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ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

Energy and Poverty
Increasing Access to Modern Forms of Energy

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Outline of presentation

- Intro to UNEP Energy and URC
- Key issues relating to access
- MDGs and energy
- Current situation
- Options for action
- Examples from UNEP projects

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The UNEP Energy Programme and activities promote the integration of environmental and social considerations in energy related decisions

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UNEP Works with Partners to:

- Influence the way various decisionmakers perceive energy as a driver of sustainable development
- Improve overall planning and management of energy systems
- Deploy and use renewable and ‘low carbon’ energy technologies
- Finance renewable energy and energy efficiency activities
- Increase the efficiency of energy transformation and use
- Develop alternatives to energy-intensive products and services, and shift consumer preferences to these alternatives.

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UNEP Risøe Centre – Energy Climate and Sustainable Development

- International research team of 24 economists and scientists.
- Established in 1990
- Partnership between UNEP, Danida and Risø
- Supporting the implementation of UNEP's energy programme

Key issues in relation to access

- How to combine efforts on increased access with poverty alleviation and specifically contribute to the MDGs
- Access for environment and/or development reasons
- Access an important mean but not an end in itself !
- Focus on energy services and finding the best solutions – no mantras or one-size-fits-all
- Barriers are known – how to overcome them ?
- Policy Framework is key – if properly implemented.

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Millennium Development Goals

- Extreme Poverty & Hunger (halve by 2015 no. on <1$)
- Universal Primary Education (all kids in primary by 2015)
- Gender Equality and women's empowerment (equal access to education)
- Child Mortality (reduce by 2/3 child mortality by 2015)
- Maternal Health (reduce by 75% maternal mortality)
- HIV/AIDS, Malaria etc. (by 2015 have reversed spread)
- Environmental Sustainability (stop unsustainable resource exploitation and halve number of people without safe water)
- Develop a global partnership for development

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World Energy Assessment 2004 upd.	Importance Of Energy To Achieving The Millenium Development Goals
Goal	Some Direct and Indirect Contributions
1) 1) Extreme poverty and hunger: · To halve, between 1990 and 2015, the proportion of the world's people whose income is less than one dollar per day. · To halve, between 1990 and 2015, the proportion of people who suffer from hunger.	· Access to affordable energy services from gaseous and liquid fuels and electricity enables enterprise development. · Lighting permits income generation beyond daylight hours. · Machinery increases productivity. · Local energy supplies can often be provided by small scale, locally owned businesses creating employment in local energy service provision and maintenance, fuel crops, etc. · Privatisation of energy services can help free up government funds for social welfare investment. · Clean, efficient fuels reduce the large share of household income spent on cooking, lighting, and keeping warm (equity issue - poor people pay proportionately more for basic services). · The majority (95 percent) of staple foods need cooking before they can be eaten and need water for cooking. · Post-harvest losses are reduced through better preservation (for example, drying and smoking) and chilling/freezing · Energy for irrigation helps increase food production and access to nutrition.

Energy and Poverty

- Energy can contribute to poverty reduction through:
  - job and income creation
  - enabling better health
  - supporting education
  - improving quality of life for women
  - reducing damage to environment
- Focus on extending access to the energy poor who mostly are:
  - women
  - living in rural areas
  - belonging to the lowest income groups
  - mainly in the lowest income countries

Access – Environment and/or Development

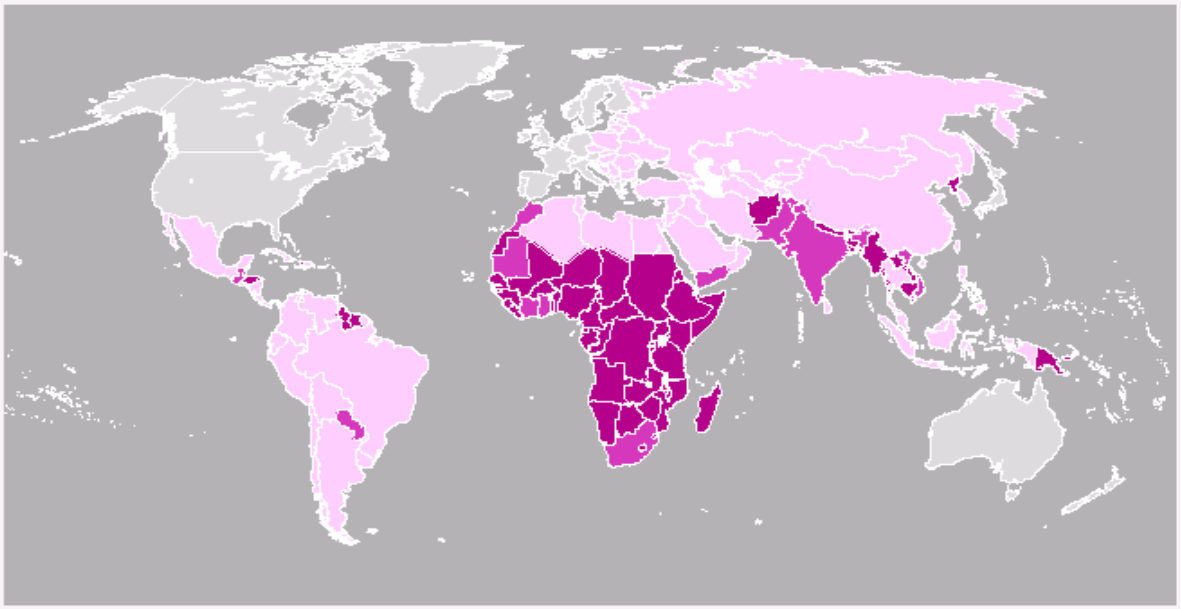
- Important to get priorities right :
  - Climate change concerns in connection with access to modern energy for the poor has little direct relevance
  - Focus on local economic, social and environmental benefits and realise that well designed programmes can ensure synergies with global climate concerns and Carbon Finance can provide an added incentive
  - Small scale access oriented electrification can help address indoor health, land-use and deforestation problems, but other Modern Forms of Energy can do the same and may be more cost-effective in some cases

Current access levels

FIGURE 1

TOO MANY PEOPLE IN DEVELOPING COUNTRIES STILL LACK ACCESS TO ELECTRICITY

(PERCENTAGE OF THE POPULATION WITH ACCESS, 2000)



Source: World Bank Group staff estimates

3% to 33% 33% to 66% Over 66%

Electricity Access in Developing Countries, 2002

Country or region	Population without Electricity (million)	% Population with Electricity	% Urban Population with Electricity	% Rural Population with Electricity
South Asia	814	40	69	33
Sub-Saharan Africa	531	17	52	8
North Africa & ME	39	87	99	88
East Asia	216	88	96	83
Latin America	47	88	98	61
Developing Countries	**1,620**	**70**	**85**	**72**

Sources: World Bank, 2000, IEA 2002.

