SMART VILLAGES:
NEW THINKING FOR OFF-GRID COMMUNITIES WORLDWIDE

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New thinking for off-grid communities worldwide

"There is no doubt that reliable off-grid electricity provision is central to eliminating energy poverty in rural communities in developing countries. However, we believe that it can also stimulate technology leapfrogging and transformational improvements in education, health, economic activity and productivity. In effect, enabling the growth of "Smart Villages" as a sustainable alternative to urbanization." Sir Brian Heap, Smart Villages

STEP 1: Eliminating energy poverty

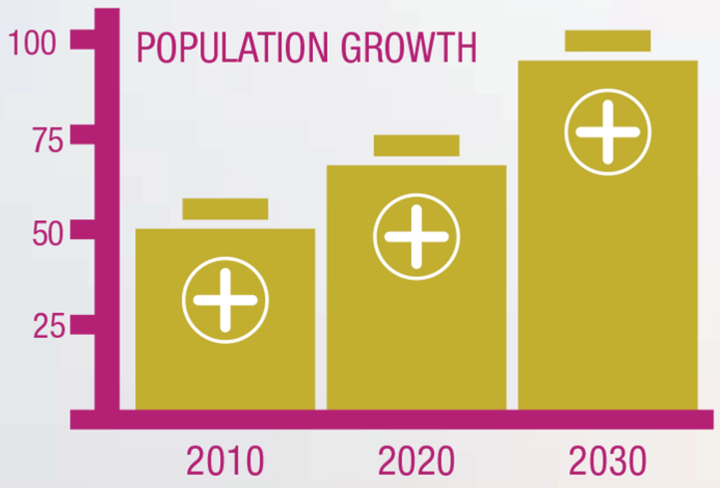
Energy poverty can be defined as:

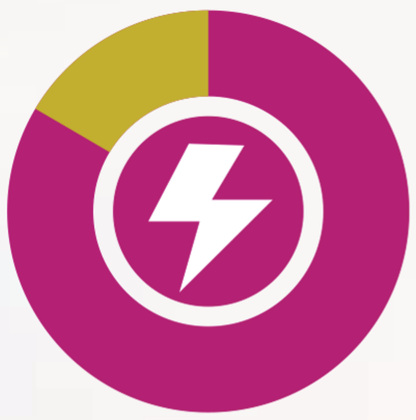
…living on less than $1.15 per day with no access to reliable, safe, and efficient energy for cooking, lighting, space heating and mechanical power…and relying upon harmful energy like biomass-generated fire for cooking and heating (Guruswamy 2011: 140).

Up to 3 billion individuals in the world today suffer from energy poverty

OPPORTUNITY 1 AFRICA

THE NUMBER OF PEOPLE WITHOUT ACCESS TO ENERGY IN SUB-SAHARAN AFRICA IS PROJECTED TO RISE TO 100 MILLION IN 2030.



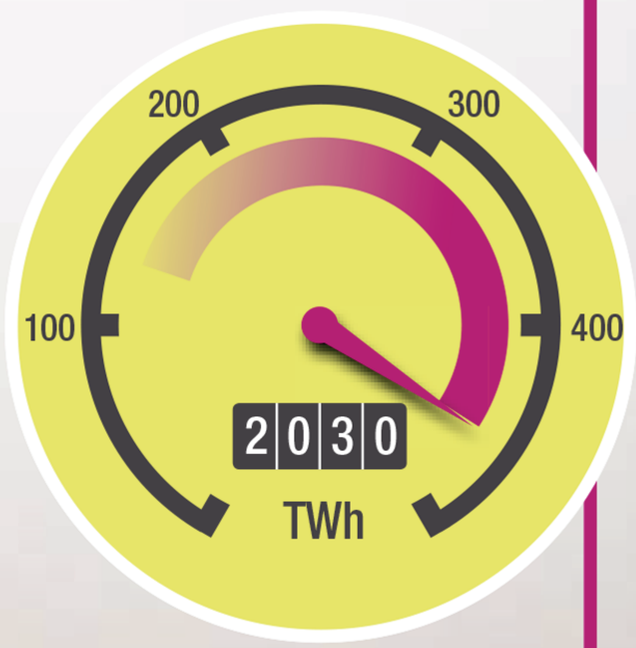


84% LIVE IN RURAL AREAS FAR FROM NATIONAL GRIDS

TRADERS LOSE **16%** OF TURNOVER DUE TO UNRELIABLE ENERGY

2.6 MILLION ARE WITHOUT COOKING FACILITIES

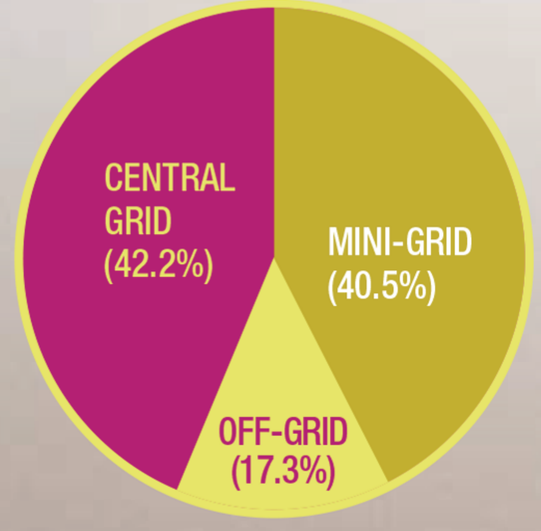
GENERATING CAPACITY NEEDS TO INCREASE 350% FROM 2016 TO 2030 – FROM 132TWh to 462TWh



$49 BILLION

ANNUAL INVESTMENT IS NEEDED IN AFRICA TO ACHIEVE UN 2030 UNIVERSAL ENERGY ACCESS GOAL WHICH IS...

