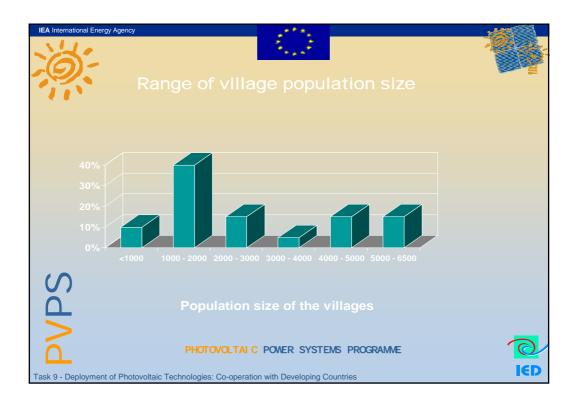
Presentation by :
Anjali Shanker, IED

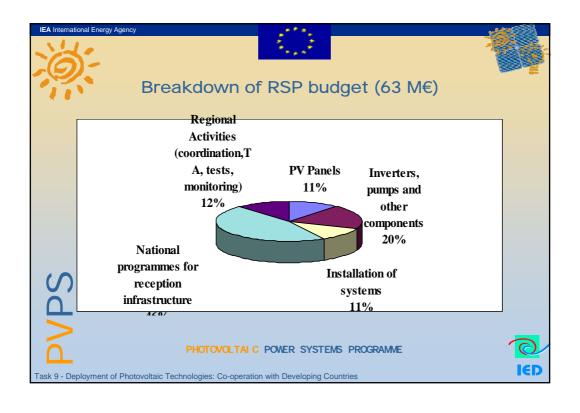
Innovation Energie Développement
PHOTOVOLTAI C POWER SYSTEMS PROGRAMME

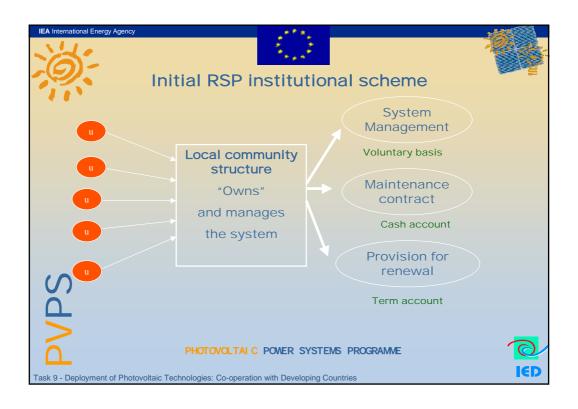


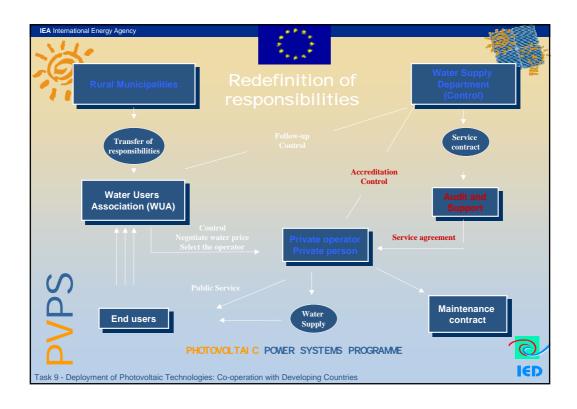


















RSP experience on Investment costs **Economic viability**

- Cost per Wp:
 - Average 20 €/Wp against 17 planned
 - For phase 2, should be between 9 and 15 €/Wp, depending on system size
- **Ost per person:**
 - 50 €/person
 - To be compared with 20 to 50 € for hand pumps projects: a much better service for an equivalent investment cost

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Task 9 - Deployment of Photovoltaic Technologies: Co-operation with Developing Countries







RSP initial financial rules

- End-user contribution covers :
 - operating costs
 - maintenance contract
 - provision for renewal of pump and inverter (but not the PV panel or the water tank and tubes)
- ◆ 40% to 60% recovery on total water production potential ensures sustainability



Payment for water:

- fixed fees or per quantity.
- Typical water price : 250 FCFA/m3 (0.38 € / m3)

