African experience in Disseminating Green Energy Technologies for Rural Remote Areas

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Common Characteristics of the African Countryside
1. Low levels of access to modern energy options & technologies

- Av. 80% reliance on solid biomass
  - Av. 5% electricity access levels – mostly for lighting
  - Lack of modern, efficient cooking appliances
  - Urban-biased energy policy
2. Negative benefits associated with the use of traditional energy

- **Health** – highest fatality rate
- Safety for women and girl children – cover long distances
- Lack of productivity
- Inefficient appliances – energy losses up to 80%
3. Lack of income-generating opportunities and productive work especially for the youth

- High unemployment esp. of youth

- Rural areas as labour reservoirs

- Lack of enablers for cottage industries

- Income generating projects not sufficiently powered
4. Energy poverty has inherent gender inequities affecting women and girl children more

- Women & children mainly responsible for gathering wood fuel
  - Long distance of btn 2-4 hours
  - Neck and back pains & respiratory diseases
  - Exposure to weather elements and dangers
5. Traditional approaches of increasing access in rural areas are not sustainable

- Energy access in the context of rural development
  - Energy an enabler of economic opportunities & not a standalone
  - Focus on the end-uses or end product
- Sustainability a defining feature
6. Underdevelopment and general poverty and how energy can be a catalyst for rural development

- Economic – Unemployment, lack of adequate income, agriculture,
- Social – gender inequities, poor health, education, etc.
- Environmental – land degradation, indoor/outdoor pollution,
- Institutional – governance, cross sectoral issues
Therefore success and sustainability of energy interventions depends on addressing these:

- Are the energy options provided safe, reliable and affordable?
- Can they contribute to improve rural economy through providing income-generating and employment opportunities?
- How do options assist in bettering schooling opportunities for children?
- Does the provision of energy options improve access to health services?
- Does the provision of new energy options address gender inequities & empower and improve the status of women?
African Rural Energy Enterprise Development

Partnership Approach to Energy Entrepreneurship Development for Increased access of Modern Energy
The AREED Model

Enterprise Development Services

Start-up Financing

Enabling Gov’t policies

Entrepreneur

Energy business: services and products for rural and urban clients

NGOs / Dev. organisations

Financial Institutions
- 2nd stage financing
The AREED approach is mostly focused at building sustainable energy entrepreneurship:

- Focusing on critical enablers: enterprise and entrepreneur
- Combining services and capital
- Bringing together resources from multiple sources
- Targeted customized tools and activities
- Real time, working, evolving partnerships to plan, implement & improve
- Cross platform learning
Finance partnerships bringing together the hard and soft resources that must be blended to launch sustainable enterprises
Programme partnerships bringing together the governance specialty expertise, and local presence required
Implementation partnerships delivering services & capital to the entrepreneurs

Senegal

Ghana
<table>
<thead>
<tr>
<th><strong>Enterprise partnerships creating and growing of sustainable business</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KBPS, Zambia</strong></td>
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<tr>
<td>• Charcoal Production from sawmill waste</td>
</tr>
</tbody>
</table>
| • $73,000 loan & EDS  
  a) Construction of 15 brick kiln  
  b) Marketing & distribution network |
| • Work started since 2003 |
| **VEV, Senegal** |
| • Servicing of wind-powered water pumps |
| • $17,000 loan & EDS  
  a) Expanding inventory to shorten service times  
  b) Offer short term credit to qualifying clients |
| **Anasset, Mali** |
| • LPG distribution |
| • $38,000 loan & EDS  
  a) Purchase plant & equipment  
  b) Increase sales |
| • Bought new bulk LPG tank & installed car dispenser |
| • Increased sales |
| • Work started since 2003 |
The AREED Deal Flow

Concept Stage

Initial Go-No Go

Entrepreneur Training Stage

PV SHS
Fuel Switching
Salt Drying
Coffee Husk Pelleting

Formal EDS Stage

Solar Dryers
Water Pumping
Butane Dist.

