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Renewable Energy Technologies and Poverty Alleviation

RETs

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RETs Objectives

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- Assess the role of RETs in poverty alleviation
- Identify the main barriers to the dissemination and use of RETs
- Formulate policy outlines and instruments to overcome the identified barriers



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AFREPREN, AIT, CENBIO/COPPE, ENDA, ERC, ERG, ERI, FB,
MEDREC, TERI

RETs Niches

Niches	Africa				Middle East	Latin America		Asia		
	East Africa	Tunisia	Senegal	South Africa	Lebanon	Argentina	Brazil	China	Cambodia	India
Treadle and Wind pump	•									
Solar and wind pump		•								
Improved stove		•	•						•	
Biodiesel				•						
Solar Water Heater				•	•	•				
Wind turbine						•				
Vegetable Oil							•			
Photovoltaic							•			
Biomass Gasification								•	•	•

- Energy Needs
- Local capacity
- Natural Resources
- Impact on poverty alleviation



Niche

Wide range of technologies



Energy for increasing income and productive uses

- Increased agricultural productivity and land under irrigation (RE pumping in Africa)
- Low cost energy for SMiEs (Biomass Gasification in India, China and Cambodia)
- Energy savings and employment (SWHs in South Africa, Lebanon and Argentina)
- Conservation of agricultural products (Vegetable Oil in Brazil)



RETs Barriers

- Low policy attention
- Weak institutional framework
- Lack of adequate planning and regulation
- High cost and lack of affordability
- Missing capacity
- Quality of products, installation
- Lack of adequate O&M infrastructure and project sustainability
- Low awareness
- Exclusion of poor population in policy objectives

Policy Outlines

- Integration of RETs into development policies
- Incentives to improve affordability
- Development of adequate institutional framework
- Development of capacity
- Improving awareness



Policy Outlines – Some Examples

- ***RE Pumping (East Africa, Tunisia):***
 - Provide access to financing
 - Research and technology adaptation
 - Coordinated actions
 - Developing capacity



Policy Outlines – Some Examples

- ***SWHs (South Africa, Lebanon, Argentina):***
 - Implementing Standards and Certification
 - Installation under new housing programmes
 - Capacity building at political level
 - Updating building codes and regulations
 - Loans under preferential conditions
 - Government procurement agreements



Policy Outlines – Some Examples

- ***Bio-gasification (China, Cambodia, India):***
 - Community based financial mechanisms
 - Supportive legal framework
 - Developing capacity of local manufacturers
 - Technology transfer and increased collaboration with research institutions

Conclusions

- Relevance of non-electrical technologies for satisfying priority household and productive energy requirements (cooking, water heating, heating, water pumping)
- There is high potential for local job generation through system manufacture and renewable resource extraction and processing
- Widespread nature of high investment cost barrier relative to household income level
- Need to develop political will, commitment and application of adequate policies and strategies supported by both the public and private sectors
- Policies should be formulated to fit each country and playing rules be sustained in time

Conclusions

- RETs as a tool for developing income generation activities is a key element for project sustainability
- Availability of adequate databases matching population distribution, energy requirements, income level and energy resources is generally lacking and would be useful for planning
- The role of RETs for poverty alleviation is generally found to be important in all countries studied, and contrasts with the low level of development and priority assigned to the area.
- The role of RETs for poverty alleviation is variable among countries, depending on resources, capacities, existing energy infrastructure and population distribution (urban/rural)

Conclusions

- In some of the countries (e.g. Brazil), large scale RE projects are an option for poverty alleviation through increased economic activity in rural areas and through adequate access to energy
- Coordination of activities and stakeholders is generally needed to avoid wasting resources and efforts (adequate institutional cross-sector framework)
- RETs should become an integral part of development programmes (opposite to isolated and technology driven projects)



Conclusions

- Equipment manufacturing and O&M infrastructure are generally weak, though some capacity exists (variable among countries) and could be strengthened through cooperation
- R&D should be coordinated and focus on technologies that correspond to priority energy requirements and local capacities
- Projects should take into account local development needs and priorities

