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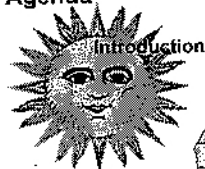
## Providing Off-Grid Power the GOOD or BAD news for sub-Saharan Africa

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Siemens Limited

The views presented within this paper do not necessarily reflect the policy or views of Siemens, but are from personal experience gained over 15 years in Renewable Energy product supply.

## Agenda

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Statement  
Economic Indicators  
Access to Electricity  
Africa "The dark Continent"  
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PV Production  
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Conclusion  
The Way

## Statement

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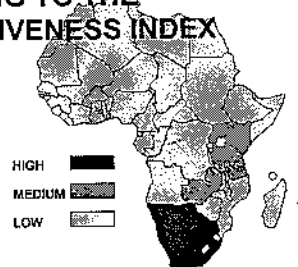
"Electrification is a potent symbol of access to development and modernity. The perception of being valued enough to be electrified, should not be underestimated."

"Energy is a key factor in economic development, whether for growth in the commercial and industrial sectors or in the provision of basic services to rural populations."

## Economic Indicators

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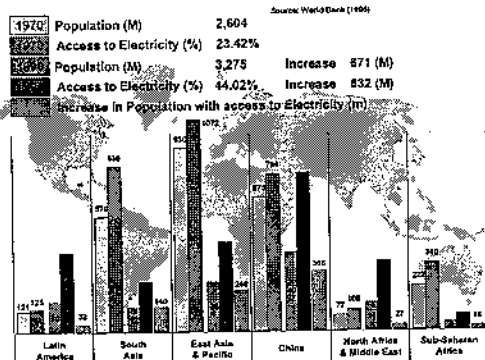
### PERFORMING ECONOMIES ACCORDING TO THE COMPETITIVENESS INDEX



(source The Africa Competitiveness Report - 1996)

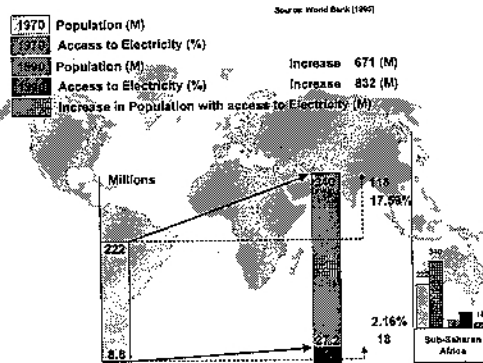
## Access to Electricity

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## Access to Electricity

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## Africa the DARK Continent

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This picture is courtesy of Entorn and is used in their advertising campaign - Southern Africa

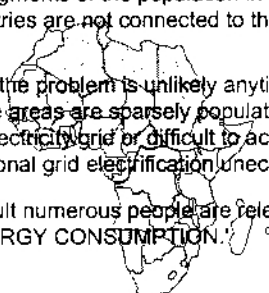
## Facts

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FACT - Large segments of the population in developing countries are not connected to the electricity grid.

FACT - Relief of the problem is unlikely anytime soon, as many of these areas are sparsely populated, far away from the electricity grid or difficult to access making conventional grid electrification uneconomical.

FACT - As a result numerous people are relegated to 'SURVIVAL ENERGY CONSUMPTION.'



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## World Market - Applications 1998 - 120 MWp

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### Good News Grid Connected

- Growth rates are excellent thanks to government programs in Japan, Germany etc.

### Rural electrification

- More and more people understand how important it is to bring electricity to the 2 billion people who live without it.

### Industrial & Consumer

- Steady growth rates; totally "natural" market. Siemens has a most competitive product - they need it and have the money.

### Bad News

- Governments come and governments go; so do their programs.

- It is the most difficult, troublesome and expensive market to penetrate. Biggest problems are corruption, ignorance, missing technical and micro-banking infrastructure.

- No bad news.

## World Market - Development (MWp) 1998 - 120 MWp

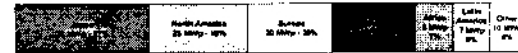
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Year	Rural (MWp)	Industrial (MWp)	Consumer (MWp)	Total (MWp)
1995	30	28		69
1996	31	35		82
1997	35	45		114
1998	27	80		120
Av %	+ 57.5%	+ 3.5%	+ 21.3%	+ 20.3%

## World Market - Regions 1998 - 120 MWp

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### Good News

#### Japan - North America - Europe

- Excellent development due to subsidized programs, industrial and consumer applications.