Status of Electrification in Sub-Saharan Africa

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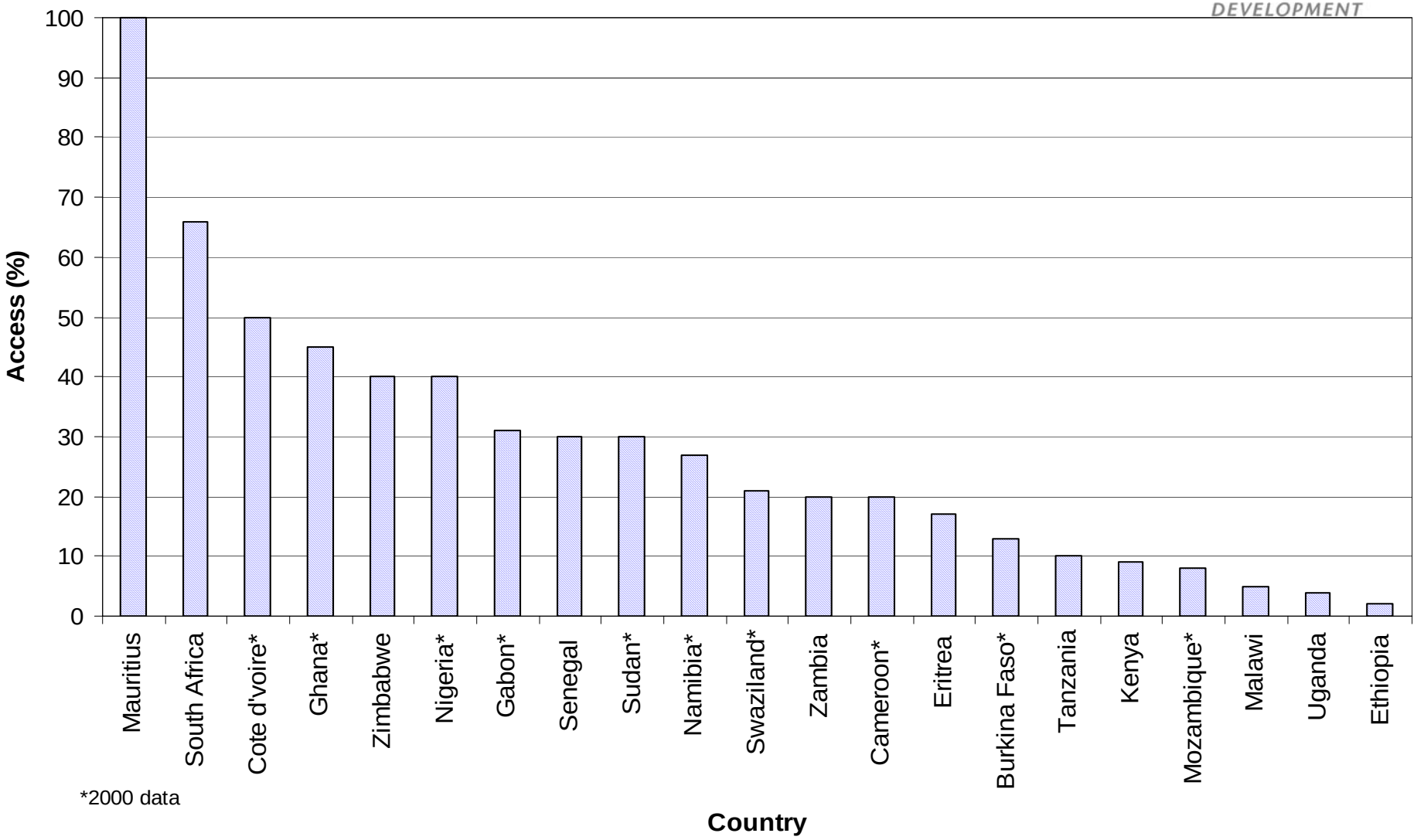
Percentage of Population With Access to Electricity in Africa, 2001



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People relying on biomass for cooking and heating in developing countries, 2000

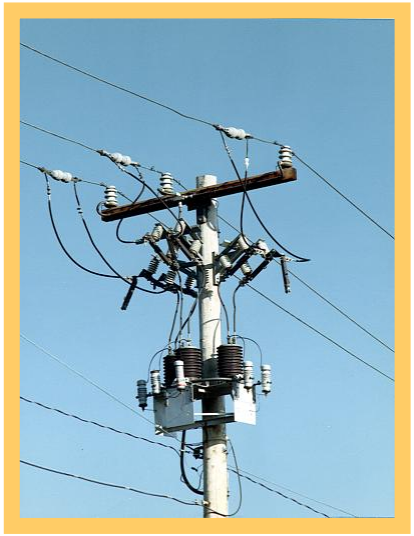
Country or region	Millions	Percentage of population
China	706	56
Indonesia	155	74
Rest of East Asia	137	37
India	585	58
Rest of South Asia	128	41
Latin America	96	23
Middle East and N. Africa	8	0.05
Sub-Saharan Africa	575	89
All developing countries	**2,390**	**52**

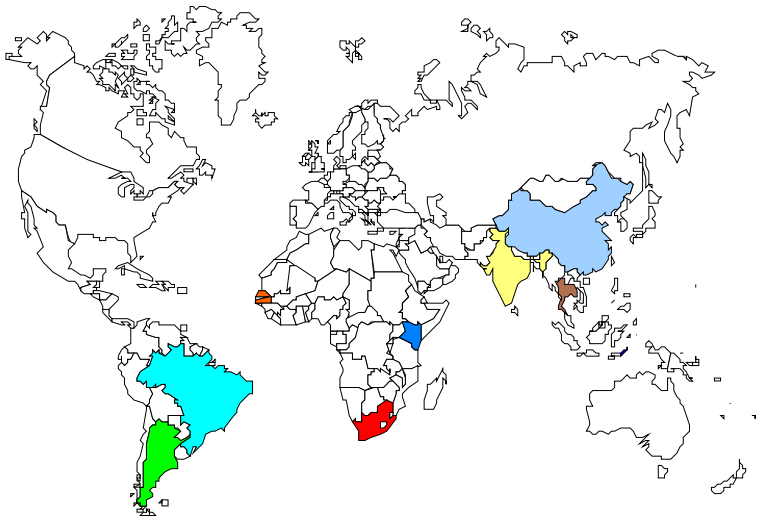
Source: International Energy Agency 2002

GNESD Study Results

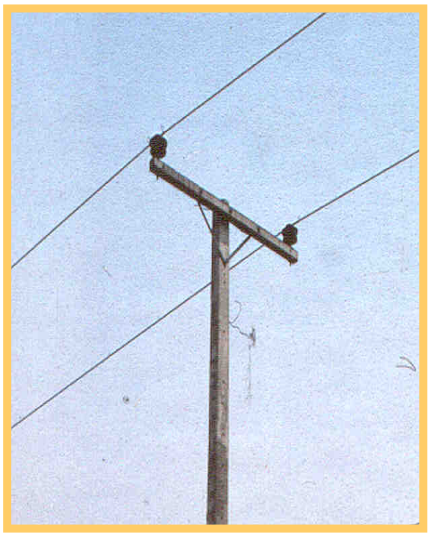
Has power/electricity sector reforms expanded access among the poor?