Investment Committee

Solar Bakery
Efficient Lighting
Solar Crop Drying
Solar Hot Water
Biomass fuels
Sawdust Briquetting
Financed Stage
The AREED Project Process

- Country partners advertise AREED in local media
- Initial screening of applicants
- Enterprise development services (EDS)
- Review of final business plans
- Decision to invest
- Soft/flexible loans
- Enterprises support (financed) under AREED I: Zambia (7), Tanzania (6), Ghana (15), Mali (18)
South African Solar Concession Programme

Utility model for fee-for-service for Solar Home Systems for Remote Area Power Supply
Background – RAPS Systems

- PV SHSs in areas where grid extension is uneconomic
- Commercial utility model & involvement of the private sector
- Companies’ rights to establish off-grid utilities in designated concession areas – agreement for 20 years
- Fee-for-service model incl. maintenance of the systems
- Govt subsidies to cover 75% of the CAPEX for 5 years
  - R3 500 subsidy for each installed system paid to service provider
  - Customer pays R110 installation fees to the utility
  - Monthly subsidy of R40 reducing the fee for maintenance to R110 per month
# Solar Concession Programme

<table>
<thead>
<tr>
<th>Concession</th>
<th>Area Covered</th>
<th>No of installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuon-Raps (NuRA)</td>
<td>Northern KwaZulu-Natal</td>
<td>6,541</td>
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<tr>
<td>Solar Vision</td>
<td>Northern Limpopo</td>
<td>4,758</td>
</tr>
<tr>
<td>Shell-Eskom</td>
<td>Northern Eastern Cape, Southern KwaZulu-Natal</td>
<td>5,800</td>
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<tr>
<td>EDF-Total (KEES)</td>
<td>Central KwaZulu-Natal</td>
<td>3,300</td>
</tr>
<tr>
<td>Renewable Energy Africa</td>
<td>Central Eastern Cape</td>
<td>0</td>
</tr>
</tbody>
</table>
Service model

**Model 1 (NuRa)**
- Installations, oversight
- Fees/repayments, complaints
- Credit, data, support, maintenance, other sales
- Operations management
- Local energy stores
- Deliveries, approvals and tariffs
- Data, status, applications
- Orders, status
- Head office

**Model 2 (SolarVision)**
- Installations, maintenance
- Fees/repayments
- Pre-vended units
- Data, revenue
- Transaction/system info, orders
- Deliveries, approvals, tariffs
- Sales, engineering data
- Representative vendors
- Regional energy centre
- Head office
Service model

**Model 3 (EDF/Total)**

- Operations manager
- Operational support
  - Data, reporting
  - Reporting, approvals, management
  - Applications, data, status

- Dwellings
  - Applications, fees/repayments
  - Credit, data, support, installations, maintenance, other sales

- Energy centres

- Head office

**Model 4 (Eskom/Shell JV)**

- Dwellings
  - Customer care, complaints, maintenance via technicians
  - Fees/repayments, complaints
  - Credit

- Regional energy service companies (RESCOs)
  - Pre-purchased units, incentives for accurate data submission
  - Revenue, data

- Spaza shops
  - Installations

- Head office
  - Transaction/system info, orders
  - Approvals, tariffs, data
While successful in generating interests from the private sector, as well as for the establishment of N-S consortium with local participation:

- Household have control of the systems but not ownership = prone to vandalism, neglect and misuse
- Limited applications = no cooking and higher power appliances
- Expensive systems requiring large subsidies from govt for both CAPEX and OPEX
- Inaccessible roads, esp. in rainy season for maintenance
- Irregular income for many households affecting sustained payments
CONCLUSIÓN
Analysis of the 2 models

- Energy Access
- Income Generating
- Improved Schooling
- Health Services
- Gender

**Diagram:**
- AREED
- Solar Concession
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