SMART VILLAGES
New thinking for off-grid communities worldwide

THE SMART VILLAGES INITIATIVE

John Holmes, Bernie Jones, and Terry van Gevelt

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TERRAT

TERRAT

- Simanjiro district, Manyara region, Tanzania
- Terrat village (pop. 1,262) and 12 satellite villages (pop. 7,000)
- Pastoralists

TERRAT

- Institute for Orkonerei Pastoralists Advancement (IOPA)
  - Founded by Martin Kariongi in 1993
  - Social venture to address the needs of the community
  - Rural-urban migration
  - Community-driven economic empowerment
  - Bring modern life to the village

TERRAT

- Milk and livestock: an economic opportunity
- Internal study: surplus milk
- Process surplus milk to make higher value dairy products (e.g. cheese, yoghurt, butter and ghee)

TERRAT: MILK PROCESSING

- Electricity
- Water
- Processing units (NGO support)
- Capacity (NGO support)

TERRAT: ELECTRICITY GENERATION

- Three biodiesel generators (300kW)
- 06:30 – 23:30 daily
- Run as a community enterprise
  - Jatropha production and processing
  - Operation and maintenance
- Powers 8 boreholes and 5 processing units

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TERRAT: THE MILK ECONOMY

- Daily processing capacity 1-2,000 litres
- External linkages
- Annual circulation of USD 207,000
- Gender equality and income improvement

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TERRAT: VILLAGE ELECTRIFICATION

- 189 households
- Schools
- Health centre
- Church
- Small enterprises
- A community radio station

TERRAT: DEVELOPMENT OUTCOMES

- Health
- Education
- Productive enterprise
- Quality of life

TERRAT: PRODUCTIVE ENTERPRISE

- Significant cost reductions for existing businesses (e.g. grocery shops, bars, hairdressers, tea rooms, mobile charging)
- Expansion of business activities and diversification of economic activities (welding, carpentry, internet centres)
- More jobs!