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PVPS

	revenues from water sales	pricing			ASS Cost	Wp	1500 Wp	2500 2500 Wp	3800 Wp
Burkina Faso	 Village Water Poin Committee. 	Consumed volume billing (Sourou Yatenga et Passoré) Yearly fee (Sissili)		• 0,4 €m³ • 0,1 €m³	€year in % of the system cost		316 1,5%	319 0,8%	325 0,6%
Cape Verde	 private concession, Agence communale de production et gestion d'eau (APDA) 		40 to 100 CUE/m³ for domestic uses, 30 CUE/m³ for irrigation	• 0,4 to 1 €m ³					
Gambia	Village Water Poin Committee	Yearly fee	 50 à 125 Dallasis per active person and per year 	• 0,13 to 0,33 ∉m ³	€year in % of the system cost	359 1,5%	438 1,3%	491 1,0%	571 0,9%
Guinee Bissau	 Village Water Point Committee 	Yearly fee	3000 Pesos / person/ month	• #0,2 €m³					
Mali	Village Water Poin Committee	some cases of consumed volume billing, fees on irregular basis	depends on the villages : • 200 FCFA /family/month • free for domestic use and 6000 FCFA/year for each 0,5 ha (CMDT zone)	• 0,08 €m³	eyear in % of the system cost	384 2,2%	398 1,5%	523 1,3%	554 1,0%
Mauritania	Private concession.	consumed volume billing. some rare cases of fees.	75 to 100 UM / m ³ for drinking water	• 0,42 to 0,56 ∉m³	€year in % of the system cost	2,2%	393 1,5%	433 1,1%	512 1,0%
Niger	 Village water point committee 	Consumed volume billing	Details not available	• 0,19 €m³	eyear in % of the system cost	202 0,9%	219 0,7%	232 0,5%	250 0,4%
Sénégal	Village water point committee	 monthly fee, except for the case of m³ billing,. 	500 to 1000 FCFA /family/month	• 0,21 to 0,42 ∉m³	€year in % of the system cost		261 0,8%	293 0,6%	341 0,6%
Chad	Community managemen with a Water Poin Committee (CPE) semi-urbain managemen with a committee for water managemen (CGE)	CPE : monthly fee CGE : consumed Working billing TA	CPE: 150 to 350 FCFA /household/month	0,15 €m ³	system	0,7%	333 1,2%	519 1,2%	912 1,6%



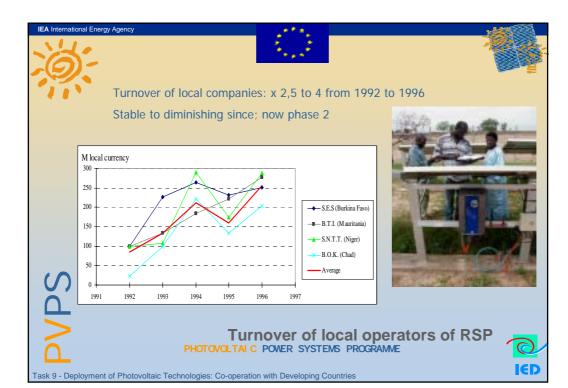
Task 9 - Deployment of Photovoltaic Technologies: Co-operation with Developing Countries



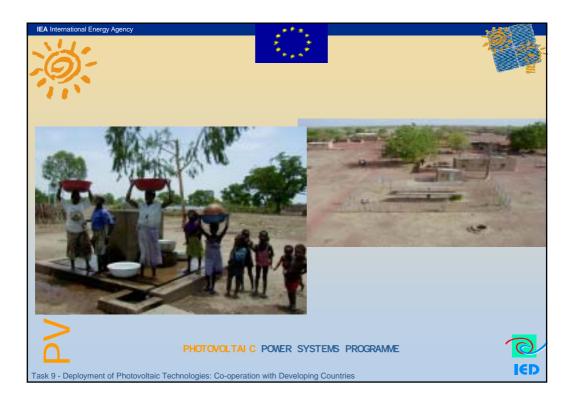
	Number of pumps of the sample	Percentage of villages of the sample vz financial objectives for maintenance and renewal of equipment							
		> 100 %	66 à 100 %	33 à 66 %	< 33 %				
Burkina Faso	55	49%	25%	20%	5%				
Gambia	47	6%	11%	17%	66%				
Mauritania	20	25%	35%	15%	25%				
Senegal	38	45%	26%	21%	8%				
Total sample	160	33%	23%	19%	26%				

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- Agribusiness development : water pumping systems and AC Power Bloc
- Community facilities & Social infrastructures :
 Health Centre, School, Barangay Hall,
 Community Lighting systems and Potable Water supply. (Additional SHLS)
- <u>Institutional Development</u>: community support and training on technical, credit management, agribusiness development.

