

## **Renewable energy means Problem solving and added value – and not only for Africa**

From Dr. Axel Berg

According to the International Renewable Energy Agency (IRENA), offgrid renewable energy sources currently supply some 53 million people on the African continent, while in Asia some 76 million people use off-grid, renewable sources of electricity. Sounds good! Yet, only two percent of all investment went into decentralized renewable energy, such as off-grid solar or mini-grids, which have the proven potential to bring energy to those in remote parts of Africa who need it most. Japan, which is not known to be a green leader, is financing more clean energy in Africa than Germany, France, Italy, South Korea, China and the US combined. The EU and China shine on the world stage with flowery words while continuing their dirty business with Africa.

The rich countries have started to take advantage of clean energy at home, and are speeding up, but have no desire to extend this to Africa. Between 2014 and 2016, more than 60 percent of the energy investments of the rich African countries were spent on fossil fuels. Annually over 10 billion euros. Only 3 billion euros flowed into renewable energy and 4 billion euros into other energy infrastructure and huge dams. Half of this went to Egypt, Angola and South Africa, i.e. relatively rich African countries.

Carbon-based energy sources are driving climate change forward, whereby the effects are more detrimental to Africa than D., and as an economic development factor act in the opposing direction. China, the largest financial investor in Africa with \$ 5 billion a year, invests exclusively in oil, gas and coal, even though China is driving the global energy transition. The World Bank, as the second largest investor, at least intends to reduce its exposure to oil and gas from 2019 onwards. Germany is in fourth place behind Japan with around 1.5 billion euros in public energy funding in Africa. Most bilateral financial movements support corporate or industrial interests in donor countries. Thus, for example, Germany supported Siemens, in Egypt and Nigeria, in the construction of huge gas-fired power plants with up to 4,400 MW of power.

Africa is a continent with a young and growing population. Telephony development was a leap frogging, a term used to describe the omission of individual stages in the course of a development process. Although there has never been a land line network in Africa comparable to the European one,

thanks to mobile phone technology Africans are now telephoning as assiduously as their European neighbors.

Leap frogging is also possible in the energy transition. Africa does not need to build centralized fossil power plants and thousands of kilometers of grids. This creates dependencies on corporations. In decentralized Africa, decentralized energy is better and much cheaper.

Photovoltaics, wind power and agriculture go well together. Barn rooves with PV modules and land leased to wind farm operators are already part of everyday life for farmers. Agro Photovoltaic (APV). The photovoltaic modules, mounted at least 5 meters height above the ground, allow soil cultivation and harvesting with common agricultural methods. Agricultural PV allows a double benefit from the field: solar power and crops. The area efficiency of solar parks is comparatively high: for example, solar parks supply between 25 and 65 times as much electricity per unit area as energy crops.

As early as 2015, Fraunhofer ISE estimated the technically feasible APV potential in Germany at 25 to 50 gigawatts. This corresponds to the power of 25-50 nuclear reactors, although based on only 10 percent of the technically possible projects were included. How much more is possible with the sun of Ethiopia? Therefore, do not continue to pursue geothermal energy in the East African Rift Valley. With about 10 cents / kWh it's just too expensive - and central, not decentralized. I say: Abandon it!

In arid and semi-arid regions, large parts of the population often live off agriculture, which is particularly affected by drought, desertification and severe water shortages as a result of climate change. Due to the partial shading of arable land, APV systems demonstrably reduce the need for valuable water resources and provide livestock with shade. Even crops that would normally not grow due to the dry and hot climate and strong sunlight can be cultivated in an APV system. At the same time, the solar power produced can be used for the operation of water pumps or desalination plants.

In off-grid regions, a few solar modules mean a significant improvement in the quality of life, access to information, education and better healthcare. In Ethiopia or Sub-Saharan Africa, for example, around 90 percent of the rural population has no access to electricity. The APVs provide farmers with a whole range of new sources of income, while the dependency of the rural population on fossil fuels, such as diesel for generators and kerosene for lamps, is declining. In addition, the solar power can be used for the cooling and processing of agricultural products, resulting in their greater durability and better marketability.

Globally, the production costs of PHOTOVOLTAIK and Wind power in 2018 will be lower than the installation costs of nuclear power and the construction of coal or gas power plants. Of course, without considering the operating costs for fuel or personnel.

The marginal costs of renewables are close to zero. In sunny regions of Africa or Chile, in 2018 the solar power cost only 1.5 - 2.5 cents. Saudi Arabia wants to build the largest solar power plant in the world by 2030. It will then produce as much electricity as about 200 medium-sized nuclear power plants (200 GW). A kilowatt-hour of solar power should not cost more than one cent (€).

The chemical transformation is the logical parallel to the energy transition. Petroleum derived plastics are not fully biodegradable. Plastic bags or plastic wrappers are often used only for a short time and then re-appear over hundreds of years where they are not supposed to. They pollute the environment, clog the sewers and the stomachs of marine animals and as microscopic particles can be found in the Arcticas well as in the stomachs of German citizens. This material can be replaced by a variety of plants such as corn, potatoes, sugar beet and wheat, algae and microorganisms. The sun turns worthless substances into valuable commodities.

Farmers have much to gain if they participate in the conversion of our economic system to biogenics, that is, renewable base raw materials.

My recommendation:

Rich countries need to stop investing their wealth in unsustainable, shortsighted fossil fuel projects. Instead, they must - in their own interest and that of the world - support Africa in building a clean and reliable decentralized renewable energy supply, by expanding the already existing export initiative for renewable energies and the installation of regenerative technologies locally. Germany and the EU could, for example, build photovoltaic-powered mega-battery factories using the African Sun together with the local population in order to reduce the Asians' lead in this area.

Energy is - everywhere - the first step towards creating value. By using public funds, European companies, especially medium sized businesses from the renewable energy sector, can be attracted to the countries of refuge and the poorest countries where originally they had no intention of going but where they are most needed, - and where money can be made .