



Alliance for
Rural
Electrification

Shining a Light for Progress

Small wind for rural electrification In developing and emerging countries



International Small Wind Energy Conference 2010

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ARE Policy and development Officer

ARE promotes renewables in developing countries

ARE is an international business association which provides efficient renewable solutions for rural electrification in developing countries.

- The Alliance attracts and unites all relevant actors in order to **speak with one voice**
- The Alliance generates **technical and financial solutions** about rural electrification
- ARE communicates and **advocates** for rural electrification using RES
- ARE is the international **business network** for off-grid professionals.



Who is Who – List of Members

Acciona Solar

ASIF

BAE

BP Solar

Cedes

CTEK

Eauxwell

EPIA

ESHA

EWEA

Fondazione Madre Agnese

Fortis Wing

GWEC

IDAE

IED

INES

**Institute for Sustainable
Power (ISP)**

ISE Fraunhofer

IT Power

KXN

OutBack Power

Phaesun

Phocos

Q Cells

RENAC

Rolls Battery Europe

Rural Energy Foundation

Scatec Solar

SHARP

Siemens

SMA

Solar 23 Dev. Plc

Solar Pack

Solaria

SolarWorld

Steca

Studer Innotec

Sunlabob

Trama TecnoAmbiental

Trojan Battery

University of

Southampton

University of Twente

of those, 1.340 million live in rural areas

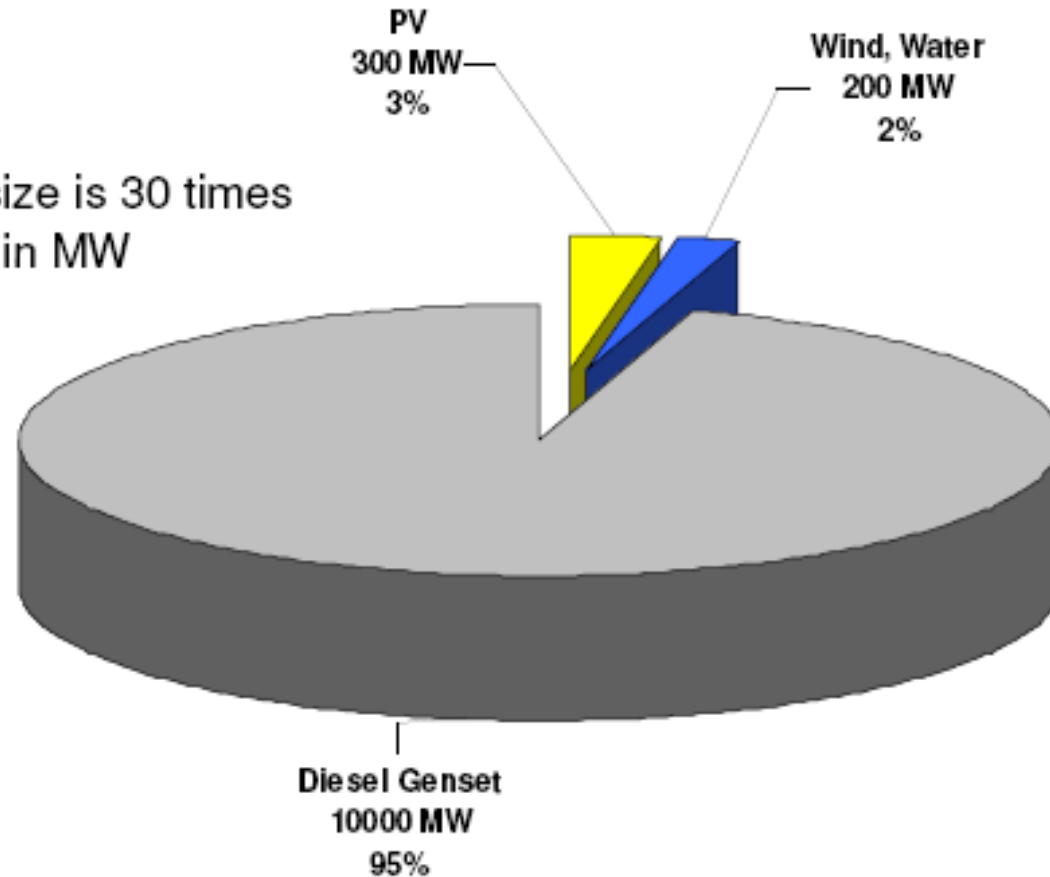
Global Electricity Access 2005	Population	Population with electricity	Population without electricity	Electrification rate	Urban electrification rate	Rural electrification rate
	million	Million	Million	%	%	%
Africa	891	337	554	37,8	67,9	19,0
Developing Asia	3.418	2.488	930	72,8	86,4	65,1
Latin America	449	404	45	90,0	98,0	65,6
Middle East	186	145	41	78,1	86,7	61,8
Developing Countries	4.943	3.374	1.569	68,3	85,2	56,4
Transition Economies and OECD	1.510	1.501	8	99,5	100,0	98,2
World	6.452	4.875	1.577	75,6	90,4	61,7