- Empirical assessments of the impact of the power sector reforms on the poor
- Policy options for improving the poor's access to electricity



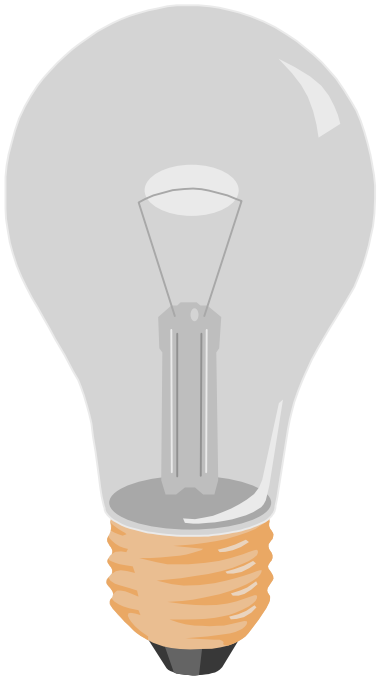


Location of GNESD Centres



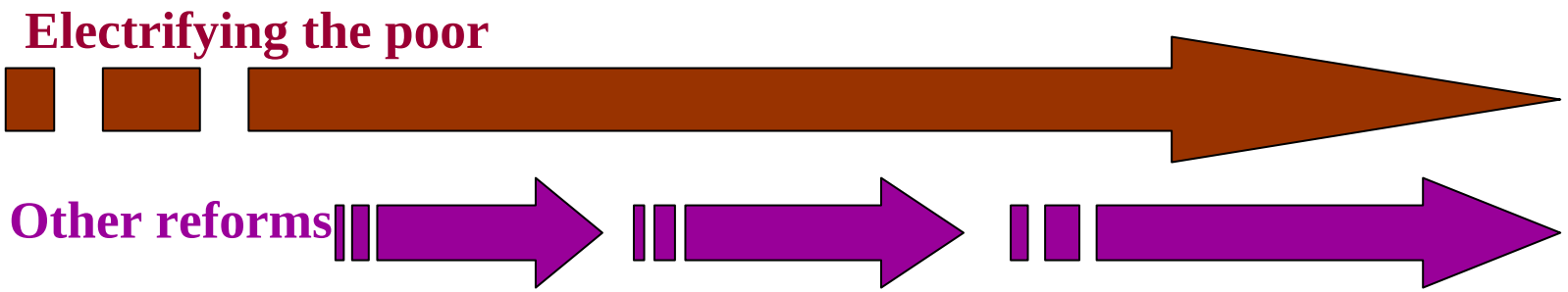
Findings

- Lack of reliable trend data sets on electricity use among the poor - indication of past limited policy interest (used proxies & analysis of primary data)
- Market-oriented reforms have had **neutral or adverse impacts** on the poor (with a few exceptions)
- Power sector reforms need an **explicit pro-poor dimension** otherwise electrification of the poor is forgotten

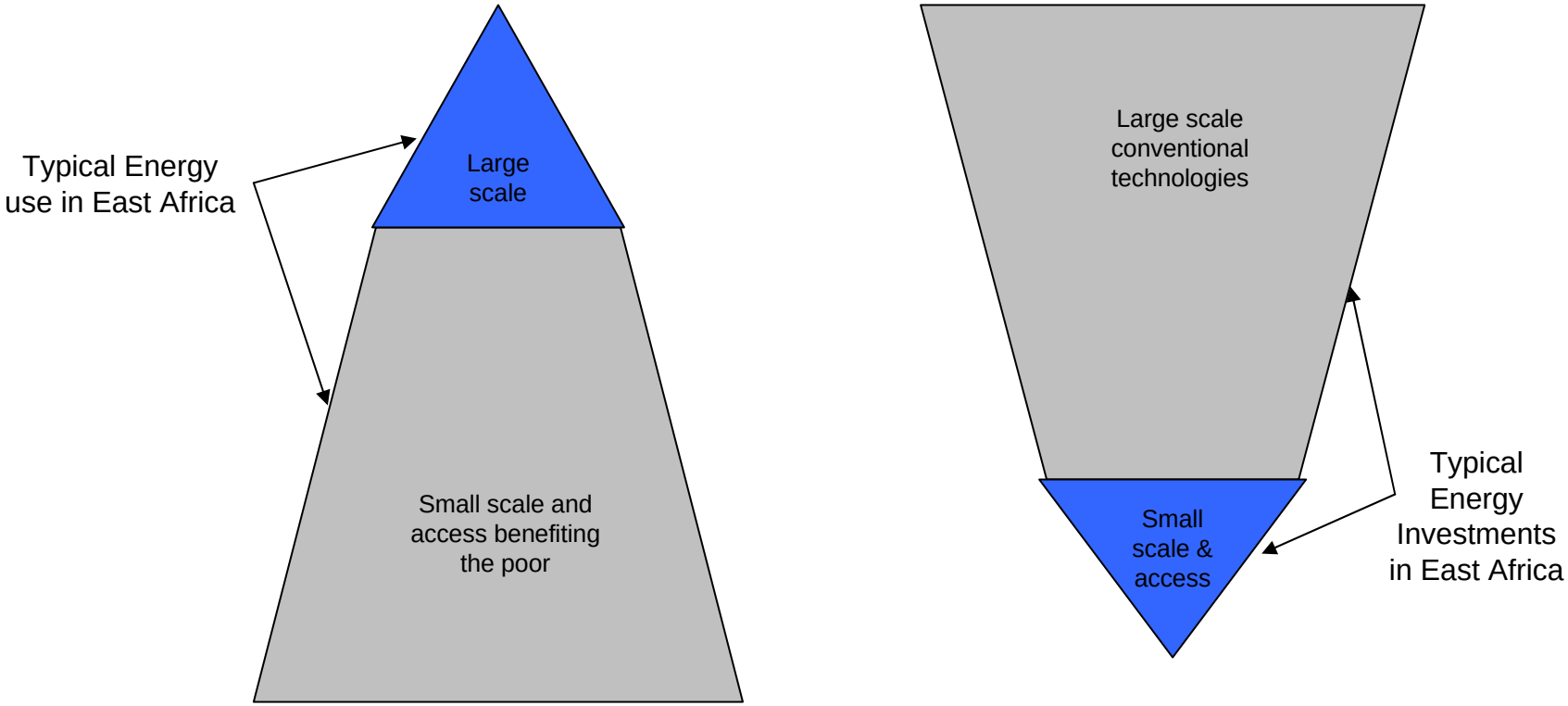


Recommendations

- Need to **protect (ring-fence)** financing for electrification of the poor
- **Sequencing of reforms**: Preferably electrify the poor first, then privatize (or in parallel)
- If possible, ensure that the **poor are represented** in key decision making bodies
- Findings dovetail results of parallel & broader assessments on public benefits of reforms



