



The amount of energy that the sun radiates on the desert regions of the world within six hours in one day is equivalent to the world's energy requirements for an entire year. A small percentage of the solar energy radiated on these desert regions could therefore solve the energy problems the world faces.

Solar Energy Partnership with Africa

An Inter-disciplinary Research Project

By Michael Düren and Winfried Speitkamp

In the summer of 2007 an inter-disciplinary working group was formed at the Justus-Liebig-University to sound out the opportunities and challenges of an energy partnership with Africa. In a series of interdisciplinary lectures and at a conference in June 2008 this subject was further explored. Additional conferences and workshops, as well as research projects on certain aspects of the subject will follow. Physicists, chemists, geographers, historians, political scientists, economists, and jurists are currently participating. In the following articles several of the participating researchers present questions and possible solutions from their disciplinary perspectives.

The backdrop to the new initiative from Giessen is the global energy crisis. From a geological perspective, we are currently using as much oil in one day as took 1,000 years to form. With a growing global population and concomitantly increasing energy consumption per person this problem will only get worse. This will particularly be the case for regions like India and China but also Africa, which have to date had less than average energy consumption. The use of fossil fuels releases so much carbon dioxide into the atmosphere that it will massively change the world's climate. In many regions of the world, including Africa, migrations of millions of people trying to escape drought, hunger and flooding will be the consequence. These so-called 'natural catastrophes' will not be accepted as natural but will in all likelihood be blamed on the industrial states, who will be asked to pay compensation.

Saving energy and increasing energy efficiency are important short-term solutions that are of great significance but will not be sufficient on their own. A switch to nuclear power does not offer solutions to the global energy crisis. It would take 13,000 new nuclear power plants all over the world to replace the existing fossil fuel plants. Because of the proliferation of weapons of mass destruction and the threat of terrorist attacks, particularly in unstable parts of the world, a concerted expansion of nuclear energy would create a great security risk. However, the increased use of biomass on a grand scale would quickly compete with food production and with a view to the increasing world hunger would not be acceptable.

What remains is largely the potential of wind, water, and solar energy. The

amount of energy that the sun radiates onto the desert regions of the world within six hours in one day is equivalent to the world's energy requirements for an entire year. A small percentage of the solar energy radiated on these desert regions could therefore solve the energy problems the world faces – if we could manage to harness it.

Using solar thermal power stations, solar energy can be inexpensively transformed into heat and electricity. It is no longer a technical problem to deliver electricity around the clock from facilities in the Sahara to all of Europe. The idea is not new, to the contrary it has been repeatedly discussed in the last twenty years. However its realisation has never been seriously promoted. This suggests that it has been less the technical problems which have hindered the efficient use of these resources but much more the political, economic, social, and cultural reasons which have stood in the way of the construction of such facilities. Historic and political burdens play a role, like the memories of colonial exploitation, and

the current violent confrontations about energy resources like oil in Nigeria. However, with the increase of energy and climate problems the use of renewable resources becomes ever more imperative for both continents.

The goal of the inter-disciplinary working group is to more deeply study the interaction of technical options with their political, economic and social conditions and therein find opportunities in which both Europe and Africa can have an advantageous, environmentally friendly energy source.

Moreover, a solar energy partnership between Europe and Africa should not just contribute to the solution of energy problems, but should help to minimize future political and humanitarian problems. The new inter-disciplinary working group of the University of Giessen addresses both aspects and works towards a sustainable partnership between both continents. •



Power stations use trough shaped mirrors that concentrate the sunlight onto a pipe filled with a heat transfer medium which runs through the focal line of the mirror.