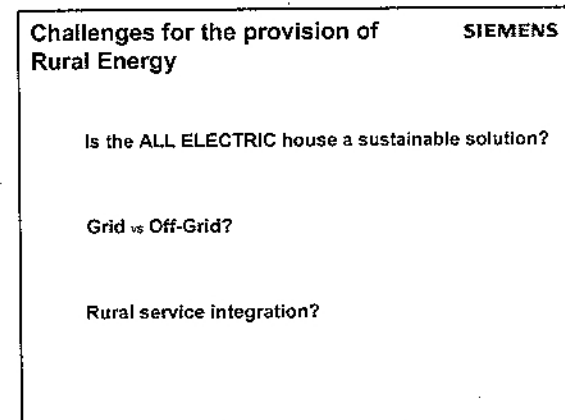
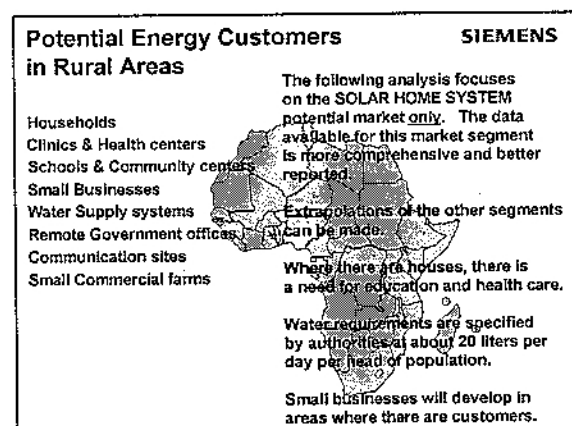
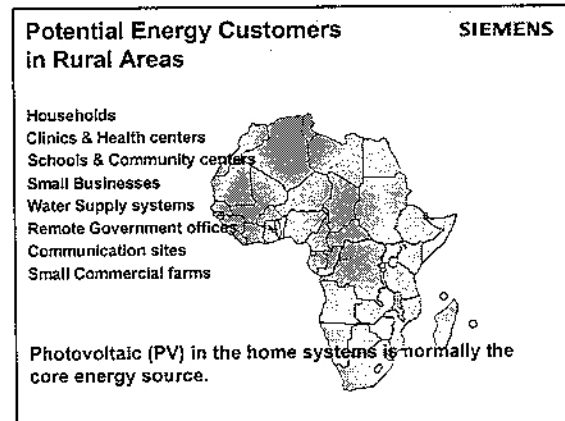
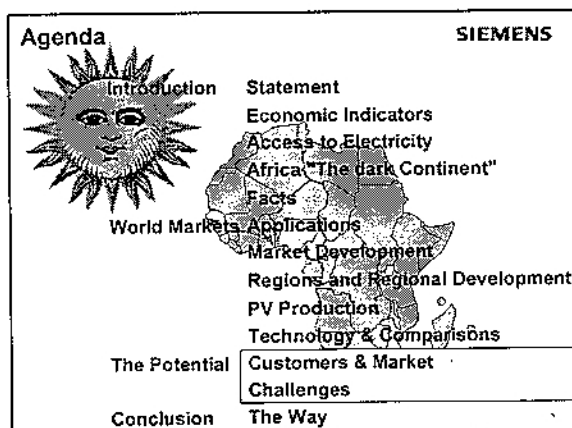
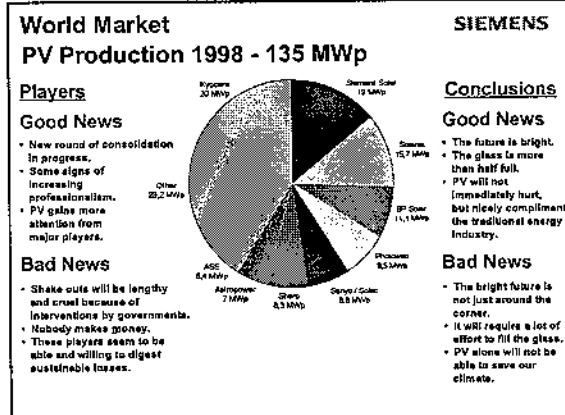
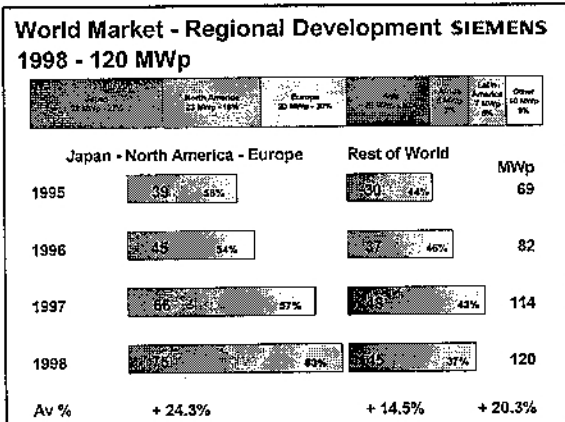
#### Rest of World