Summary

- Vast potential contrasting with low dissemination
- Weak institutional frameworks
- Need for policies targeting poor population
- Increased income and energization of productive activities
- Complement with improved access to all modern energies, efficiency and rational use



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RETs Theme Impacts



RETs Theme Impacts

- Increased consultation and links with stakeholders
- Inputs for Workshops and Meetings on RE policies:

TERI – India

ENDA – Senegal

FB – Argentina

RE 2007 Workshops focused on Policies and dissemination strategies, and offered an opportunity for direct dissemination among Policy Makers

- Input for more detailed and specific studies

RETs Theme Impacts - Examples

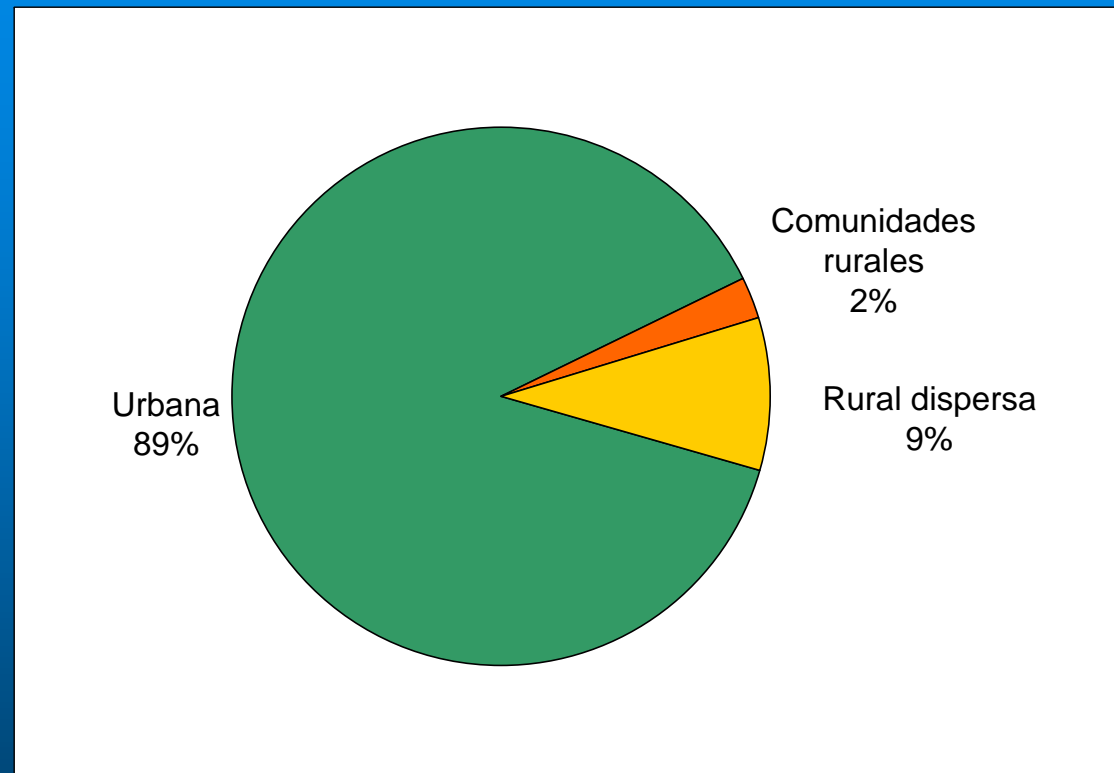
- Lebanon: RETs results could provide an input for carrying out the Energy Policy Reform Plan
- South Africa: ERC plays a catalizing role for SWH dissemination through two Workshops
- Senegal: ENDA participates in review committee on Senegal strategies for RE
- Argentina: RETs results provide input for discussion and energy scenarios in National Energy Plan



