

Executive summary

Speaking truth to power

Why energy distribution, more than generation, is Africa's poverty reduction challenge

Ryan Hogarth and Ilmi Granoff

May 2015



OXFAM

Overseas Development Institute

203 Blackfriars Road
London SE1 8NJ

Tel. +44 (0) 20 7922 0300
Fax. +44 (0) 20 7922 0399
E-mail: info@odi.org.uk

www.odi.org
www.odi.org/facebook
www.odi.org/twitter

Readers are encouraged to reproduce material from ODI Reports for their own publications, as long as they are not being sold commercially. As copyright holder, ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI.

© Overseas Development Institute 2015. This work is licensed under a Creative Commons Attribution-NonCommercial Licence (CC BY-NC 3.0).

Cover photo: EEP Energy and Environment Partnership Programme - EEP Southern and Eastern Africa.

A vast number of people in sub-Saharan Africa live in energy poverty. Over two-thirds of the region's population, 620 million people, lack access to electricity – a number almost twice that of the population of the United States. Four-fifths, or 750 million people, lack access to clean and modern methods of cooking their food – a number equivalent to the entire population of Europe (IEA, 2014). Around 65% of primary schools and over 30% of health facilities in sub-Saharan Africa also lack electricity (Practical Action, 2014).

Not surprisingly, energy poverty is a major theme on the international development agenda. Given the scale of the problem, many are calling for a dramatic scale-up of the region's power generation capacity. World Bank president Jim Kim has gone so far as to call Africa's energy gap 'energy apartheid'.

It is true that Africa has far less energy supply, particularly of power generation, than any other continent. However, evidence indicates that even dramatically expanding such supply will leave many in energy poverty. Even the International Energy Agency's (2014) ambitious scenario for expansions in Africa's power supply leaves 530 million individuals in the region without electricity in 2040 and 653 million without modern cooking services.

The reason is that most investment in power generation in Africa is not geared towards serving the basic energy needs of the poor; it is rather geared towards

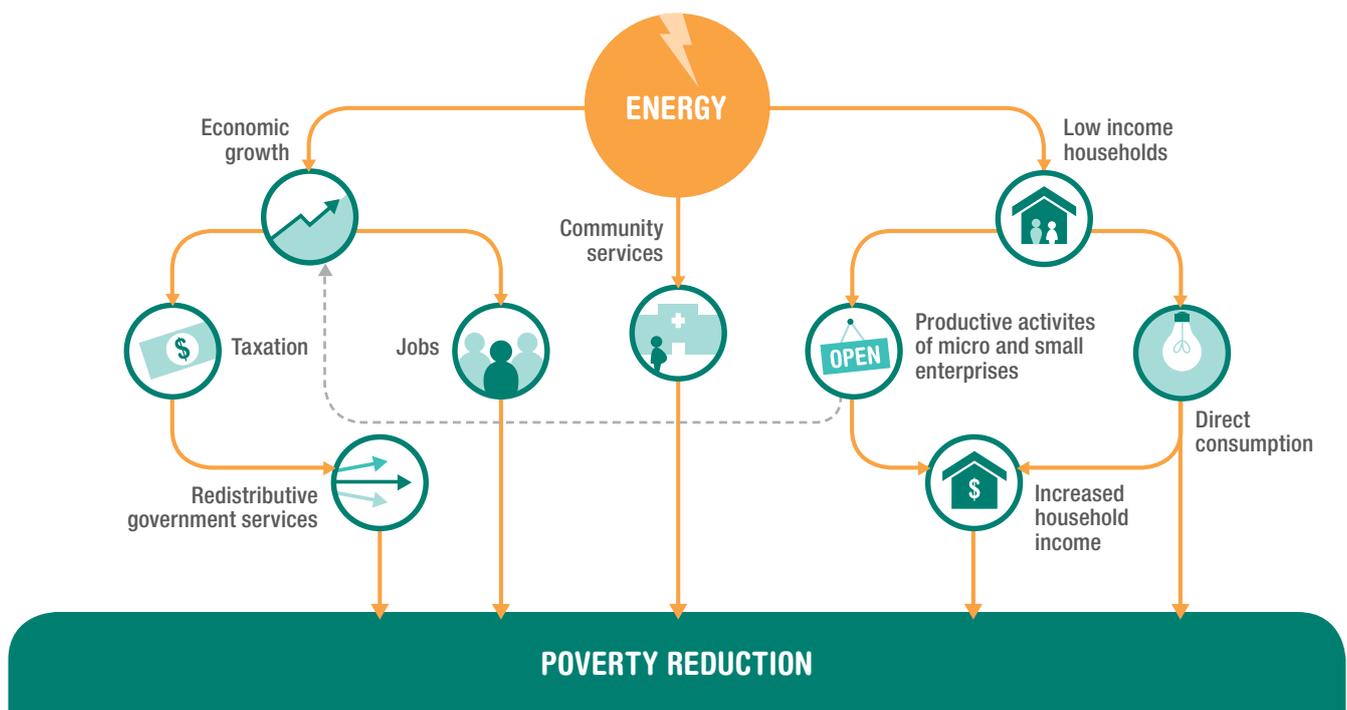
industrialization and the rising demands of existing consumers. In fact, two-thirds of the energy investment in Africa is devoted to producing energy for export. Approximately half of current electricity consumption in Africa is used for industrial activities – mostly mining and refining (IEA, 2014).