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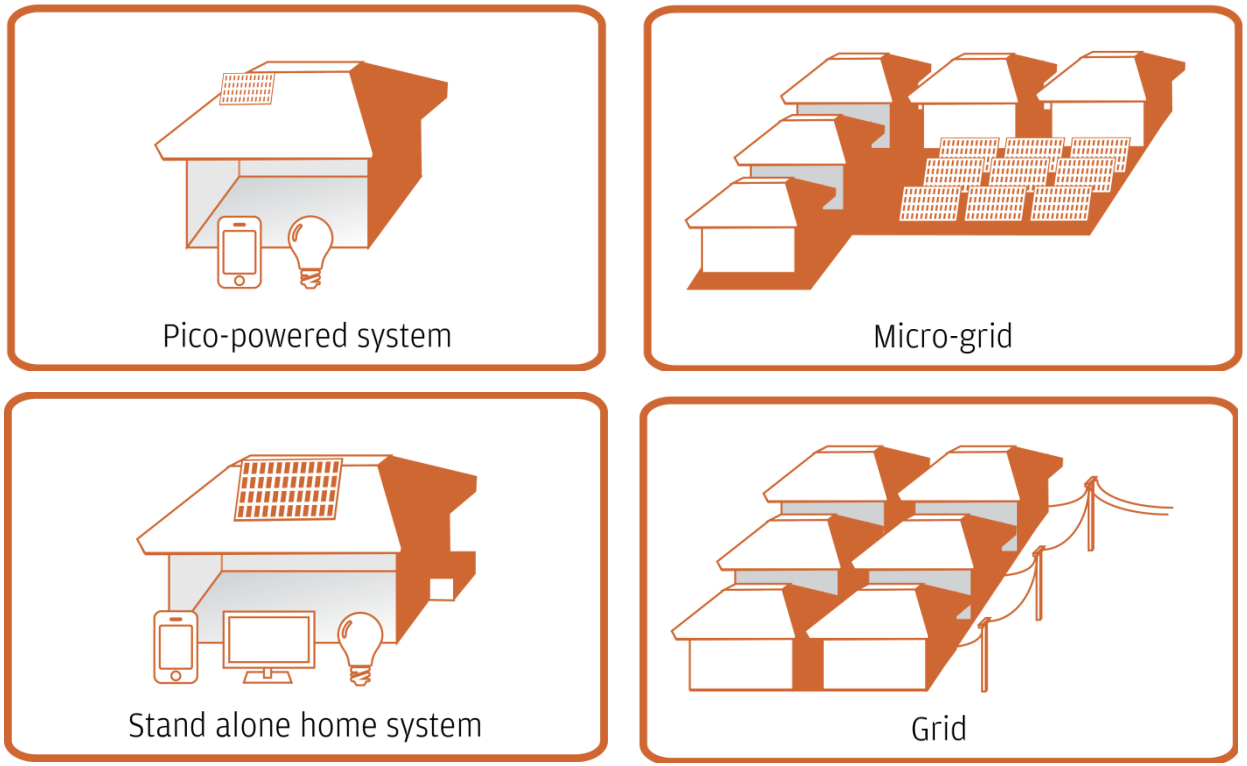
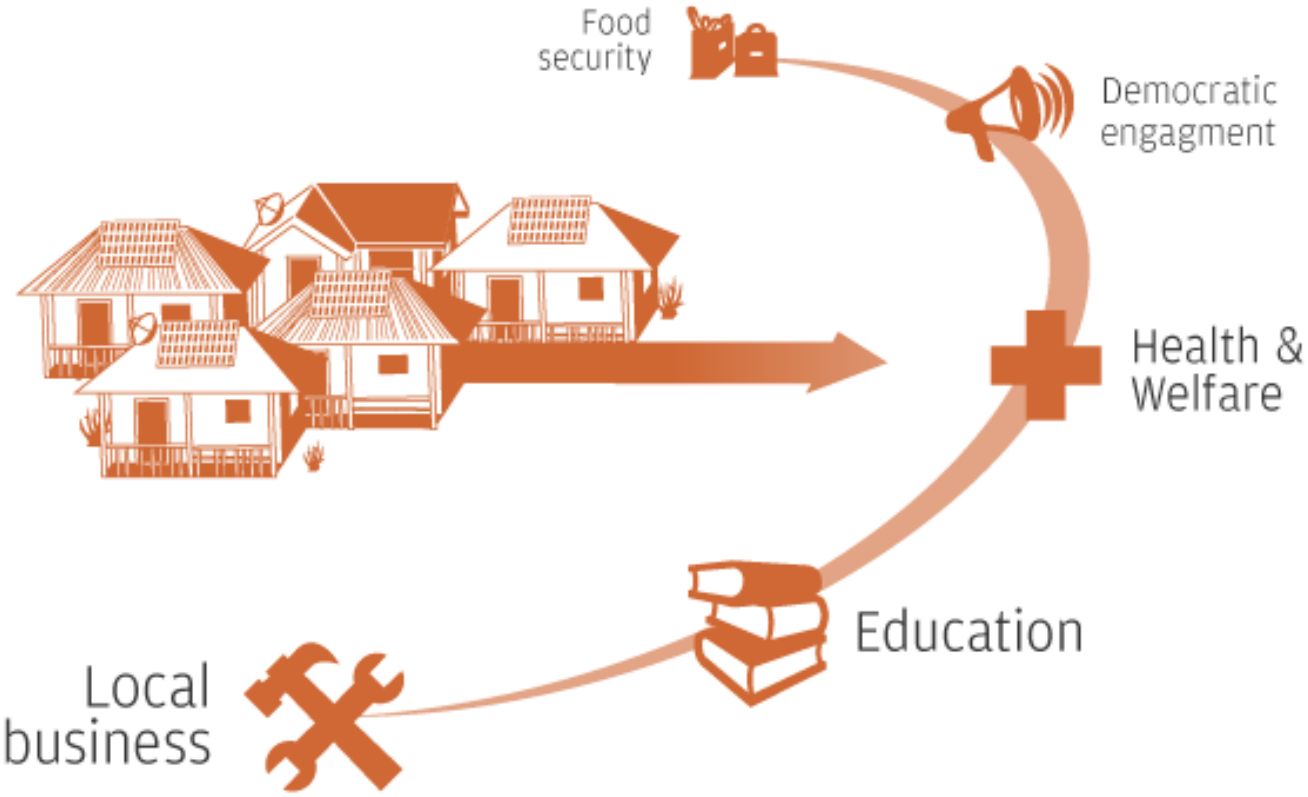
RURAL ELECTRIFICATION