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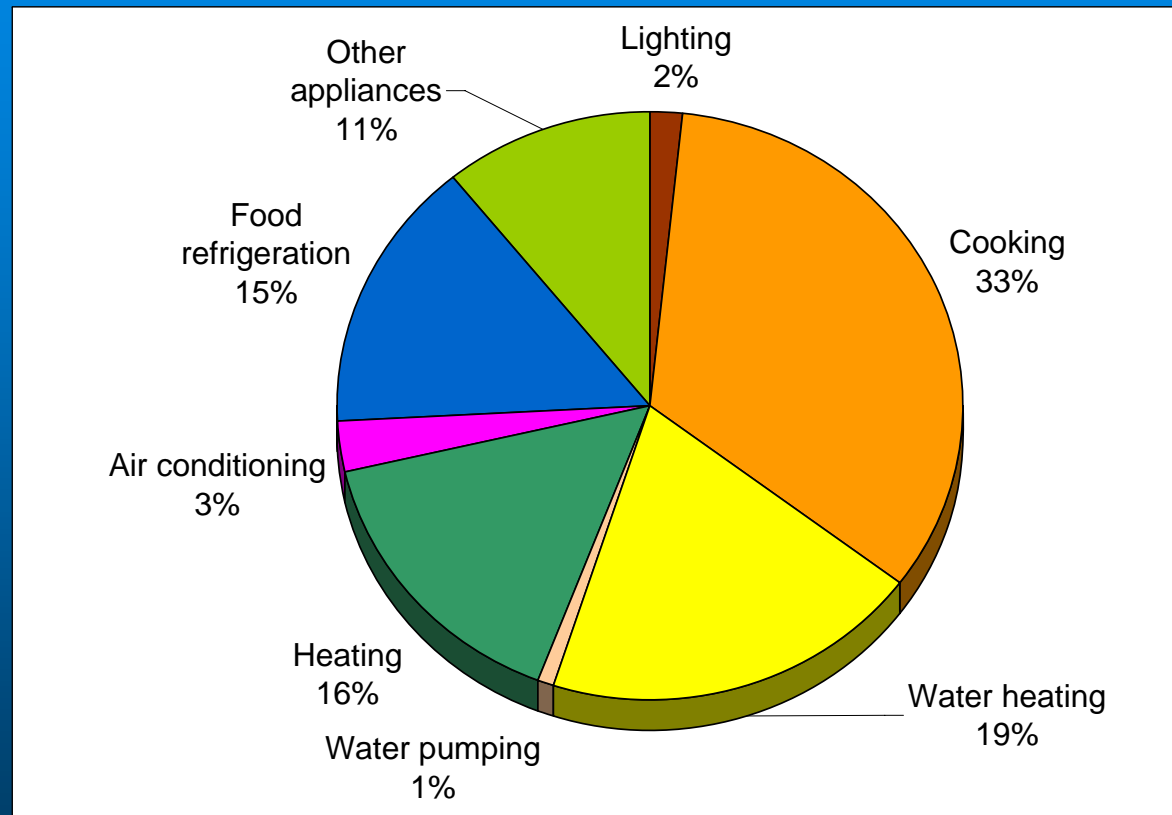
Case Study - Argentina

Poor Population Energy Requirements



- 89% of poor households are located in urban and peri-urban areas, close to conventional energy networks

Poor Households' Energy requirements Argentina



- Thermal energy requirements represent an important fraction of basic household requirements (70% of useful energy)

Poor population Energy requirements Argentina

Sector	Net energy requirement (TOE/yr)	Useful energy requirement (TOE/yr)	As % of national energy consumption in 2001
Urban and rural households	2,453,103	830,950	6.42
Rural health care centres	9,795	4,388	0.03
Rural schools	25,349	13,982	0.07
Urban productive	157,883	77,650	0.41
Rural productive	202,555	53,603	0.53
Total	2,848,685	980,573	7.46

- Poor population basic energy requirements only represented 7,5% of national energy consumption