- World Bank and some governments rediscover the value of PV (especially) for these regions.

### Bad News

- High risk due to political fluctuation and extremely competitive, bureaucracy.

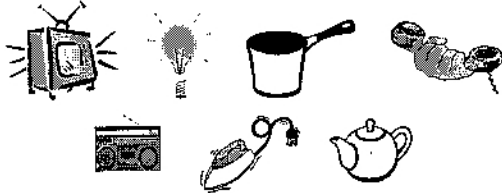
- Lack of infrastructure, financial crisis and weak economies.



### Challenges for the provision of Rural Energy

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Not all the households have the same energy needs,



### Challenges for the provision of Rural Energy

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There are a number of fuels which can meet those needs:

Differing in technology

Differing in price

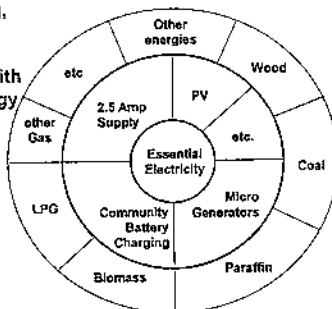
Differing in efficiency

Differing in availability

### Challenges for the provision of Rural Energy

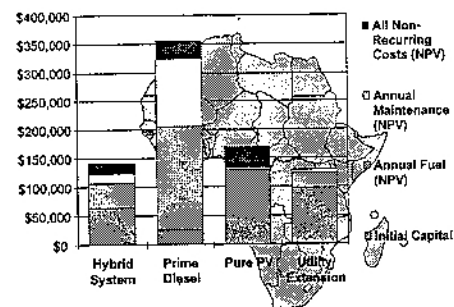
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The core is essential electricity - for lighting, radio & TV packaged together with other energy forms - for cooking, water heating, cooling & space heating.



### Life Cycle Cost Comparison (NPV) 20 year synopsis

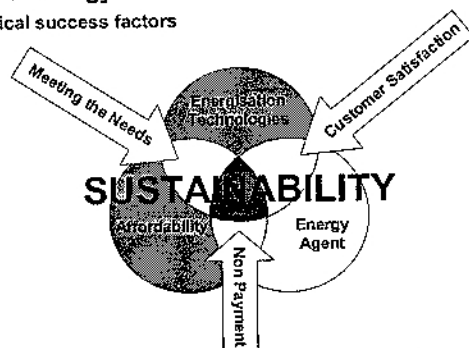
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### Challenges for the provision of Rural Energy

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Critical success factors



### Challenges for the provision of Rural Energy

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What is needed to POWER rural communities

Co-ordinated affordable financing

Clear country policy

Tested procedures

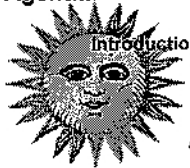
Generic Energy Modeling


Capacity building

Innovative technology application



If you don't know where you are going, any road will take you there!

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CONCLUSION	SIEMENS
Nelson Mandela: Opening of Parliament 1996	
<p>"We can neither heal nor build if the rich in our society see the poor as hordes of irritants; or if the poor sit back, expecting charity.</p> <p>All of us must take responsibility for the upliftment conditions and prepare to give our best to the benefit of all."</p>	
	
Thank You	