Technology	Generation capacity (kW)	Energy sources	Services available	Estimated economic cost
Pico-power systems	0.001 – 0.01	Hydro, wind, solar	Lighting, radio communication reception, two-way mobile communication	US$ 10-100
Stand-alone home systems	0.01 – 1	Hydro, wind, solar	Same as above plus additional lighting and communication, television, fans, limited motive and heat power	US$ 75 – 1,000
Mini-grids	1 - 1000	Hydro, wind, solar, biomass; diesel; hybrid combinations	Same as above plus enhanced motive and heat power, and ability to power community-based services	Medium-large capital cost, low marginal cost to end-user
Regional grid connection	1000 - 1000000	Gas, hydro, wind, solar PV, biomass	Assuming high quality of connection, same as above up to a full range of electric power appliances,commercial and industrial applications	Medium-large capital cost, low marginal cost to end-user

Source: based on Alstone et al. (2015:309) and Kempener et al. (2015:6)

INTEGRATED RURAL DEVELOPMENT



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Focus: pico -systems, stand-alone home systems, micro-/mini-grids

Policy advice: an insightful, 'view from the frontline' of the challenges of village energy provision for development, and how they can be overcome

Approach: bring together the key players: villagers, entrepreneurs, academics, NGO's, financers, regulators and policy makers etc:

- What are the barriers?
- How can they be overcome?
- What messages to funders and policy makers?

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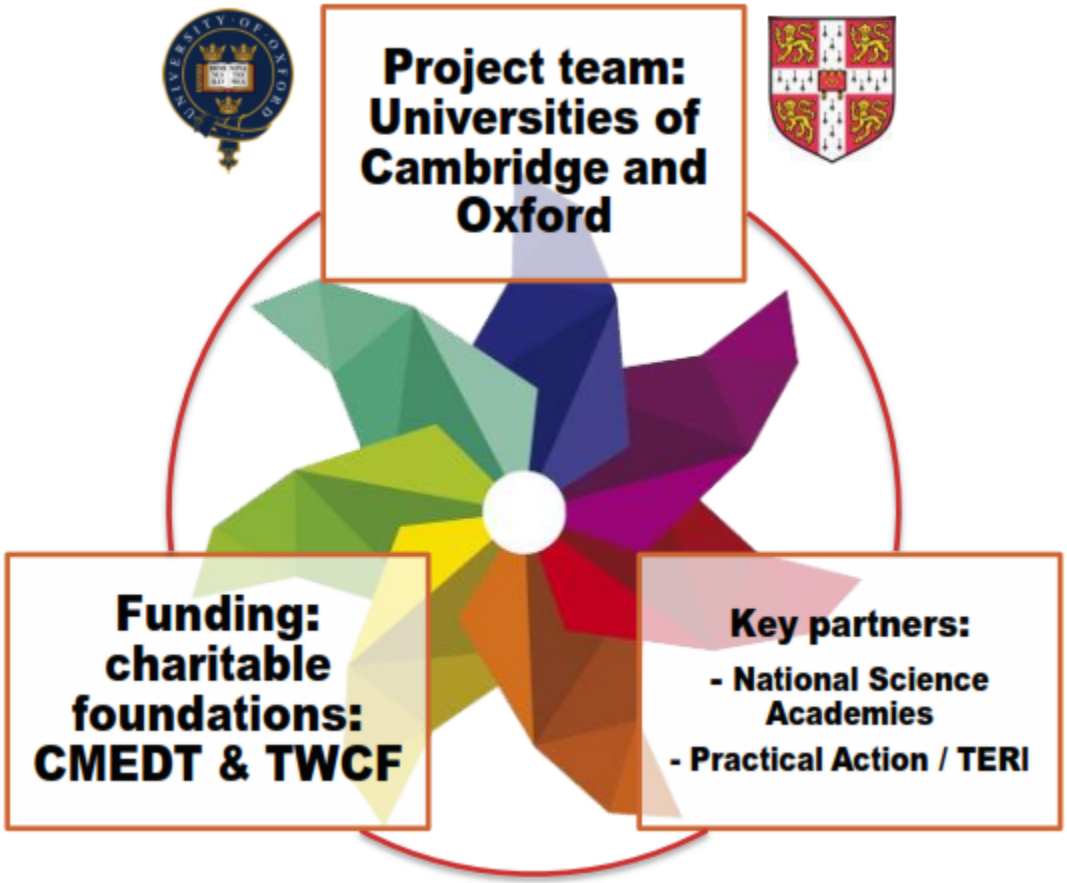

