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Electricity for All – a Driver for Development in Africa?

Large-scale investments in grid roll out to rural Africa have only a weak impact on income, health and education; benefits do not reach the poor

More than 1.1 billion people in developing countries lack access to electricity. Based on the assumption that electricity is a prerequisite for economic development, the UN has proclaimed the goal of providing electricity to all by 2030. This will cost an estimated 640 billion USD. New empirical evidence, however, shows: Effects on income, health and education in newly connected communities are low. Moreover, the poorest households are lacking funds to get connected. This calls for a stronger focus on electrification through low-cost off-grid technologies, which could improve the cost-benefit balance.

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MAIN FACTS

Economic development is expected to be hampered without electricity. However, the evaluation of a large-scale rural electrification program in Rwanda shows: Positive effects of electrification on business activities are weak.

On-grid electrification facilitates everyday activities, but electricity usage levels remain low. The demand could also be satisfied with lower cost off-grid solar.

Because the poor cannot afford the investment either way, subsidies are required, but considerably less so for off-grid electrification.

Why does rural electrification play an important role in current development policy?

More than 1.1 billion people in developing countries lack access to electricity. Some 590 million of them live in Africa, where the rural electrification rate is at only 14%. It is often hypothesized that lacking access to electricity hampers development. The absence of modern lighting restricts productive activities after nightfall, but also educational and recreational activities. Based on such assumptions, the United Nations (UN) are pursuing the goal of universal access to electricity by 2030 via their initiative "SE4All", as it is also reflected in ***Sustainable Development Goal 7.*** The investment requirements are enormous – according to the OECD an additional 640 billion USD till 2030. Sub-Sahara Africa alone would require annual investments of 19 billion USD. In comparison: The total official development assistance influx to Sub-Sahara Africa is 42 billion USD per year.

What are the differences between on-grid and off-grid electrification strategies?

The two most promising ways to provide rural African households with electricity are extending the grid infrastructure and disseminating off-grid solar. Even though an on-grid connection provides much more power, studies in rural Africa have shown that usage levels of connected households remain low. Electricity is mainly used to operate low-power devices like lamps and mobile phone chargers. This demand could also be met by solar kits. The investment costs differ immensely: While for on-grid electrification in rural areas they amount to at least something between 750 and 1500 USD per connection, retail prices of solar kits start at 20 to 30 USD and reach typical service levels of rural households at 200 USD.

Is the UN's hope for positive development effects induced by universal electricity access justified?

Up to now, little evidence exists on socio-economic impacts of electrification in Africa. A new study by RWI presents first insights into the causal effects of one of the largest on-grid electrification programs of the world, the Rwandan Electricity Access Roll-Out Program. It finds that the number of connections increases considerably, but even in grid-covered areas 30% of households remain unconnected. This is not due to a lack of interest but to affordability reasons: the poorest cannot pay for the upfront connection fee. While electricity facilitates everyday activities and reduces daily energy expenditures, there is only weak evidence for impacts on poverty indicators such as income generation, health, and education. In regard to business activities, the study finds only a modest increase. The main limiting factor remains the lacking access to supra-regional markets.

Sources:

Lenz, L., A. Munyehirwe, J. Peters and M. Sievert (2017), Does Large Scale Infrastructure Investment Alleviate Poverty? Impacts of Rwanda's Electricity Access Roll-Out Program. World Development 89: 88-110. (earlier version published as Ruhr Economic Paper #555. http://www.rwi-essen.de/media/content/pages/publikationen/ruhr-economic-papers/rep_15_555.pdf

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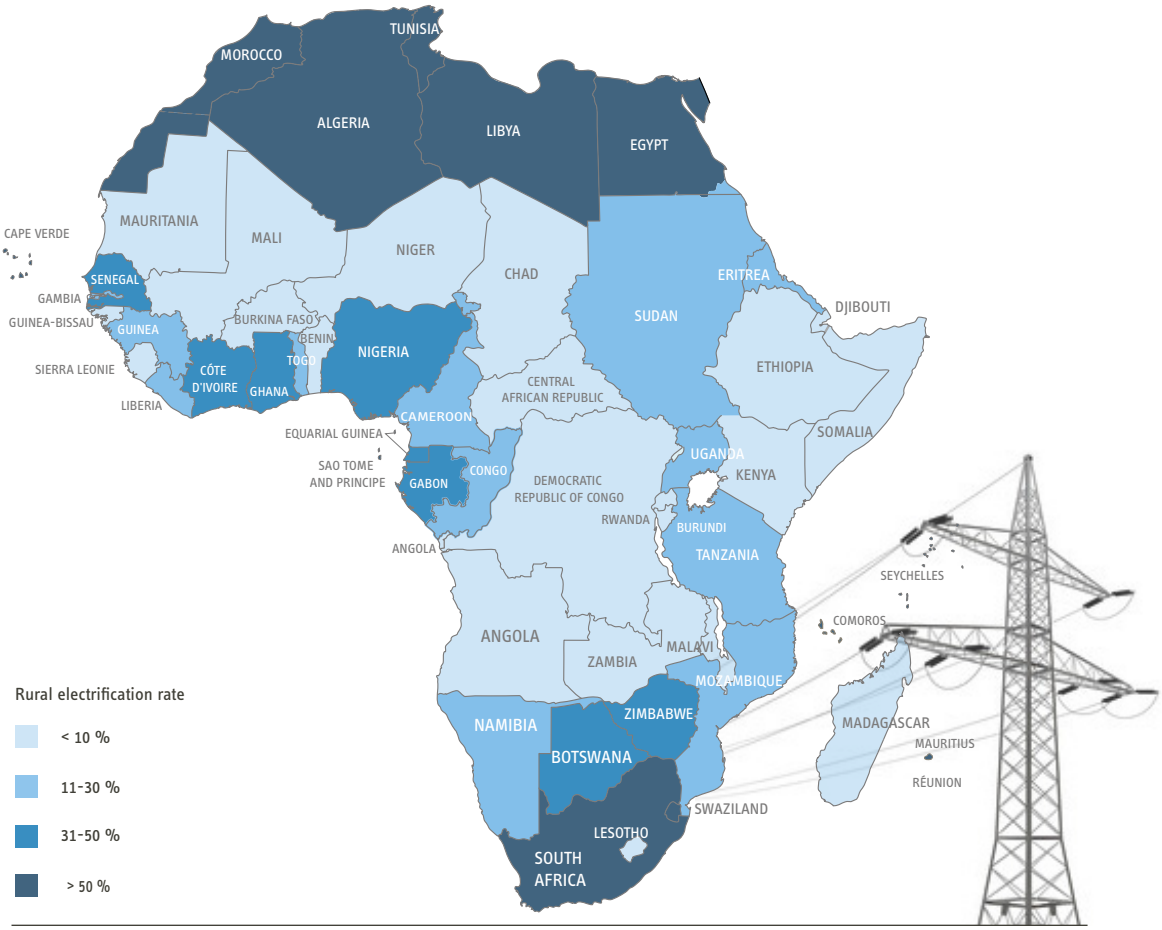
Electrification Rates in Rural Africa



Sources: World Energy Outlook database.

Policy Recommendations

- In order to achieve the universal access goal, electrification has to be complemented by additional measures, because the poorest strata in rural Africa will not be able to afford the connection fee or the investment into off-grid solar. Specifically targeted subsidies could help remedy the low uptake-rate among the very poor.
- Cost-benefit analyses should compare on-grid and off-grid electrification strategies for different target regions, since empirical evidence indicates that there is an extremely low demand for electricity beyond basic usage levels.

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