Illustrating the Problem :
Typical Energy Use Vs Energy Investment in Africa (*Afrepren 2004)*



Strategies for Access and Development

- A coherent strategy for the promotion of Access has to be embedded in a broader sustainable energy policy strategy and should

1. **consider country characteristics** that influence the effectiveness and the desirability of policy instruments and the responsibility for global climate change;
2. **follow an approach that includes an array of effective instruments** in which promotion of access is integrated with other local development actions.

The Dual Electricity Challenge

Countries with large sections of the population and geographical areas with no access to electricity

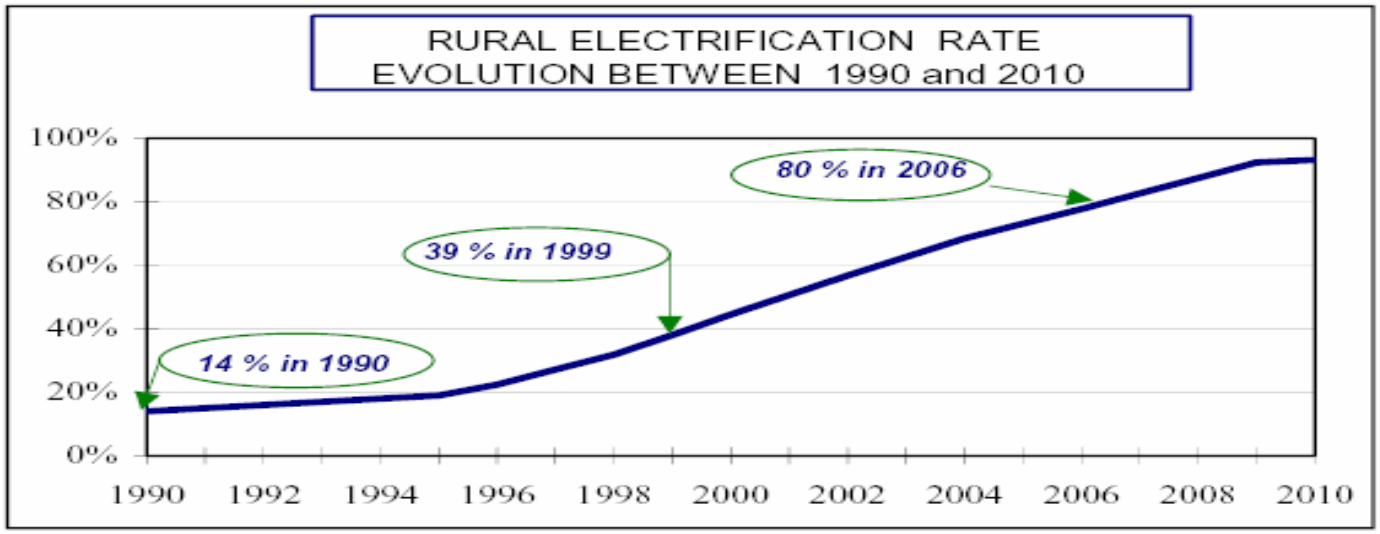
- *Cannot rely on the internally generated cash from their power sector to finance the massive expansion needed.*
- *Public and ODA funds may have to play a role in providing access to electricity (as opposed to subsidizing electricity consumption).*

How can large scale power sector development be linked with specific policy action on access to modern energy services for the poor

- *"Trickle down" not realistic*
- *Dedicated policy efforts linked with sector reforms*
- *Learn from early OECD experiences on access and recent problems with reforms*

Political Commitment is Key

- Strong commitment over time can achieve strong progress e.g. Morocco from 14% rural access in ’90 to 80% in ’06 (projected)



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Options for Improving Access

- Regulate prices to reflect economic costs to ensure fiscal stability and financially sound sector companies
- Improve sector governance so that energy markets are fair and uncorrupt
- Redirect subsidies to the poor to ensure social equity
- Implement subsidies that facilitate investment and not ones that subsidize consumption

The Investment Challenge

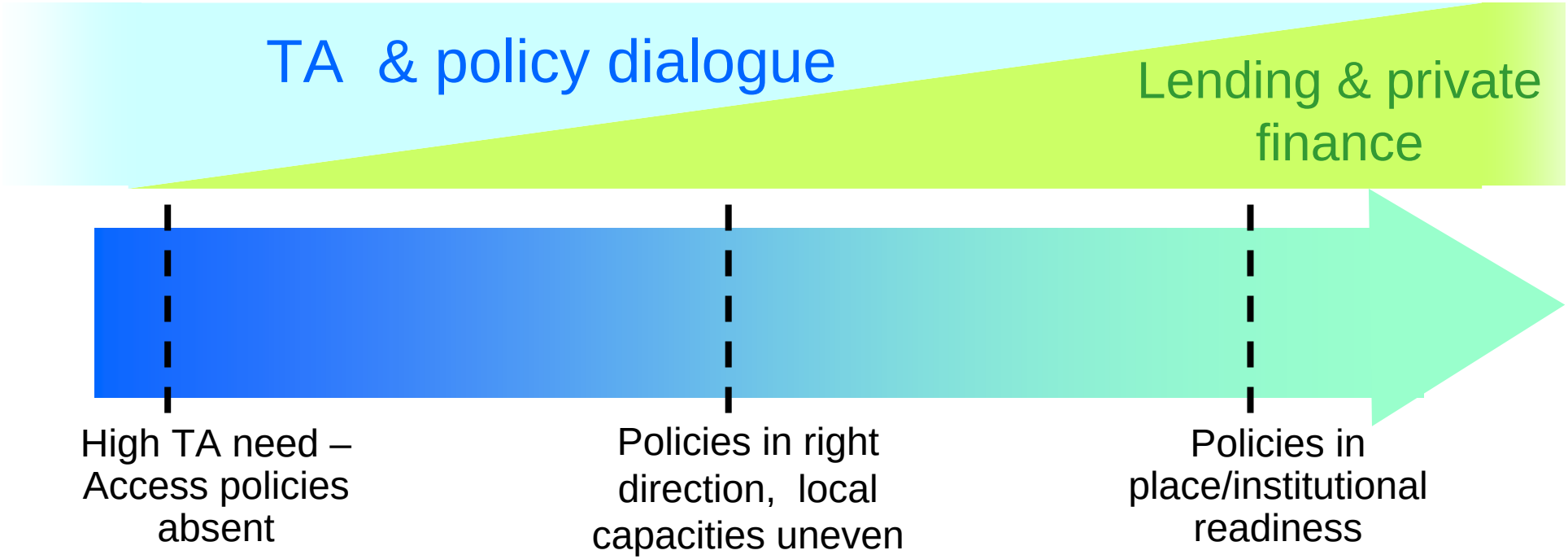
- Key numbers from IEA World Investment Outlook – 2003
  - US$ 16 trillion over next 30 years for energy sector investments
  - US$ 10 trillion (60%) for electricity
  - Approx. 5 trillion in DCs/CEITs where risks are perceived as high and private investments declining
  - Stable policy frameworks necessary to attract international finance and local finance needs to be much more engaged
  - Funding for access programmes represent a special challenge but PPPs combining investment subsidies with private implementation has shown promising results

