

# Power to Africa!

## Exploring the continent's alternative sources of energy.

When it comes to energy, Africa is a land of extremes. With almost one half of Africans lacking regular access to modern electricity services, it is by far the most underserved continent. Some Africans who do have access pay amongst the highest power prices in the world, while others pay amongst the lowest, often as a result of heavy subsidies from their governments. On average, electricity tariffs are much higher in Africa than in other developing regions, with enormous undesirable social and economic consequences. And the situation is getting ever more challenging: energy demand in Africa is projected to almost double over the next 20 years while globally, it will grow by less than one third.

By Alexander Ochs

**T**here are several reasons for Africa's persistent energy crises. On a first most obvious level, insufficient power supply results from a lack of generation which itself stems from an insufficient capacity to produce power. But why then are no investments made to increase installations for power production, transmission and distribution?

Many African countries face challenging geographic conditions, with significant portions of their population living in remote,

often hard-to-reach areas. Extending the grid to them is costly and the rate of return on investment is minimal from a utility's perspective, taking into account the limited demand and ability to pay of prospective customers. People in such areas, therefore, are often left to rely on traditional fuels for cooking, such as wood or animal dung, as well as candles and kerosene lamps for lighting. Where electricity is available, it is still mostly produced from small installations powered by fossil fuels, such as diesel generators, the most expensive means for generating electricity.

But even in grid-connected areas across the African continent, the power supply can be unreliable – and unaffordable for many citizens. This includes countries where fossil fuels are available: Algeria, Libya and Nigeria

have significant natural gas and oil reserves; Egypt at least has the former, and South Africa has one of the world's largest reserves of coal, however, most African countries lack these resources. Even where these resources exist, their use has not led to the expected social gains for a majority of the population, despite the hazardous environmental and health impacts that had to be expected.

Africa cannot disregard climate change threats that it faces through the burning of fossil fuels. Africa's energy system is socially and economically unsustainable, even where power lines exist and whilst taking such climate change threats into account. Due to its high exposure, existing stresses such as poverty, food insecurity, water scarcity, political conflicts, and ecosystem degradation,



and its low adaptive capacity, Africa can be seen as Earth's continent most vulnerable to climate change.

Climate variability is projected to severely compromise agricultural production in many parts of Africa. Droughts and inland flooding will very likely increase and sea-level rises will affect low-lying coastal areas including such with large populations. Whole ecosystems and the biodiversity that can be found in them are at a severe risk. Malnutrition, malaria and other vector-borne diseases already threatening many Africans, can be exacerbated by climate change.

The dire impacts of climate change are already felt. This does not stop short of the electricity sector. In the African countries that do not – mostly or exclusively – run on fossil fuels, power is usually generated from

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hydroelectric river dams. Here, both poor rainfall or heavy flooding often leads to power disruptions. Both weather extremes have become more frequent and intense in many places through the impacts of climate change. Exacerbated by climate change, extreme, uneven and difficult-to-forecast weather events add up to the cost of generating and transmitting electricity.

If business-as-usual – an expansion of the existing energy system based on fossil fuels – is not a viable option, what is? My position distinctly differs with a number of commentators. I do not consider nuclear energy a viable option (for Africa or any other part of the world), despite its limited greenhouse gas emissions. Aside from the technology posing unjustifiable security risks, it is by far the most expensive of all existing mainstream energy technologies. It is not without reason that it is the only technology with negative growth rates and that almost all countries, including formerly strong proponents, with nuclear experience,

are currently reducing their nuclear share or phasing out installations entirely.

Africa's energy crisis can be solved. But this requires a new, smart, ambitious, effective and motivating approach: New as in modern, alternative technologies; smart as in clever and profitable business models; ambitious and effective as in determined goals, grand strategies and concrete policies and measures; and motivating as in educating a local, enthusiastic workforce that puts all plans into reality eager to achieve a bold objective. The objective has been agreed to by all African governments and the world community: to supply modern, reliable, affordable and sustainable energy to all world citizens.

Africa's renewable potentials are as enormous as they are underused. The total

potential from solar photovoltaic alone is estimated to be 73 times the expected total energy demand of the entire continent. Of course, there are enormous subregional differences. While solar resources are outstanding in eastern and southern Africa, respectively, and enormous in northern and western regions, they can produce cost-effective yields even in often cloudy central regions, given the maturity and low costs of the technology. Average wind conditions are best in eastern, northern and southern parts of the continent and a viable option also in many parts of the west. Hydroelectricity and biomass resources, the use of which can now be limited to sustainable practices and technologies, are available in wide parts of Africa as well. These domestically available, modern, affordable and reliable resources finally need to be developed much more vigorously. And they should be used wisely and efficiently. It is still surprising how much energy is being squandered even in regions with the highest scarcity.

The investment required to reach the goal of universal access to electricity in Africa by 2030 has been estimated at 300 to 500 billion US dollars. These investments will not just empower people by supplying basic energy needs; they will lay the basis for most other United Nations Sustainable Development Goals from Eradicating Poverty to Good Health, Gender Equality and Decent Work and Economic Growth. To gather the enormous financial resources required cannot be expected from African governments, private sources or international donors alone. We will only succeed if all actors contribute.

A significant increase in investment in Africa's domestic renewable resources will only happen if markets are opened and credible, ambitious, long-term goals as well as concrete and effective policies create an attractive investment environment. Renewable plans and project pipelines must be the result of careful assessments of local energy needs and development opportunities. Sectoral plans must be embedded in broader development strategies, ministerial mainstreaming and federal-subfederal policy integration. They must follow careful assessments of alternate technology pathways exploring both different technology sources as well as their application in stand-alone systems, mini-grids or extended larger grids. Effective governmental policies and measures must go hand in hand with the availability of appropriate financial products and together target specific investment risks and barriers. Finally, transparent and accountable bureaucratic processes, e.g. for project permitting, are essential.

Sounds complicated? It is! But the number of countries, provinces and municipalities in developing and developed world regions, including in Africa, that have demonstrated enormous successes in building sustainable energy systems, is growing quickly. They have started to build tomorrow's Africa today. 🌱

Alexander Ochs is the Founder and Managing Director of SD (Sustainable Development) Strategies, a consultancy practice working at the intersection of energy, the environment, and social and economic development based in Berlin, Germany. SD Strategies was named Best Energy & Economic Development Consultancy and received the 2018 Clean Energy Award from Global Energy Review.