

Renewable energy stands for problem solving and added value – both for Africa and the world

By Axel Berg

According to the International Renewable Energy Agency (IRENA), 53 million people on the African continent use off-grid renewable sources of energy, while in Asia 76 million people are supplied by such off-grid renewable sources of electricity. Sounds good! Yet, only two percent of all investments in Africa went into decentralized renewable energy, such as off-grid solar or mini-grids, which evidentially have the 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 altogether. The European Union and China shine on the world stage with flowery words while continuing their dirty business with Africa.

The rich countries have started to step up and use clean energy at home. They are speeding up but have no intention to extend this achievement to Africa. Between 2014 and 2016, more than 60 percent of the energy investments of the rich countries in African were spent on fossil fuels; annually over ten billion euros. Only three billion euros went into renewable energy sources and four billion euros into other energy infrastructure and huge dams. Half of this money was invested in Egypt, Angola and South Africa, i.e. relatively rich African countries.

Carbon-based energy sources are accelerating climate change, whereby the effects of climate change are more detrimental to Africa than for example Germany. Regarding the economic development factor fossil fuels lead the way in the opposing direction. China, the largest financial investor in Africa with five billion U.S. dollar 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 with around 1.5 billion euros in fourth place in public energy funding in Africa; behind Japan. Most bilateral financial movements support corporate or industrial interests in the donor countries. Thus, for example, Germany supported Siemens in the construction of huge gas-fired power plants with up to 4,400 MW of power in Egypt and Nigeria.

Africa is a continent with a young and still growing population. Telephony distribution was leapfrogged. Leapfrogging is 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 telephone network in Africa comparable to the European one, thanks to mobile phone technology Africans are now telephoning as incessantly as their European neighbours. Leapfrogging is just as possible in the energy transition. Africa does not need to build centralized fossil power plants and thousands of kilometres of grids. This creates dependencies on corporations. In decentralized Africa, decentralized energy is democratic, clean 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 quite a number of farmers worldwide. The latest adaptive development is Agro Photovoltaic (APV). The photovoltaic modules, installed 5 meters height above the ground, allow soil cultivation and harvesting with common agricultural methods. Agricultural PV makes a double benefit from the field possible: 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. With APV the farmer simultaneously can use the soil for crop farming.

As early as 2015, the Fraunhofer-Institut für Solare Energiesysteme (ISE) estimated the technically feasible APV potential in Germany at 25 to 50 gigawatts (GW). This corresponds to the power of 25 to 50 nuclear reactors, even though calculations were based on the case that only 10 percent of the technically possible projects were realised. How much more would be possible with the sun of Africa? It is an economic mistake in the long run to continue to pursue centralized unities, whether fossil or renewable, like big dams, gas-pipelines or geothermal energy in the East African Rift Valley. With at least ten cents per kWh it is just too expensive - and central, not decentralized. I say: Abandon it and build decentralised renewable energy plants.

In arid and semi-arid regions, large parts of the population often live on agriculture, which all along is particularly affected by drought, desertification and severe water shortages. Climate change makes the situation even worse. Due to the partial shading of arable land produced by the APV systems, they demonstrably reduce the need for valuable water resources and provide livestock with shade. Even crops that normally would not grow due to the dry and hot climate and strong sunlight can be cultivated in an APV system. At the same time, the produced solar power can be used for the operation of water pumps or desalination plants. In off-grid regions, a few solar modules can have a significant positive impact on 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 does not have 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, solar power can be used for the cooling and processing the agricultural products, resulting in their greater durability and better marketability.

Globally, the production costs of photovoltaic and wind power in 2019 will be lower than the installation costs of nuclear power and the construction of coal or gas power plants. That without considering the operating costs for fuel or personnel. In the meantime renewable energies are even cheaper than to continue running depreciated fossil plants. The marginal costs of renewables go close to zero. In sunny regions of Africa or Chile, for example solar power only costs 1.5 - 2.5 cents in 2018. Saudi Arabia is planning to build the world's largest solar power plant by 2030. By then it will 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 packaging are often used for a short time only and then re-appear still over hundreds of years later in places where

they are not supposed to. They pollute the environment, clog the sewer systems and the stomachs of marine animals. Microscopic plastic particles can be found in both Arctics as well as in the stomachs of German citizens. This harmful plastic made from oil 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 a biogenic system, that is, renewable raw materials. Sikkim, an Indian state and home of Darjeeling tea is the good example of a small region becoming economically prosperous by 100 percent renewable energies and 100 percent bio-production. By way of illustration Sikkim demonstrated how the UN's Sustainable Development Goals (SDG) can be realised to derive benefits for the local population and preserve the environment at the same time.

My recommendation would be: Industrialised countries need to stop investing their wealth in unsustainable, short-sighted nuclear and 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 German Energy Export Initiative for the renewable energy sector, and by the installation of regenerative technologies locally. For instance, Germany and the EU could build photovoltaic-powered mega-battery factories; using the African sun working hand in hand with the local population in order to challenge the Asians' lead in the area of battery storage devices.

All over the world, energy is the first step towards creating value. By using public funds, European companies, especially medium sized businesses from the renewable energy sector and the organic agriculture sector, can get incentives to enter the markets of the poorest countries and the countries of refuge where initially they had no intention of going but where they are most needed - and where money and serious progress can be made.

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