

# Decentralised Off-Grid Electricity Generation and the Poor

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# Access to Electricity

- Estimated 1.6+ billion without access to electricity
- The without are in rural and urban areas
- Success stories with liberalised electricity systems
- Still struggling, mainly South Asia and sub-Saharan Africa
  - Zambia
  - Botswana
  - India

# Liberalisation of Conventional Electricity Markets

- The model and its effects
  - freeing up public funds
  - facilitating public-private partners
  - exposing niches
  - environmental concerns

# Generation and Competition

Monopoly	Purchasing Agency	Wholesale Competition	Retail Competition
Monopoly in generation, transmission and distribution	Competition in generation – single buyer.	Competition in generation - Spot market or pool. Choice for distribution companies.	Competition in generation - Spot market or pool. Choice for distribution companies.
No choice for retailers	No choice for retailers	Choice for retailers.	Choice for retailers.
No choice for end- consumers	No choice for end- consumers	No choice for end-consumers.	Choice for end-consumers.

# What is the Rural Electrification Problem?

- We know what rural electrification is supposed to do
  - improve opportunity for education
  - improve health
  - improve income generation
- We know the constraints
  - dispersed and poorer communities
  - often remote and inaccessible
  - poor quality supply where exists
  - limited effect on income generation

# Finding Solutions

- Technologies available
  - gas turbines
  - reciprocating engines
  - micro turbines
  - photovoltaic
  - wind
  - fuel cells
  - small hydro/other renewables
- Public policy commitment
- International aid
- Private investment

# Solution is Complex

- Fit for purpose
  - idea of staged reform
- Business models accounting for context, technology and socio-economic factors
- Scaling-up
  - EPSRC funded research – 2009-2014
  - University of Dundee
  - The Energy Resources Institute
  - University of Manchester
  - University College London