43,6% of the rural population in developing countries has no access to electricity

Enormous untapped off-grid RES potential

Potential market

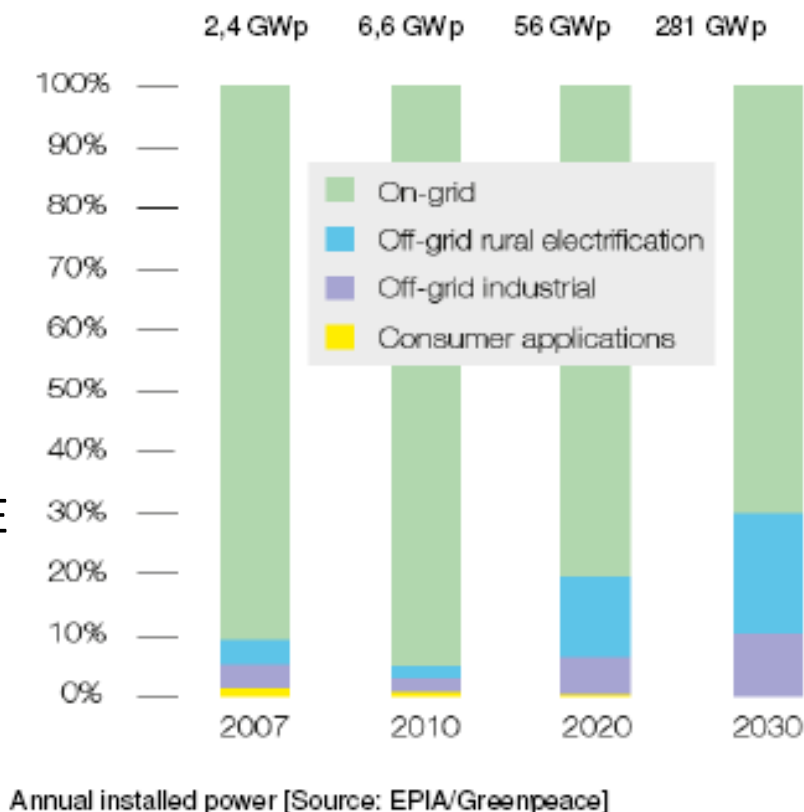
Potential market size is 30 times bigger than today in MW



Source: Conergy



Off-grid is a future market

- Decreasing costs of RE technology
- Electricity needs in off-grid areas increase
- Increased international financing for climate change related purposes
- Local banks: Increased awareness of RE potential
- New business models (i.e. GSM related)
- Long term trend for higher diesel prices




**Off-grid:
Long term estimate of the PV industry**

The most common renewable options

Technology	Advantages	Shortcomings
<p>Small RE stand alone applications</p> 	<ul style="list-style-type: none">• Good business cases• Financing relatively easy.• High flexibility.• Easy to move and share.	<ul style="list-style-type: none">• Relatively high overhead costs.• Only first step towards full electrification.
<p>Mini-grid fed by RE/ Hybrid systems</p> 	<ul style="list-style-type: none">• Power for economic activities.• Technically efficient maintenance• Easily expandable• With diesel backup: Stable power supply also at night and during unfavourable weather conditions.	<ul style="list-style-type: none">• Financing challenging (need for PPA / subsidies)• Organisation of O&M challenging.

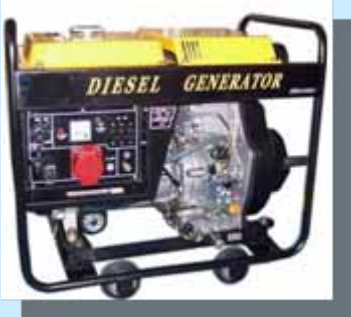
Decentralised RES vs grid extension

Technology	Advantages	Shortcomings
Grid extension 	<ul style="list-style-type: none"> • Energy for productive use • Maintenance is safeguarded in principle 	<ul style="list-style-type: none"> • Risk of electricity theft • High price of connection for remote areas and limited willingness to pay • Even higher prices over difficult terrain • Power supply depends on quality of the grid • Power transmission losses