The 'energy access gap' – the number of people without access to modern energy services – is largely distinct from the 'industrial energy gap' – the massive gap between installed electricity generation capacity in the industrialised and unindustrialised world. Greater ambition to close the industrial energy gap will not necessarily resolve the broader energy access gap.

This paper revisits the roles that energy plays in poverty reduction. First, while energy does not reduce poverty itself, it delivers *energy services*. These services can improve poor people's welfare both directly by enhancing their own productivity, education and health, and indirectly by changing the economy around them. The paper provides a simplified framework for thinking about these energy services, and then reviews the literature on their importance to poverty reduction (see Figure A).

From this framework, we draw a series of three important conclusions about energy priorities and their implications for poverty reduction and development.

Figure A. Energy's pathways to poverty reduction

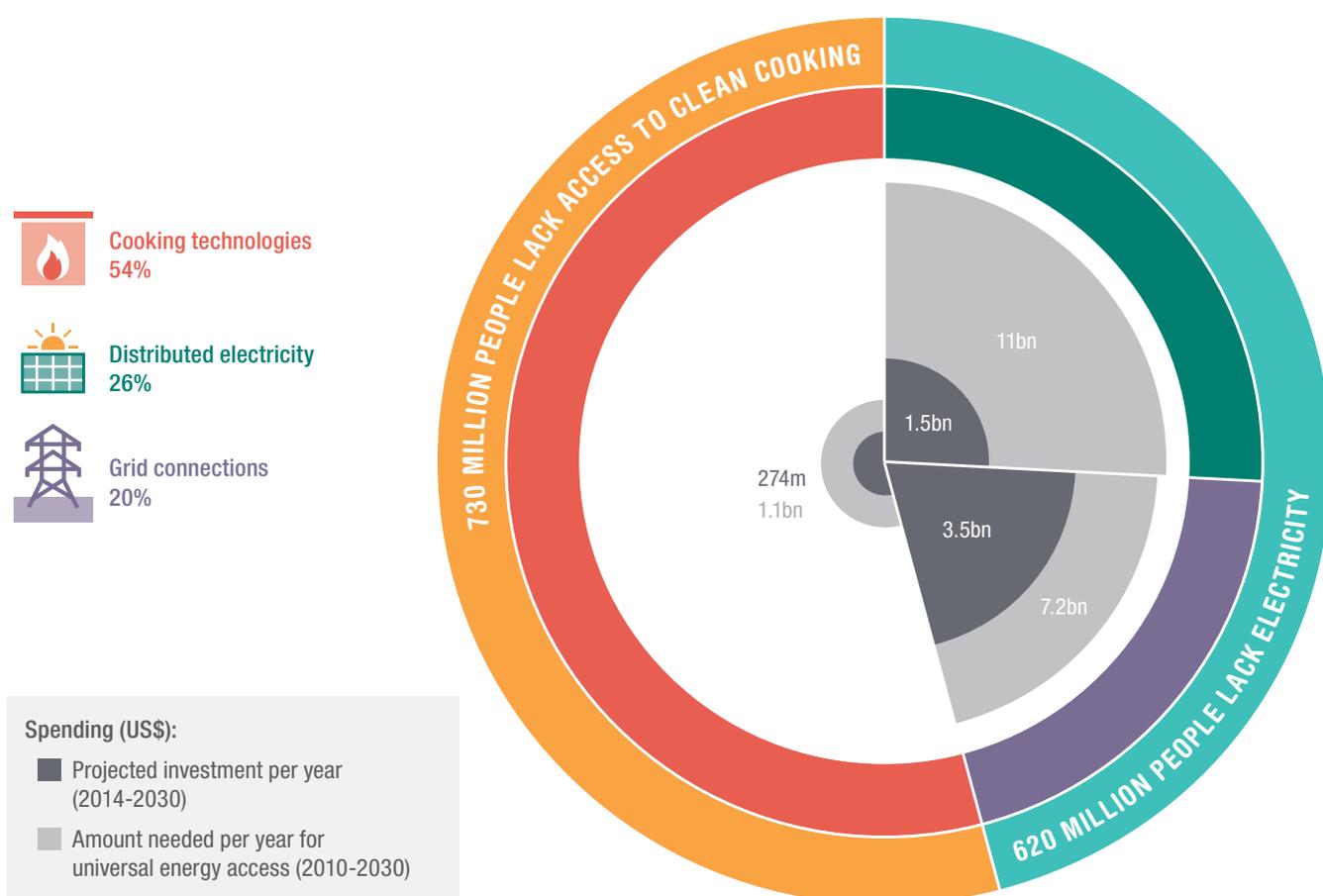


1. Tackling energy poverty will have less to do with ambitious expansion of electricity capacity, and more to do with ambitious distribution of energy services to poor people

At its most technical level, energy access means delivering energy to households above a base threshold. The lack of modern cooking services accounts for the largest share of incidences of energy poverty (see Figure B), and addressing that lack has the clearest and most immediate benefits for human welfare (Bailis, Ezzati, & Kammen, 2005; WHO, 2014). Policies that promote and underwrite access to improved cookstoves and fuels, for example, will be the most important for delivering modern cooking services. For this aspect of energy access, electricity supply will play a minimal role in their delivery (World Bank, 2008). Figure B also shows that cooking technologies, while not expensive, face a significant shortfall in the investment needed to achieve universal access to households. Delivering electricity services to households also generates rapid and immediate poverty reduction, as does the delivery of such services to schools, primary health clinics,