5 x 2009 LEVEL



57% NEEDS TO COME FROM OFF-GRID (17.3%) AND MINI-GRID (40.5%) TECHNOLOGIES AS THE CENTRAL GRID (42.2%) WILL REMAIN INACCESSIBLE TO MANY

NO ACCESS TO ELECTRICITY:

65% OF PRIMARY SCHOOLS

30% HEALTH CENTRES

SMART SUSTAINABLE LOW CARBON POWER ALTERNATIVES CAN DELIVER BUT ARE CHALLENGED BY ABUNDANT FOSSIL FUEL RESOURCES

THE GROWING DEMAND FOR OFF-GRID ENERGY

Providing energy in a bottom-up way instead has a lot to recommend it. There is no need to wait for politicians or utilities to act. The technology in question, from solar panels to low-energy light-emitting diodes (LEDs), is rapidly falling in price. Local, bottom-up systems may be more sustainable and produce fewer carbon emissions than centralised schemes. In the rich world, in fact, the trend is towards a more flexible system of distributed, sustainable power sources. The developing world has an opportunity to leapfrog the centralised model, just as it leapfrogged fixed-line telecoms and went straight to mobile phones.

The Economist

"Low carbon, decentralised energy can reach communities much faster than expanding existing, inefficient central grid systems. And it offers immediate improvements to people's lives. Projections for achieving universal energy access in sub-Saharan Africa acknowledge this potential and assume that just over half the provision will need to be mini and off-grid solutions. Such options will also be more resilient in the face of climate changes."

Green Alliance report

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A general conclusion from this scoping study is that while there are both Government-led and NGO initiatives, village energy provision needs to be higher up Governments' agendas, which tend otherwise tend to take a more centralised view, emphasising large-scale electricity generation and grid extension. Such approaches prioritise urban populations and often offer rural populations little immediate prospect of reliable access to electricity.

Smart Villages MCSC Scoping report 2012

The Tanzanian off-grid experience

Tanzania is the second largest economy in East Africa - yet close to 90% of Tanzanian's live without access to electricity. A large proportion of them rely on expensive and often dangerous energy alternatives, including disposable batteries, charcoal, kerosene and diesel powered generators. Only a minority (10.5%) of the households are connected to the national grid. In remote areas only 2% benefit from electricity use.

Even in areas with grid access, individuals and commercial enterprises many wait months or even years for an individual connection. As a result, many are choosing to source electricity off grid and so the region has become a centre for energy innovation:

BIOGAS

Company: Katani (Sisal) Ltd, based in Tanga, Tanzania is establishing biogas and biofertiliser plants using sisal biomass at its ten sisal plantation factories.

Product: Traditionally more than 95% of the sisal leaf is considered waste. Katani Ltd plans to implement a system of mini-grids through 10 MW of bio-based electricity can be transmitted at low cost.

Impact: Already providing 1,000 families with incomes and electricity through the grid.

HOME SOLAR SYSTEMS

Company: Zara Solar is a small privately owned business of Mr Mohamed Parpia in Mwanza, Tanzania that sells PV. The company employs 5 technicians and has a large network of self-employed technicians with training certification in more rural areas.

Product: The PV solar panels are standard 14 W amorphous silicon and feed into a lead-acid battery. Typically they can power 2 fluorescent lights for about 3 hours nightly.

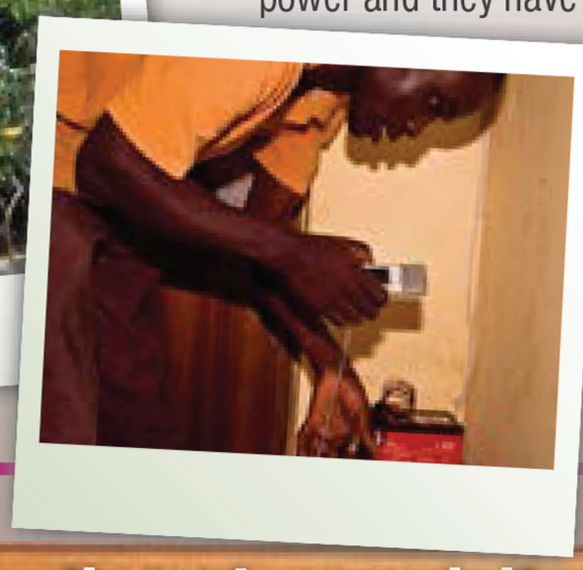
Impact: Now serves over 20,000 households in the region.

BATTERY POWERED 'PORTABLE GRIDS'

Company: EGG Energy (Engineering Global Growth) is creating a 'portable grid' by selling subscriptions to a battery swapping system thus providing low income households and small entrepreneurs with safe, reliable and affordable energy services.

Service: They employ rechargeable batteries, first used in aircraft blackboxes, in an innovative way - as 'the Netflix of batteries'. Their aim is to increase 'last mile connectivity' which refers to the final leg of delivering a connection to an electricity supply.

Impact: Savings upwards of 50% in comparison to diesel generated battery power and they have already connected 2000 households with plans to scale up rapidly and to expand to neighbouring countries such as Malawi or Kenya by 2015.



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