Core Areas for International Action

- Systematic support to energy development as a part of poverty reduction and economic development strategies
- Systematic inclusion of energy in design and cost of all development assistance addressing other sector MDGs
- Commitment to long term financing of energy sector development
- Increase global funding for energy poverty programs focusing on increased access

Long term engagement → patience required!

Persistence, not perfection, is the key.



African Rural Energy Enterprise Development

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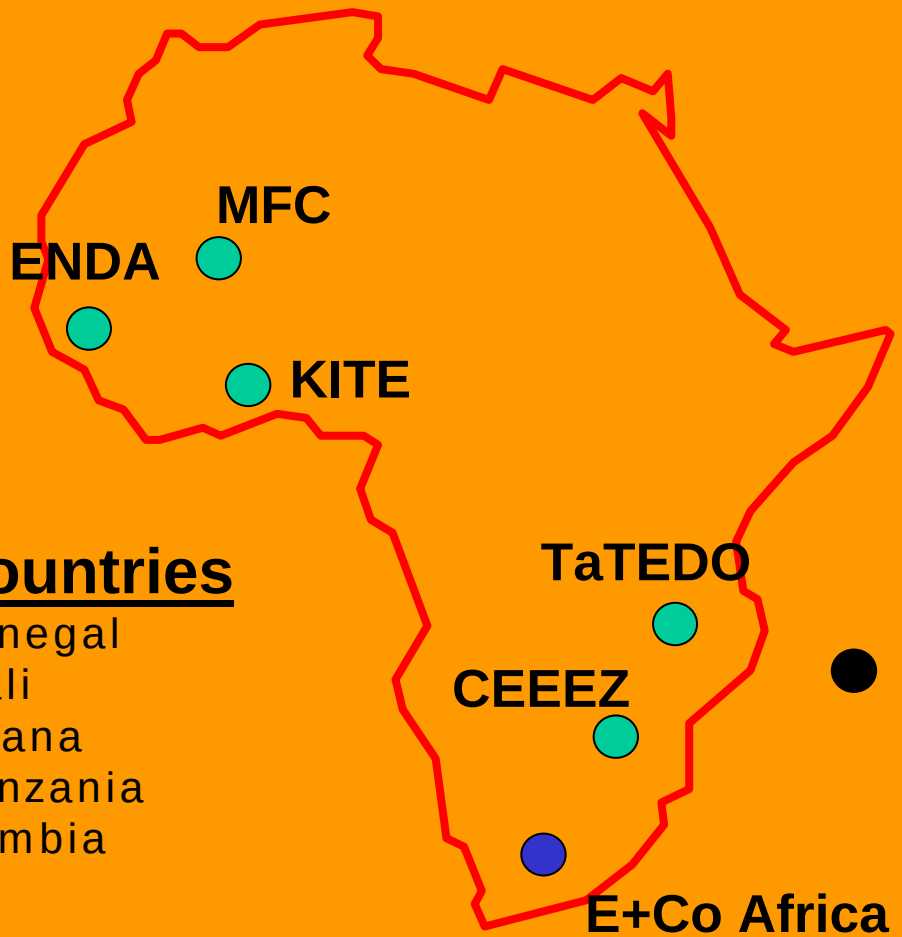
Programme Intro

Demonstrating that needed energy services can be delivered on a sustainable basis by small/mid sized local enterprise.