and micro- and small-scale business enterprises (Pueyo, Gonzalez, Dent, & DeMartino, 2013; World Bank, 2008). For each of these end-users, easily distributed energy technologies, even if they deliver relatively small amounts of electricity, are frequently the most cost-effective options for securing access to those services most important to poor people (Practical Action, 2014; Szabó, et al., 2011; USAID, n.d.). Figure B shows that a smaller proportion of the total incidences of energy poverty would be most cost-effectively treated through grid connections. More than 2.5 times additional investment is required to secure energy access through distributed systems than energy access through grid connections (IEA, 2011). Incremental increases in poor people's access to energy services reduce poverty and improve lives. If there is anywhere that 'energy apartheid' can be said to exist, it is the absence of basic energy services for very poor people. Closing this energy access gap will require ambitious investment in distributing energy services to households and communities.

Figure B: Incidences of energy poverty in sub-Saharan Africa and the technologies and investment needed to secure universal access



This figure breaks down incidences of energy poverty and the technologies and investment needed to treat each incidence. Many households will suffer from both forms of energy poverty, but households with clean cooking will still need electricity (and vice versa).

2. Expansion in centralized power generation serves industry, the services sector and already-connected households, before it serves the poor.

Greater centralised generation is necessary to enable energy services that are valuable for industrialization. Powering industrial growth has the potential to reduce poverty through employment, and through greater government revenue, but its track record in doing so in Africa is mixed. A long chain of transformations must take place to ensure that the benefits of industrial growth reach poor people effectively. The dominance of the extractive sectors in Africa's industrial growth makes this all the more challenging (IEA, 2014). Extractive industries have a weaker track record than other forms of industrial growth, such as manufacturing, in catalyzing poverty reduction. In fact, Africa's energy input into non-industrial sectors like services and agriculture has historically produced more jobs than when input into industry (Practical Action, 2012).