Renewable Energy Niches Argentina

Source / Technology	Zones	Population	Type of Use
Biogas	Temperate and arid/cold	Rural communities and dispersed	R (P, S)
Wind Mill	Temperate and arid/cold	Rural communities and dispersed	R, P, S
Solar Water Heater	Arid and temperate	All	R (P, S)
Improved Cookstove	All	Rural and peri-urban	R (P, S)
Solar Cookers	Arid and warm	Rural communities and dispersed; peri-urban	R, S (P)
Wind Turbine	Temperate and arid/cold	Rural communities and dispersed	R, S (P)
Mini Hydro Power	All	Rural communities and dispersed	R, P, S
Solar Driers	Warm, arid and temperate	Rural communities and dispersed	P, R
PV for community services	Warm, arid and temperate	Rural communities	S (R, P)
Biodiesel and mechanical power	Warm and temperate	Rural communities	P, R, S
Solar passive heating	Arid and temperate	All	S (R, P)

R= residential, P= productive, S= services; () means that could be used for this uses also

- SWHs is one of the few niches identified suitable for both urban and rural areas

SWHs Argentina

Estimated conventional energies savings



Zone	Annual net energy NG m3/m2	Annual net energy GLP kg/m2	Annual net energy firewood kg/m2
Warm zone	170	129	2594
Temperate zone	139	105	2114
North Patagonia	102	77	1545

	Equivalent surface of solar collector per household (m2) to cover basic energy requirements			
	Warm	Temperate	Arid-Cold	Country
Residential user	0.32	0.66	1.63	0.68

- SWHs could satisfy 100% of basic energy requirements

SWHs Argentina

- Feasible option for firewood and LPG users lacking access to NG in short and mid term
- Potential for 360 ktep savings of NG/LPG (20% of residential LPG demand in 2006) with high impact on household energy expenditures
- Potential for significant positive impact on NG availability for industry and EE generation during critical months



SWHs Argentina

- Investment cost represents 7 years of average household LPG expenditure
- Simple and adequate financing is required for the poor population to have access to this technology
- Manufacturing processes must be improved to reduce costs and improve performance
- Quality standards and certification are required for manufacturing processes, products and installation procedures
- The legal void in thermal energy applications must be filled, seeking compatibility with building codes



General Recommendations for poverty alleviation through RETs

- To guarantee the access to energy of the population within reach of conventional energy networks
- To expand networks when feasible
- To increase the share of RETs in the interconnected national system (GENREN)
- To develop technologies and projects for productive applications and income generation
- To complement conventional and renewable energies in rural productive applications (e.g. gasification/diesel)



General Recommendations (cont.)

- To develop an adequate institutional framework which helps coordinate stakeholders and formulate policies for incorporating RETs into national development strategies
- To provide coherence and stability to the legal and regulatory framework, eliminating bias against RETs
- To establish alternative financing schemes and incentives that recognize the benefits of RETs, providing stable rules that guarantee the effectiveness of the instruments



General Recommendations (cont.)

- To develop instruments for risk and uncertainty management in RE projects
- To improve the knowledge on renewable resources to identify the best potential areas
- To support R&D in RETs aimed at local manufacturing cost reduction
- To develop quality standards for manufacturing, products and installation and ensure compliance through certification and incentives



General Recommendations (cont.)

- To develop an adequate O&M infrastructure
- To develop capacity of relevant stakeholders in diverse areas (policies, incentives, financing, projects, installation, use, maintenance, etc.)



Conclusions - Argentina

- Institutional and policy issues should be solved first in order to allow the effective dissemination of RETs
- It would be difficult, though not impossible, to satisfy the energy requirements of the poor population exclusively with RETs
- For the majority of poor population (urban), access to conventional energy networks would be one important aspect of the most sensible solution to satisfy in the short and mid term their unmet energy requirements

Conclusions - Argentina

- Conventional fuels are still very important for the satisfaction of the energy requirements of the poor population (LPG, diesel oil, NG)
- The role and potential share of RETs could be significant, particularly for grid connected systems, thermal applications and transport
- Most of RE initiatives would not be sustainable unless they include productive and income generating activities



Summary – Main intervention areas

- Technological development and adaptation (incentives for local manufacturing, standards and certification)
- Market development (unbiased regulatory framework)
- Investment support (low bureaucracy, long term and adequate financing)
- Mechanisms for the effective application of policies and instruments (enforcement)
- Regulatory and political framework stability and flexibility



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