E+Co

UNEP Paris

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Countries

Senegal
Mali
Ghana
Tanzania
Zambia

Funders/Investors

- UNF, sida, BMZ, Dutch
- Bodyshop, Domini, DBSA

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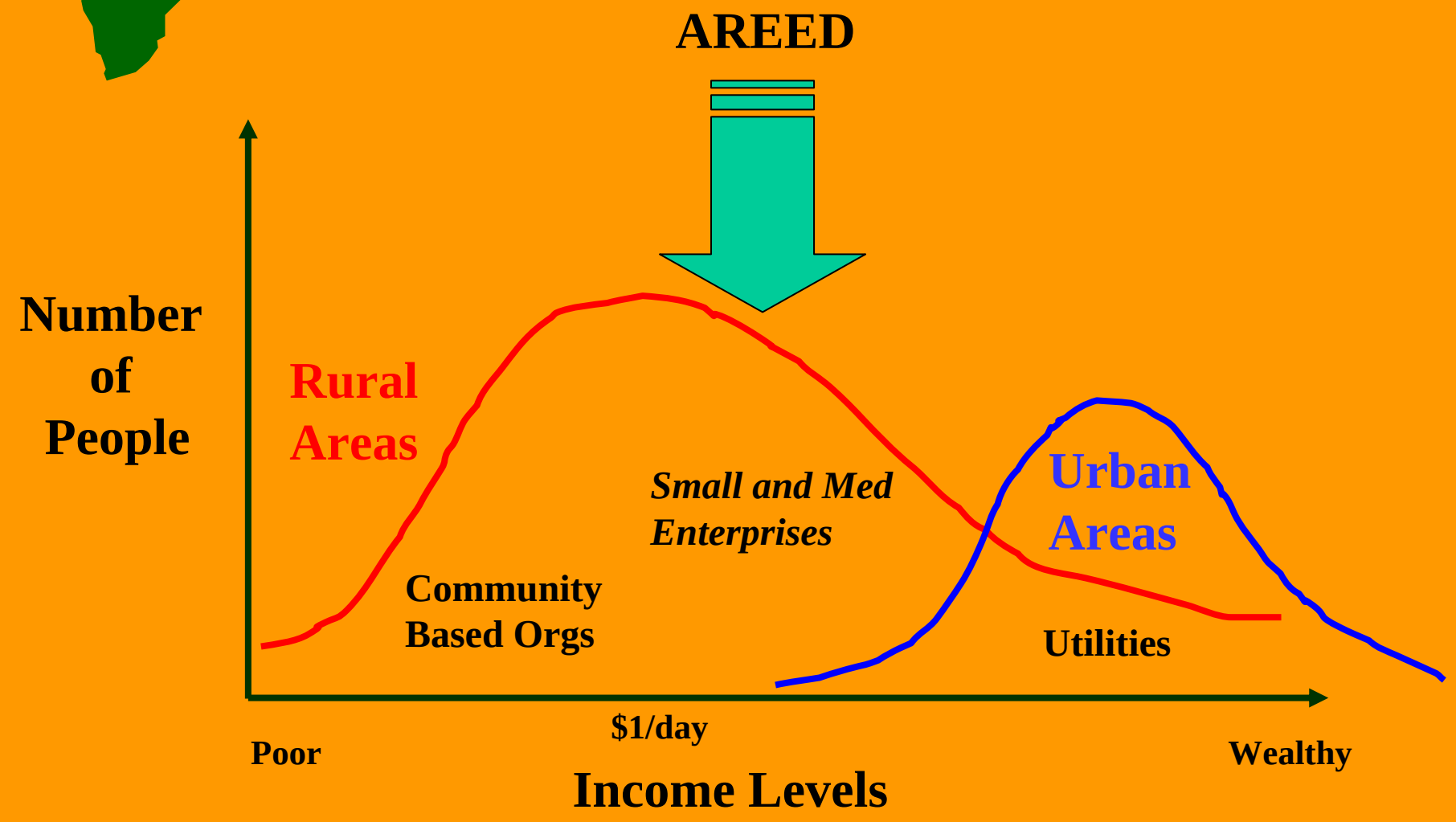

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Source: Kumasi Institute of Technology and Environment

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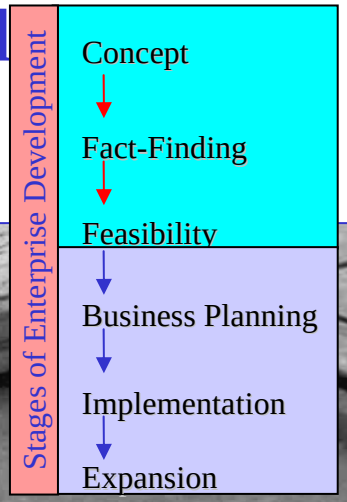
Enterprise Centered Model

Enterprise Development Services

Seed

What are the challenges SMEs face :

- Lack of business skills
- Lack of risk capital
- Lack of rol



- Generally loans
- Terms = what the enterprise can bear
- Concessionality = ability to take risk

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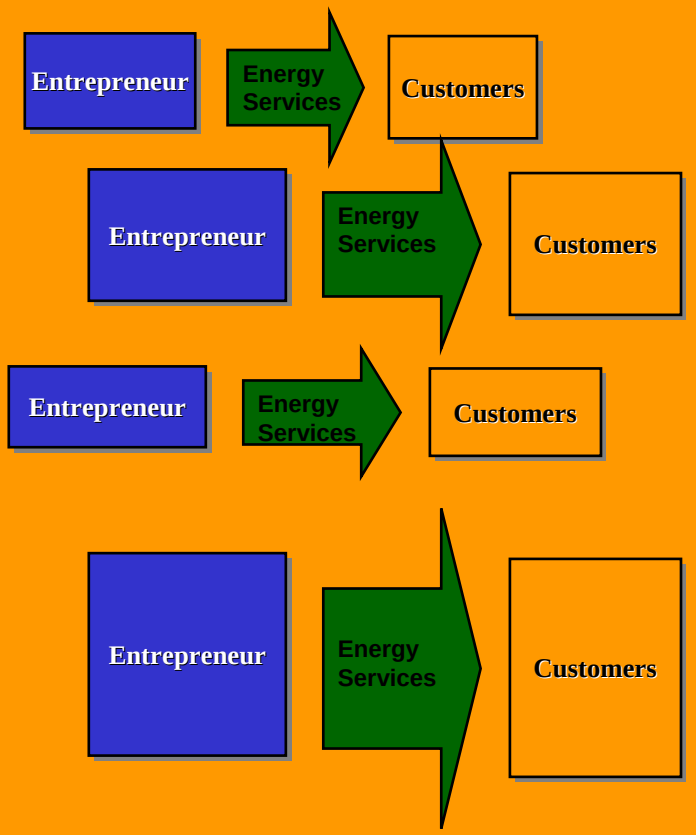
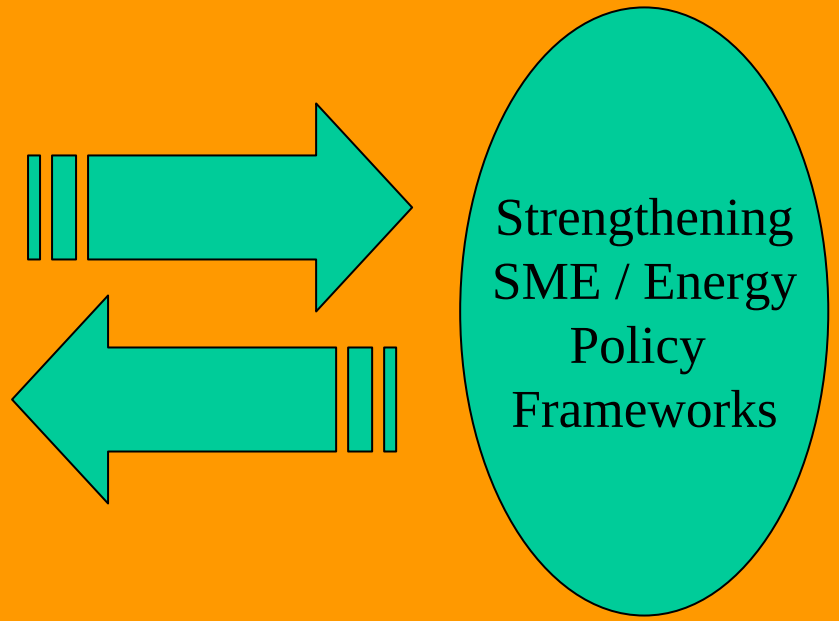
SME Policy Development





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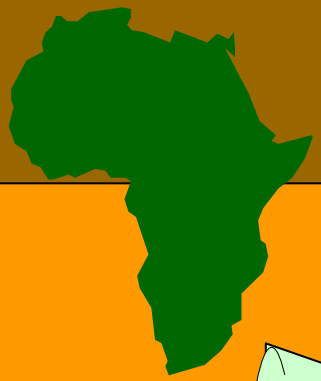
Deal Flow



Initial
Go-No Go

Investment
Committee

Concept Stage

PV SHS

Fuel Switching

Salt Drying

Coffee Husk Pelleting

Solar Dryers

Water Pumping

Butane Dist.