It also cannot be assumed that the energy services most important to poor people would be delivered as a by-product of ambitious expansions in electricity generation capacity, or even the expansion of both generation capacity and electrification. Even in communities that gain access to the electricity grid, connection tends to occur regressively: poor households often remain without electricity for years, even decades, as they are unable to afford the connection charges (World Bank, 2008). Hence, the challenge is not predominantly the technical one of radically expanding the generation capacity; it is orienting policy to deliver electricity to those who need it most.

High 'ambition' to close the industrial energy gap risks neglecting the formidable policy task of providing energy access to all. Ambition is not merely about the number of megawatts installed, but the number of people reached.

3. Distributed, clean energy interventions are best suited to tackling energy poverty – and poverty more generally.

Many of the services that are important for poverty reduction would be most cost-effectively fulfilled by lower carbon technologies. Wherever the harvesting of biomass is unsustainable, a shift to more efficient biomass stoves, kerosene or LPG will tend to represent a reduction in greenhouse gas emissions (Bailis, et al., 2005). Moreover, most households, schools, clinics, and micro- and small-scale enterprises located away from the electricity grid will best gain access through distributed renewable energy technologies. Solar photovoltaic (PV), wind, biomass, and micro-hydro would be the most cost-effective option for between 67.1 and 75.4% of off-grid and mini-grid household connections (IEA, 2014; Scott, forthcoming; Szabó, et al., 2011). These technologies solve some of the core delivery problems of getting key services to poor people.

For the electricity poor that will gain access through the grid, large-scale renewable technologies can easily meet this demand. Distribution will remain the challenge. Evidence suggests that large-scale renewable technologies can help to close the industrial energy gap. While closing this gap will be less useful to delivering energy access and energy services to the poor, their contribution to increased centralized capacity is important.

References

- Bailis, R., Ezzati, M., & Kammen, D. (2005). Mortality and Greenhouse Gas Impacts of Biomass and Petroleum Energy Futures in Africa. *Science*, 308(5718), 98-103.
- IEA (2011). *World Energy Outlook 2011: Energy for All*. Paris: International Energy Agency.
- IEA (2014). *Africa Energy Outlook - A focus on energy prospects in sub-Saharan Africa*. Paris: International Energy Agency.
- Practical Action (2012). *Poor people's energy outlook 2012: Energy for earning a living*. Rugby, UK: Practical Action Publishing Ltd.
- Practical Action (2014). *Poor people's energy outlook 2014*. Rugby, UK: Practical Action Publishing Ltd.
- Pueyo, A., Gonzalez, F., Dent, C., & DeMartino, S. (2013). *The Evidence of Benefits for Poor People of Increased Renewable Electricity Capacity: Literature Review*. Brighton: Institute of Development Studies.
- Scott, A. (forthcoming). *Building electricity systems for growth, access and sustainability in Africa. Background paper for the Africa Progress Panel 2015 report: Climate change - an agenda for Africa's future*. London: Overseas Development Institute.
- Szabó, S., Bodis, K., Huld, T., Pinedo, I., Tromboni, U., & Moner-Girona, M. (2011). *Energy options in rural Africa: solar and diesel distributed systems vs grid extension*. Ispra: Joint Research Centre, European Commission.
- USAID (n.d.). *Powering Health: Electrification options for rural health centers*. Washington, DC: United States Agency for International Development.
- WHO (2014). *Burden of disease from household air pollution for 2012*. Geneva: World Health Organization.
- World Bank (2008). *The Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits. An IEG Impact Evaluation*. Washington, DC: World Bank.

ODI is the UK's leading independent think tank on international development and humanitarian issues.

Readers are encouraged to reproduce material from ODI Reports for their own publications, as long as they are not being sold commercially. As copyright holder, ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI.

© Overseas Development Institute 2015. This work is licensed under a Creative Commons Attribution-NonCommercial Licence (CC BY-NC 3.0).

All ODI Reports are available from www.odi.org

Oxfam is a global organization working to right the wrongs of poverty, hunger, and injustice. We save lives, develop long-term solutions to poverty, and campaign for social change. We are an international confederation of 17 members working together in more than 90 countries to create lasting solutions.

Cover photo: EEP Energy and Environment Partnership Programme - EEP Southern and Eastern Africa.

Overseas Development Institute
203 Blackfriars Road
London SE1 8NJ
Tel +44 (0)20 7922 0300
Fax +44 (0)20 7922 0399

www.odi.org



OXFAM