Beyond mini-grids
Village Power without Subsidies

Empowering rural "off-grid" communities by providing "Sustainable Electricity for All"

Africa Power Ltd. will provide power in the poorest, most inaccessible regions

Background

- Mini-grids policy based on western power concepts
- **Africa needs smaller packets of power – Africa model**
- Villagers do not want electricity (kWhrs)

  They want <u>the services electricity provides</u>
- **Need a pro-poor rural access to electricity**
- **$75,000 Study by Sincronicity Power and World Bank**
  - **Villagers have access to expensive energy**
  - **have a greater need**
  - **and greater ability to pay**

Examples:

Dry cell battery: $40-100/ kWhr

Kerosene lamp: $12/kWhr

Firewood – lost education

New Model

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Provide Village Power to all:

- **Anchor Client Power**
  - Income stability and leverage of EDF funds with private sector finance
- **Business Power (agriculture & micro-enterprises)**
  - Creates local economic development and jobs. Increased Income.
- **Community Power (houses; health clinic; schools; street lights)**
  - Household systems save money over kerosene lamps and candles

System is sized to power the end-use requirements

- Distributed power systems. Removes wiring cost (25% on mini-grid cost)
- Easily expanded – add new system or expand current installation

All systems installed on a “pre-pay” systems with no deposits

- Pro-poor business model
- We do not need subsidies

A-B-C Model was conceived by Sincrositewatch and is used with their permission.

Anchor Clients

- **Replace cell phone tower diesel generators with solar/wind**
  - Saves money
  - Reduces diesel imports to country
  - Eliminates noise / pollution
- **Tower land rental to community**
  - Pay for schools, health clinic, street lights
- **Local Government:**
  - Offices; Schools, health clinics

Stable credit-worthy clients

Enables Africa Power to use private sector finance to leverage development funding by factor of 10 – 15.

Business Power

Africa Power provides the power generation, business equipment and training to create or expand micro-enterprises and agriculture

- All systems create net income (after paying for systems)
- Weekly, monthly or annual payments tied to cash flow
- Individual system guarantees up-time and availability

Agri-processing

Business Power - Drip Feed Irrigation

1 kW Solar Array pumps water

1 metre water head irrigates

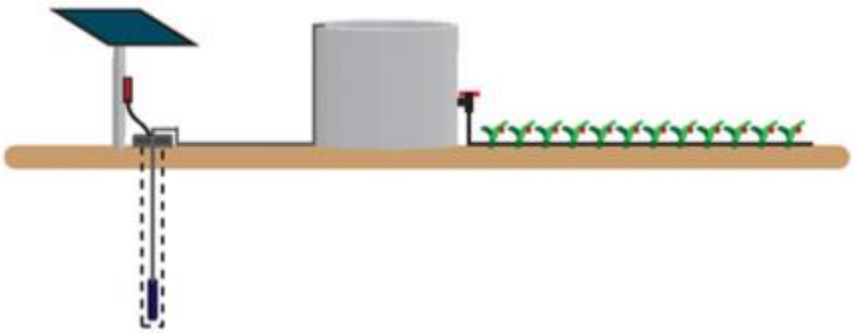
40 x 120m^2 market garden plots

Increased income $400

- Smallholder family have 3-5 helpings vegetables
- In dry season compared with 0-1 before

Charge $200 / annum after cropping

- Cost $600 per plot (small-holder)
- Annual costs (seed fertilizer) $100



Rural business generation

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Agriculture	Business Use	Household cost or time savings	Community

• Drip-feed irrigation
• **Increased egg laying**
• Crop processing
  ○ **Palm oil crushing**
  ○ Coconut fibre processing
  ○ **Jatrophi plant processing**
• Electric fences
• **Improved warehousing**
• Milk chilling and pasteurisation
• **Chilling for food preservation**
• Fish farms (water circulation)
• **Nurseries – lights to increase growth**
	• Metal workshop
	  ○ **Welding**
	  ○ Drilling & cutting
	  ○ **Lathes and mills**
	• Fridges and freezers
	• **Shop lighting**
	• Local "bar" with colour TV, lighting at night
	• **Barbers**
	• Battery and cell phone charging
	• **Carpentry**
	• Power looms
	• **Sawmills**
	• Handcraft production
	• **Cell phone tower power**
		• Lights
		• **Cell phone charging**
		• Radio
		• **TV**
		• Sewing machine
		• **Grain milling**
		• Community water pumps
			• Refrigeration of medicines and vaccines
			• **Lighting for clinics esp. night births.**
			• Power for medical equipment
			• **Street lighting (esp. for markets)**
			• Education
			  ○ **Lights for night**
			  ○ Power for internet computers, internet, projector
			  ○ **Science equipment**
			• Power for Churches
			• **Water pumps**
			• Sewage pumps

Community Power

Pay-as-you-go domestic lights

- Buy 1 week for $1.50
- 50% cost kerosene/candles
- Includes phone charger
- After 18 mths, unit is owned
- Free lighting OR
- Upgrade 4 lights and radio
- Still $1:50 per week

Gender Issues

No deposit, pay-as-you-go. No credit needed.

Increased access to electricity empowers women through:

- **Decreased time spent on household chores**
- **Reduced water carrying for market gardens (drip-feed irrigation)**
- **Improved health:**
  - Kerosene lamps are major source of indoor pollution and women suffer more respiratory diseases from increased time spent in the home
  - Lighting in health clinics important for all, but especially for women in childbirth. Light is biggest contributor to reduction in maternal deaths.
- **Increased livelihood; set up home-based micro-enterprises:**
  - Grinding; Milling
  - Weaving and sowing
  - Poultry farming and market gardens
- **Solar lights SAVE household money to spend elsewhere**

Funding impact over 5 years

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€10m funding would:

- Install €112m worth of energy systems
- Power 960 villages
- Provide 1.7 million with electricity
- Create/ expand 34,000 micro-enterprises
- Avoid 130,000 tonnes CO_2 emissions
- Reduce Diesel / kerosene imports by 50 million litres

Finance:

• Initial funding	€10m
• Bank debt	€50m
• Private sector investment	€20m
• Income (repayments)	€72m

Thank you

Any Questions?

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Synergies and Mini-Grids

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Our plan is based on each distributed system "paying its way"

- Use synergies to lower costs; create interconnections
- Build mini-grid from bottom upwards – ensures 100% utilisation

Examples

- School (Mon-Fri); Church (Sat-Sun)
- Light in hen house increases eggs by 30%; profits by 50%
- Cell phone charging increases call volume by 20%
- **Cell phone towers need 100% reliability wet season – excess power in dry season, when drip-feed irrigation needs max power but can help towers in wet season, when "irrigation redundant"**
  - Lowers costs, pays for interconnection, and starts mini-grid
- **Street lighting paid by night time market from stallholder fees**

Development Benefits

- Creation of direct installation and maintenance jobs
- Transfer of knowledge and skills in alternative energy
- Creation and growth of local supply chains
- Creation of micro-enterprises
  - Jobs, increased economic activity and improved food production
- Greater productivity through use of evening hours
- Reduced importation of diesel fuel
- Lower CO_2 emissions
- Household lighting systems improve light, help children study, lowers indoor pollution, removes burns risks
- Pay-as-you-go, no deposit allows access by poorest
- Improves economics of rural, off-grid cell phone towers, helping to spread mobiles to poor rural areas, with all the societal and economic benefits
- As a social enterprise, Africa Power will maintain and expand rural power provision for the long term.