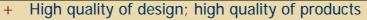
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Main observations (positive):



- + Effective local technician training and capacity building (need strict supervision!)
- + High quality installations by local technicians
- + Orientation courses on O&M for users & operators
- + Monthly collective information meeting for users
- + Reproducibility of the O&M scheme (modular approach with individual operator (teacher, clinic staff) for each solar package
- + No tariff for community packages but O&M in charge of LGU's (MOA).

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Main Difficulties observed



- Large range of components (different batteries, BCR, inverters, ...)
- Many actors involved generating inter-relation problems (public/private, central/regional)
- Lack of experience of DAR (lead implementer)
- Complicated and costly organisation of O&M
- RESCO's are not involved
- High investment cost (high quality and sophist.)
- Strong government involvement for long-term sustainability.

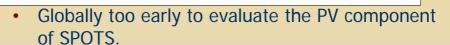
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Conclusions:



- Project has paid attention to many critical issues to avoid failures.
- Short-term consequences are :
 - Project management & organisation seem tricky and fragile;
 - Project cost is pretty high with unclear financial setup.
- Project formulation allows regular adaptation.

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- PV system quality (component and service)
- PV system design :
 - Car batteries vs. deep cycle batteries
 - AC vs. DC supply
 - Hybrid systems vs. pure PV systems
 - Prepayment technology
 - Anti-theft devices
 - Various technologies for pumping and water treatment

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Non-technological Issues



- Pre-electrification or real electrification?
- Initial investment : credit schemes, ...
- O&M: management models, costs
- Tariffs and subsidies financial viability
- Ownership
- Key actor selection for implementation
- Capacity building and local training

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Challenges...

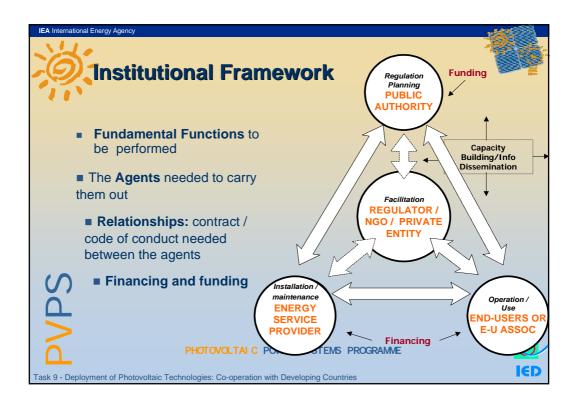
- Do the agents and stakeholders exist? Building the delivery chain (requires appropriate frameworks)
- With the required technical, financial, contractual and managerial capacity? (requires to make players and skills available)
- Ensure that over the long term, maintenance costs are properly factored in: over 50% of the system lifetime cost
- Are there enough projects / concessions / incentives to entice potential entities to become energy service providers -> project bundling (appropriate financial and contractual instruments)

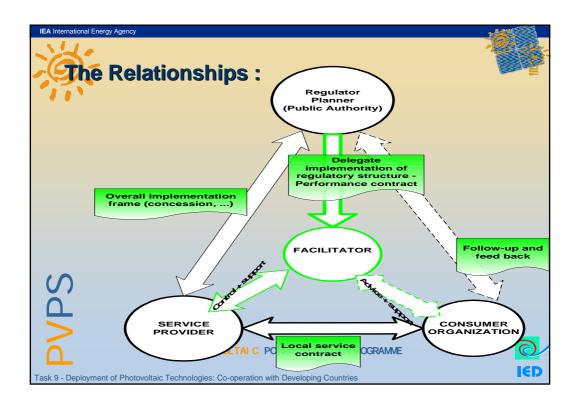
Issue of enforcement in weak legal contexts