Solar Bakery

Efficient Lighting

Solar Crop Drying

Solar Hot Water

Biomass fuels

Sawdust Briquetting

Entrepreneur Training Stage

Formal EDS Stage

Financed Stage

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Foyers Ameliores – Senegal
Energy Efficient Stoves
$22,384 loan @ 5%, 4 years; 2004
Current on loan

- **AREED Support**
  - Mentor; guide on business potential-develop business plan
  - Working Capital; new tools and equipment to improve production efficiency/capacity
  - Financial Reporting tools
  - Support to formalize business and follow business plan

- **Baseline**:
  - 2,800 stoves/year
  - Selling in Dakar
  - 8 Staff
  - Informal Business
- **Results**:
  - 3,800 stoves/year
  - Selling Beyond Dakar
  - 15 Staff
  - Formal Business

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Mona Mwanza – Tanzania
Solar Photovoltaic Systems
$100,000 loan @ 7%, 3 years ($50,000 AREED) 2003
Current on loan

- **AREED Support**
  - Develop 4-year business plan and marketing plan
  - Establish new, dedicated PV business
  - Mentor entrepreneur to identify business expansion opportunities
  - Working Capital; increase inventory to meet sales requirements
  - Support to follow business plan

- **Baseline**:
  - 500 system sales/year
  - 2 Staff
  - Electrical Shop

- **Results**:
  - 1,025 system sales/year
  - 5 Staff
  - New, formal PV Business

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Enterprises

VEV, Senegal

Business:

Servicing of wind-powered water pumps in rural Senegal.

AREED Support:

$17,000 loan

Enterprise Dev. Support from ENDA, E+Co

Investment Activity:

- Expanding inventory to shorten service times
- Offering short-term credit to qualified clients

Status:

VEV has expanded its inventory and operations.

Together, these services should help to ensure that most wind pumps in Senegal become - and remain - operational.

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AREED **Enterprises**

Anasset, Ghana

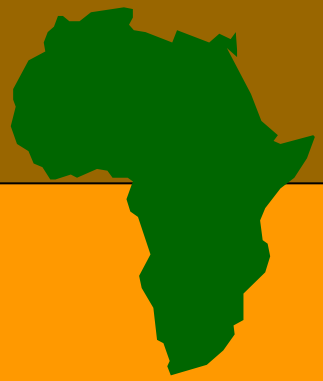
Business:
LPG distribution

AREED Support:
$ 38,000 loan
Enterprise Dev. Support from KITE, E+Co

Investment Activity:
- Purchase plant & equipment
- Increase sales

Status:
- 1,700 metric tones/year, 11,000 households
- 15 Staff, 2 LPG Stations
- $27,000 following on financing from local bank

The upgrading of infrastructure increase the delivery and service levels and makes the product more accessible to the community, decreasing dependence on traditional fuels



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The REED Investment Summary

Rural Energy
Enterprise Development

October 2005

Country	Investment Name	Technology Applied	Description of Business	Financing US$
Ghana	*AB Management*	*Energy efficiency*	*Install power factor correction equipment*	*$122,400*
Ghana	*Anasset*	*LPG*	*Retail LPG*	*$38,000*
Ghana	*Fee Hi Ventures*	*LPG*	*Operate LPG filling plant*	*$33,500*
Ghana	*Gladymanuel*	*Energy efficiency*	*Market compact fluorescent lighting*	*$70,000*
Ghana	*Lambark Gas*	*LPG*	*Retail LPG*	*$109,945*
Ghana	*M 38 LPG Filling Plant*	*LPG*	*Retail LPG*	*$59,000*
Ghana	*RKA*	*LPG*	*Maunfacture LPG stoves*	*$173,400*
Ghana	*BBE*	*LPG*	*Distribute LPG*	*$46,000*
Ghana	*Translegacy Venture Limited*	*LPG*	*Fabricate and market LPG stoves*	*$20,000*

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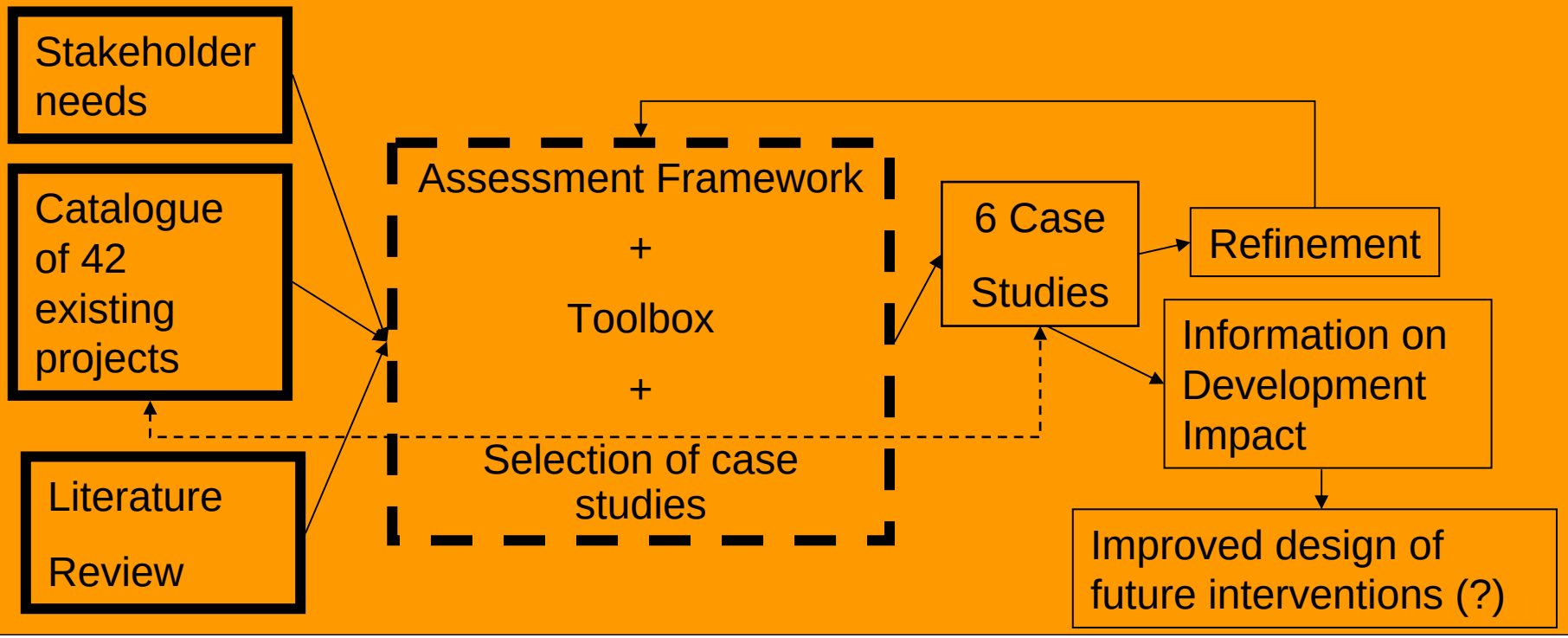
Development and Energy in Africa – EU COOPENER