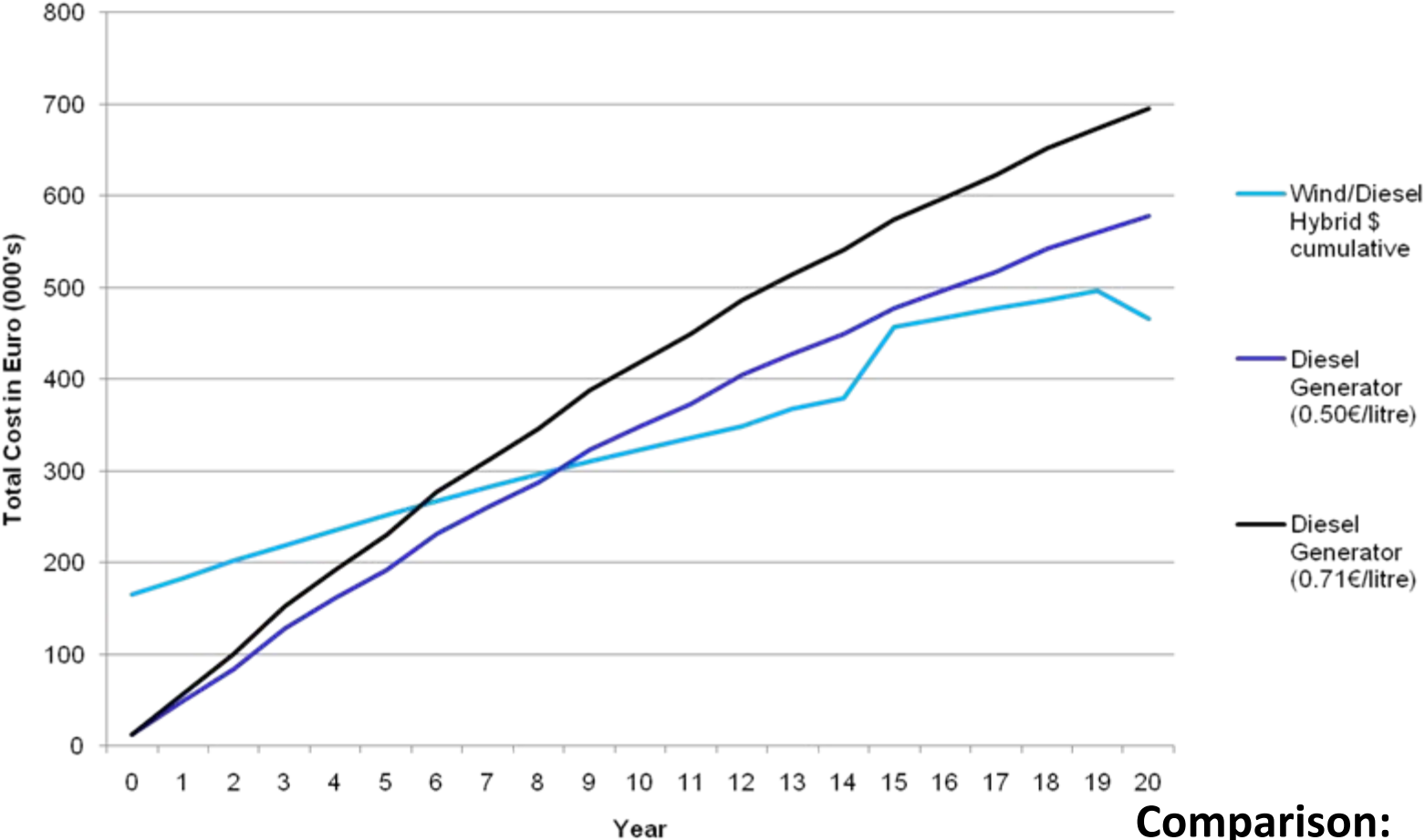
Country	Labour & other costs	Materials	Total
Kenya	6590	5960	12550
Senegal	5150	10810	15960
Mali	2590	15170	19070

Costs of grid extension in selected countries in US\$ per kilometre

Source: *Reducing the cost of grid extension for rural electrification, ESMAP (2000)*

Technology	Advantages	Shortcomings
<p data-bbox="92 559 479 611">Diesel generators</p> 	<ul data-bbox="639 568 1058 911" style="list-style-type: none">• Easy maintenance• Spare parts easily available.• Steady power source	<ul data-bbox="1097 568 1715 959" style="list-style-type: none">• Noise, emissions, local environmental/health damage• Continued dependence on external supplies• Exposure to international price fluctuations.

Decentralised renewables vs diesel



Comparison:
Cumulative costs diesel vs. Wind/diesel hybrid system

Source: Alliance for Rural Electrification

Business case 1: Electricity Services

Charging home batteries in Mauretania.