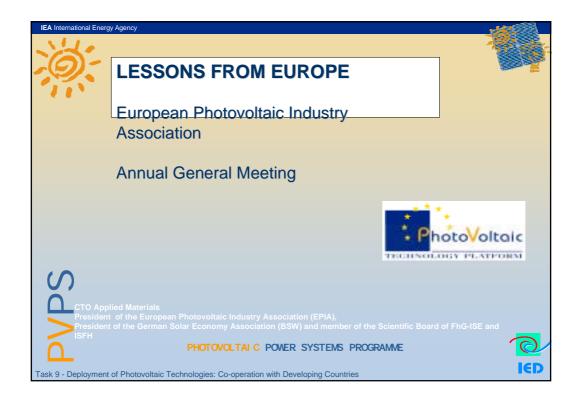
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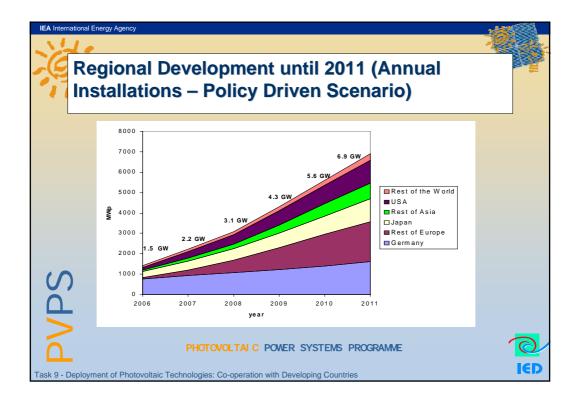


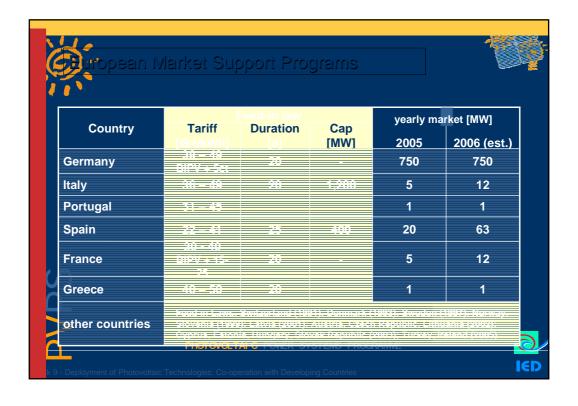
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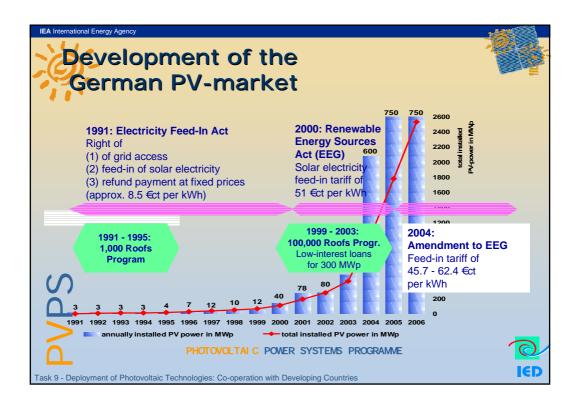


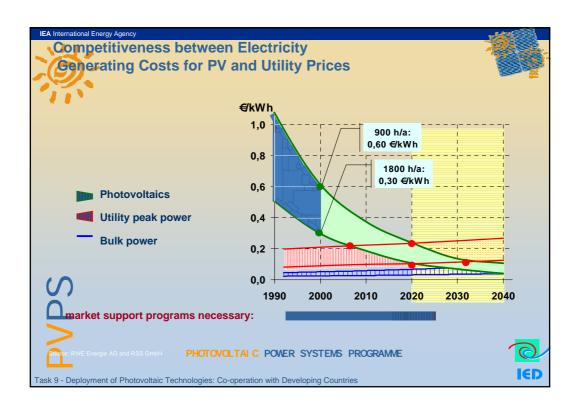
















- Without storage, cost of PV is between 20 and 45€ cents / kWh
- Need for long term targets and policies: cooperation between actors (utilities, water / education ... end-user departments)
- Regulatory frameworks: long term contracts, awareness
- Financial support schemes: long term funding, tax breaks, end user subsidies

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