- to establish and apply an Assessment Framework for evaluating development and poverty alleviation impacts of energy interventions
- to engage in a dialogue with energy policy makers and other stakeholders on the basis of the framework, with a view to incorporating these issues in energy policy.



The REED

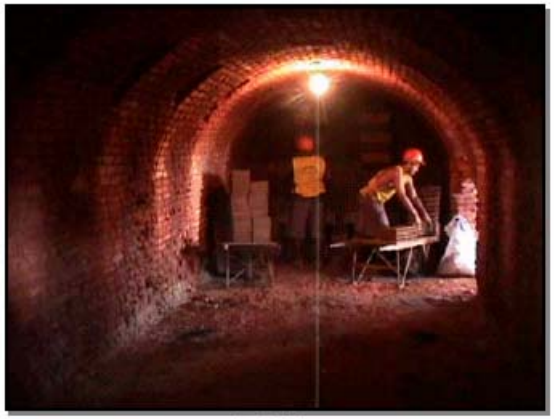
Rural Energy Enterprise Development

November 2003

Enterprise profiles

Cerâmica Bandeira
Brazil

Brazil - BREED



Brick Kilns

Bamboo used to fire bricks

Biomass Fuels to Manufacture Bricks

Ceramic Bandeira Snapshot

Country: Brazil
Entrepreneur: Frederico, Eduardo and Marco Albuquerque
Energy Service: Wood from eucalyptus plantation for firing bricks

REED Services:
- Financial Analysis Assistance
- US$ 147,000, 5-yr loan at 14% interest rate in 2 installments
- Post investment enterprise development services

Development Benefits:
- local employment via 42 permanent jobs for planting, management and harvesting of the trees, as well as the operation of the new equipment
- An example for other brick manufacturers in the region to replicate, helping them reduce business risk of rising energy fuel prices

Environmental Benefits:
- Reduced pressure on local forests
- Reduced use of coke
- Reduced CO_2 emissions

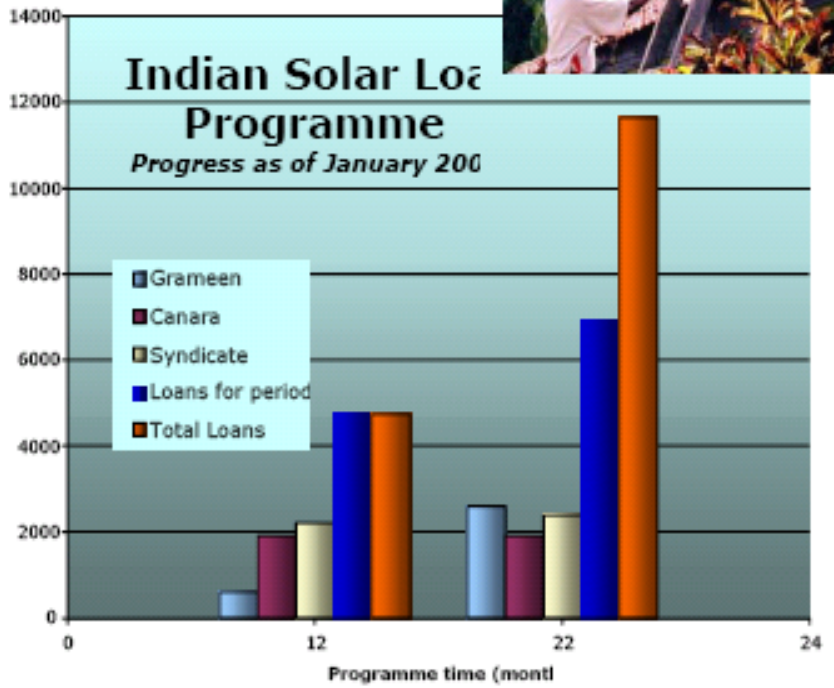
REED has invested US$2.5 million in 43

Brazil	*ASCIMA*	*PV*	*Solar water pumping for irrigation*	*$47,500*
Brazil	*Ceramica Bandeiras*	*Biomass*	*Wood fuel for brick manufacturing*	*$146,939*
Brazil	*Hidrosol*	*Solar Thermal*	*Market and maintain solar water heating systems*	*$17,400*
Brazil	*Operarias do Mel*	*Solar Thermal*	*Purchasing, packaging and marketing of Solar Dried Bee Pollen*	*$27,000*
Brazil	*Ouro Branco*	*Biomass*	*Wood processing plant*	*$50,000*
Brazil	*Solar Moveis*	*Solar*	*Commercializes low-cost solar food dryers*	*$18,333*
Brazil	*Carbo Charcoal*	*Biomass*	*Manufacture charcoal from biomass for steel industry*	*$160,000*
Brazil	*Ecofogao*	*Biomass*	*Manufacture high efficiency wood stoves*	*$15,000*
Brazil	*Village Ambiental*	*PV*	*Solar water pumping for irrigation*	*$55,000*
Brazil	*Engenho*	*Biomass*	*Manufacture fuel from biomass*	*$250,000*

The Indian Solar Loan Programme

A credit facility in Southern India (Karnataka and Kerala States) to help rural households finance the purchase of Solar Home Systems

- UNEP provides:
  - Interest rate subsidies for borrowers
  - Assistance with technical issues and Vendor Qualification
- Supported by United Nations Foundation and Shell Foundation
- Implemented with two of India's largest banks: Canara Bank & Syndicate Bank - more than 2,000 branch offices, plus their associated *Grameen* banks
- 15,000 SHS loans financed as of May 2005. Only 1,400 financed prior to programme which is on track to finance 20,000 + systems



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Thank You !

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