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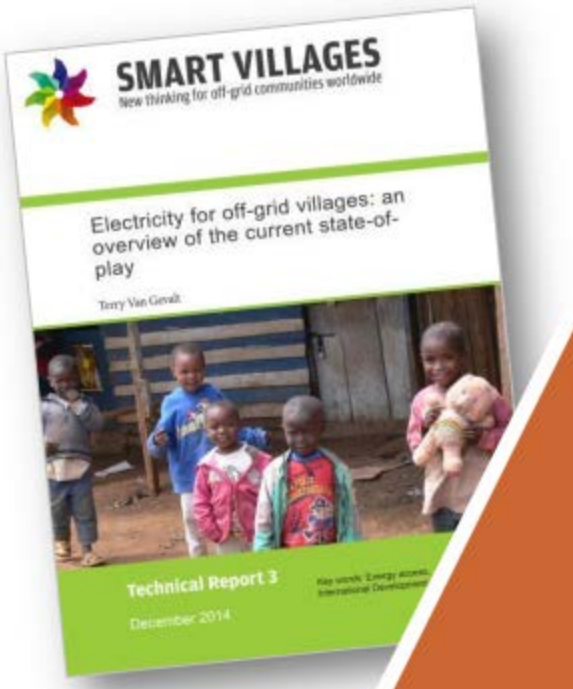
OUR ACTIVITIES