People used to travel with a bus to the nearest battery charging shop, now they can charge at walking or cycling distance.

The charging station brings employment and small revenues to the village.



Business case 2: Wind for Water

Together with Hatenboer water Fortis Wind Energy has developed a water desalination container, based on wind energy.

Water is being sold at a commercial price creating work and small profits to the local society.

www.drinkingwiththewind.nl



Business case 3: Wind for Telecom

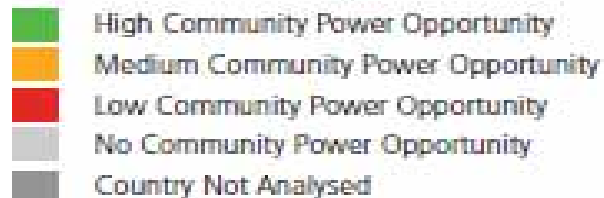
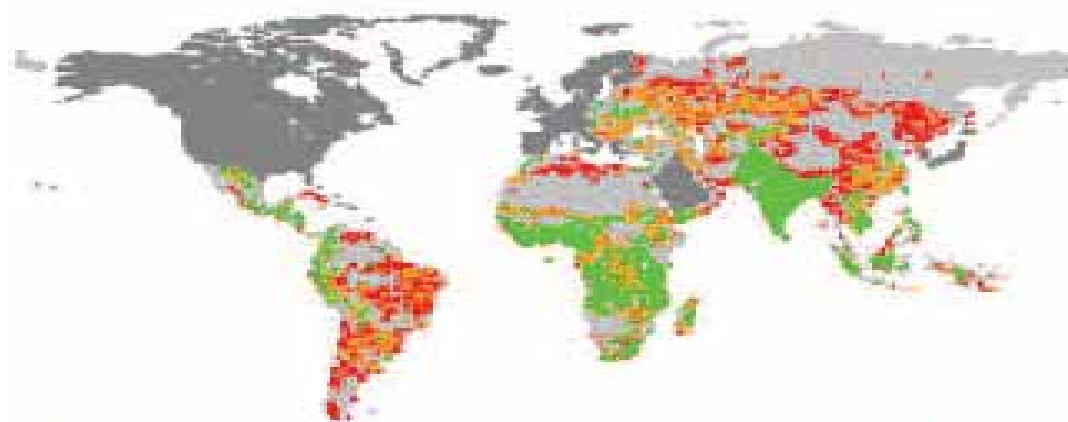
GSM and other antenna's are quite often powered by diesel generators, that in the end are not very low cost to operate.

By building hybrid power systems exploitation costs can go down.

Best ROI is now < 1 year.



**Worldwide there are more than
600.000 GSM base stations powered by diesel gensets**



Source: GSMA Research

The first and main key is the **tariffs and subsidies**:

- Sustainable rural electrification tariff **must at least cover the running and replacement costs** (break-even tariff), even though the **opportunity for profit is key to attract private operators** (financially viable tariffs).
- **Smart combinations of support schemes** are key to attract operators and ensure project sustainability.
 - Loans from local banks
 - Loans / equity from development banks
 - Microfinancing (i.e. Grameen shakti)
 - Subsidies on the upfront investment costs (i.e. REA)
 - Output based subsidies (i.e. GPOBA)
 - Development cooperation programmes (i.e. EU Energy Facility)
 - Donor financed projects (i.e. GTZ/KfW tenders)
- **Other forms of support** can also be offered to project developers: tax credits; low import duties; site surveys; market studies; and capacity-building.

Lack of institutional and political stability and clarity, inadequate legal and regulatory framework.

- **Access to electricity must rank high** on the development agenda
- Access to electricity should follow a **reliable long term strategy** and the legal framework must allow for private and local initiatives
- **Subsidies for fossil fuels** should be phased out or transferred to the RETs.
- A **close dialogue between policymakers, the private sector and representatives of rural communities** is indispensable for sustainable policies (Better education/communication on RETs).



- **Capacity building on technical, business, financing, and institutional aspects** of project and program development is necessary at every point of the project chain and must include every stakeholder.
- At the village level, **detailed technical training for end users** must cover both electricity uses and limits.
- The **personnel responsible for O&M** should also be trained right from the project implementation, with follow-up training over the long term.
- **Involvement of all the villages' stakeholders within the project is fundamental**



Engage in the global off-grid markets...

Information on new international projects and business opportunities.

Marketing

Networking: Get connected to the international off-grid community

Public Relations: Highlight your company's commitment

Lobbying: Engage to shape the global off-grid markets.

Join the Alliance!



Thank you for your attention

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Photo credit: Fortis Wind Energy, ARE members