Killing two birds with one stone: Decentralized renewable energy systems for energy transformation and rural electrification

Goldammer, Kathrin
Managing Director RLI, Reiner Lemoine Institute (RLI), Germany,
kathrin.goldammer@rl-institut.de

A reliable energy supply is the basis for health, education and new perspectives in economic growth and societal development. An energy transition towards renewable energies with universal access to energy is thus the key to the future development of many countries in sub-Saharan Africa and South-East Asia. There, energy access is especially underdeveloped in rural areas.

In our work we show a way of combining electrification schemes with energy transformation efforts. This allows leap-frogging centralized, carbon-intensive power supply systems and reaching a renewable and decentralized electricity system ensuring universal access to electricity. We have selected the case study of Nigeria to discuss details of this transformation process. Within the Nigerian Energy Support Program (NESP) Project é financed by the European Union and Germany é we developed five least-cost geospatial rural electrification plans for five federal states of Nigeria. These plans show similar patterns even though the conditions in the different states vary greatly. The patterns we discovered are:

- Before extending the central grid, on-grid power generation needs to be strengthened. The reason is that frequent power outages currently lead to the implementation of inefficient and highly polluting back-up infrastructure for grid-connected customers which are otherwise obsolete.
- In order to electrify rural areas during the time when the central infrastructure is still weak, off-grid electrification by mini-grids or stand-alone systems should be encouraged. Support is needed through policies, regulations, new business models etc.
- Merging on- and off-grid efforts to one optimized energy supply system combines the advantages of decentral and local power generation with the economies of scale of the central grid system. This means that decentral power generation allows local value creation and use of renewable energy technologies which is combined with balancing effects of interconnected systems.

With this contribution we want to encourage discussions on how to combine electrification and transformation efforts in different developing countries worldwide. The ICSD serves as the perfect platform to reach out to international experts engaged in trans-disciplinary dialogue.