Six international workshops

Forward-look workshops

Entrepreneurial competitions

Case study documentation

Impact evaluations

Technical reports

Policy briefs

Edited books

Final workshops

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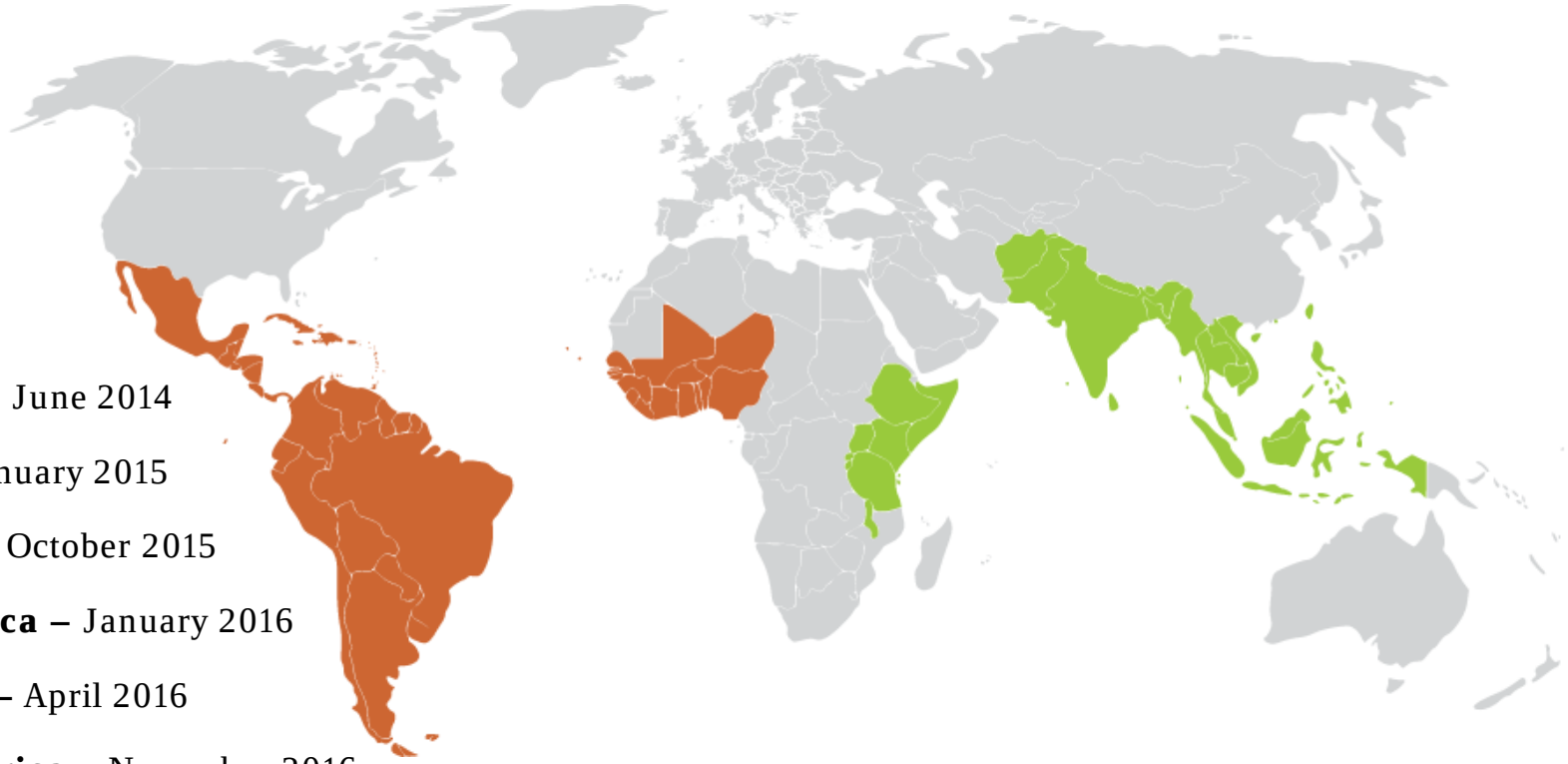
CORE COMPONENT: IN-COUNTRY WORKSHOPS



- **East Africa –** June 2014
- **SE Asia –** January 2015
- **South Asia –** October 2015
- **South America –** January 2016
- **West Africa –** April 2016
- **Central America** – November 2016

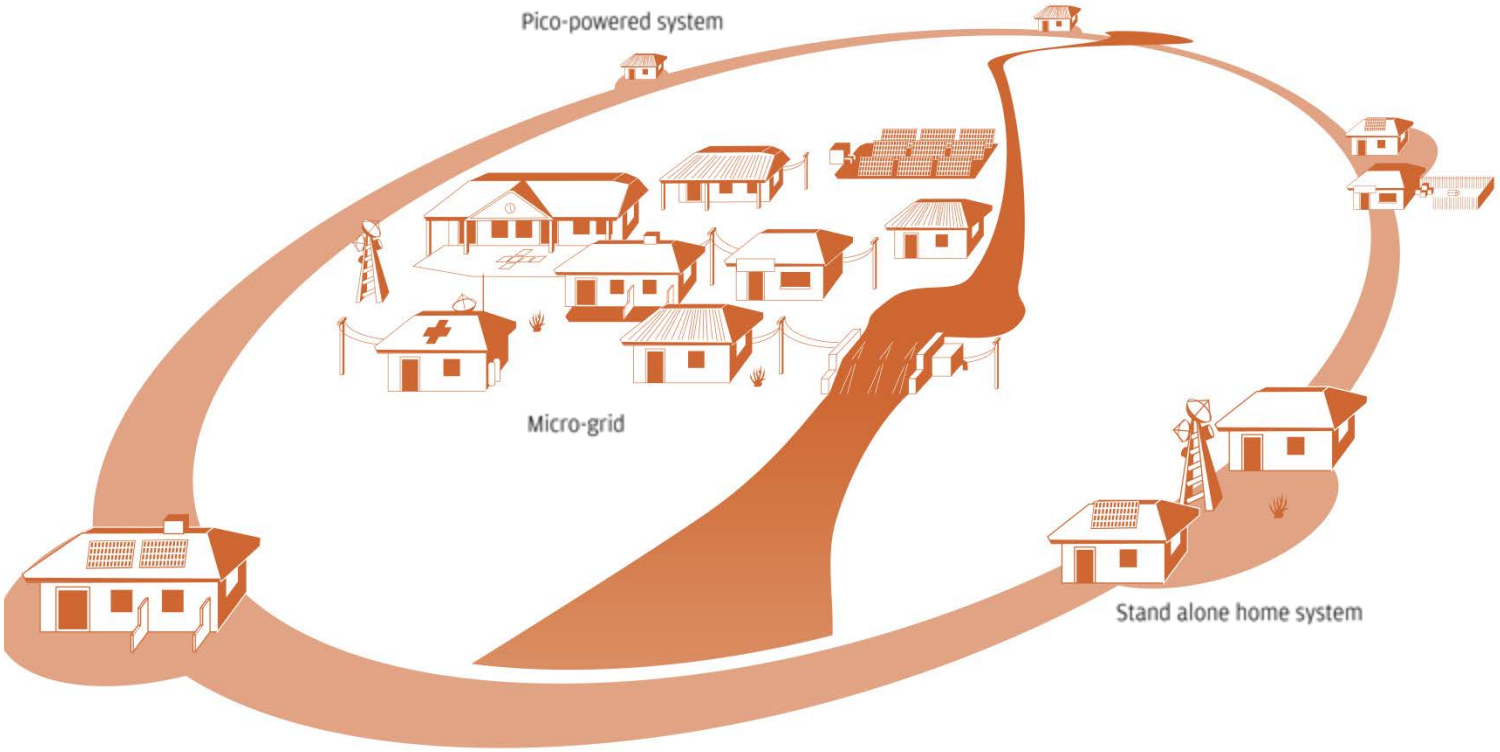
WORKSHOP FINDINGS

- Pico- and stand-alone home systems
  - Reached a ‘tipping point’
  - Constrained by distribution networks, working capital, standards, past or parallel government and donor initiatives
  - Recycling

WORKSHOP FINDINGS

- Mini-grids
  - Search for scalable business models
  - Access to affordable finance
  - Hybrid ownership models
  - Productive enterprise development
    - External value-chain linkages
    - Complementary infrastructure

HUB-AND-SPOKE MODEL



WORKSHOP FINDINGS

- Community engagement and local champions
- Sensitivity to energy needs and development pathways
- Punitive policy and regulation
- Holistic approach (public, private, community)
- Integration with other development initiatives

WORKSHOP RECOMMENDATIONS

- A platform for knowledge sharing
- Case studies (including failures!)
- Impact evaluations
- Applied research
- Public sector funded datasets on RE potential

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Thank you for your attention

www.e4sv.org | info@e4sv.org | @e4SmartVillages