



## CLIMATE CHANGE & ENERGY: RENEWABLE ENERGY

### FEATURES

# The solar researchers aiming to light up Africa

Christine Ottery

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**Can a new network of African solar researchers lead the way on solar power for the continent? *Christine Ottery* finds out.**

It was a surprise to Daniel Egbe to discover, at a 2010 conference in Tunisia, that two of his colleagues, both solar researchers from Africa, were not acquainted.

So the Cameroonian scientist introduced Teketel Yohannes, a professor at Addis Ababa University, Ethiopia, to Samir Romdhane, a professor at the University of Bizerte, Tunisia.

The result was the creation of the African Network for Solar Energy (ANSOLE), which is striving to harness local know-how to electrify the continent.

"I said 'let's see if us Africans can sit down and work together'," Egbe, currently a professor of organic chemistry at Johannes Kepler University in Linz, Austria, tells *SciDev.Net*. "We realised that we are working in related fields of semi-conductors and solar energy, and that's how ANSOLE materialised."

It is a compelling dream — to harness the abundant sunshine in an energy-deprived continent to fuel a better future for everyone. But African solar power researchers face many challenges.

Loss of talent to the [brain drain](#), lack of [money](#) to follow up ideas, little connection between like-minded colleagues across the continent, and few opportunities to entice scientists to turn their attentions to solar energy — all these plague the field.

### A network born

ANSOLE launched officially a year ago, in Austria, at an event attended by African solar energy researchers from countries including Algeria, Cameroon, Côte d'Ivoire, Ethiopia, Morocco, Nigeria, South Africa and Tunisia.

Its mission includes strengthening the links not just within Africa but between African countries and the rest of the world, so researchers from Europe, Turkey and the United States were also present.

The network now has around 200 members — most of them scientists — from 22 African, and ten non-African, nations.

"We want the coming generation not to worry about where to study, who to work with," says Getachew Adam, a PhD



The network also aims to educate African people on using solar energy  
 Flickr/PRI's The World

student at the University of Addis Ababa, in Ethiopia, and ANSOLE member. "We want to make African scientists come together [to solve the] African energy problem."

**Sub-Saharan African** countries need money and coordinated research if they are to harness the power of the sun, says Egbe.

Mammo Muchie, founding editor of the *African Journal of the Science, Technology, Innovation and Development*, agrees, telling *SciDev.Net* that solar power will become the major **renewable energy** source on the continent only by organised research, training, design and engineering.

"Our approach is to **build capacity**, especially when it comes to research," says Egbe, who is now the co-ordinator of ANSOLE. "Through our network many African researchers, especially physicists and chemists, are now directing their research in solar and renewable energy."

The group also wants to train more people to university level and promote use of decentralised solar energy through **educational** programmes in local languages.



### Aiming high

Connecting researchers is key, especially in a field where the continent's scientists have little interaction with those in richer countries, a continent which is expensive and time-consuming to traverse.

ANSOLE provides a platform for a mix of online and real-world networking. Each February 'ANSOLE Days' will bring African researchers and international collaborators face to face, says Egbe.

The first such meeting will be held this month (17–19 February) in Cameroon, followed by South Africa in 2013.

The young network hopes to become a pan-African research and education organisation  
ANSOLE

African scientists will also be able to start new **collaborations** through the ANSOLE website, which will hold a database of solar researchers and link people up to create joint proposals for scarce **funding**.

But can African scientists ever catch up to the extent that they lead the way in solar research?

Cédric Philibert, an expert in renewable energy at the International Energy Agency, says Africa "is not yet a significant player in the field of 'hard' solar science", which includes areas such as photovoltaic technologies, concentrated solar power and solar fuels research [such as artificial photosynthesis].

"To expect Africans to compete internationally in the already very advanced area of silicon-based photovoltaics is not realistic," says Egbe. "But members of ANSOLE are saying that we can do internationally competitive research in organic and hybrid organic–silicon photovoltaics."

Traditionally, crystalline silicone has been used as the light-absorbing semi-conductor in solar cells, but organic photovoltaics use carbon-based molecules to conduct light and create an electrical charge.

Yohannes, the Ethiopian co-founder and now a regional representative for ANSOLE in East Africa, says: "Organic solar cell research has attracted researchers' attention in the last three decades, because of its ease of processing, low cost and the flexibility of organic polymer-based solar cells".

The relative low cost of organic solar technology and modest infrastructure requirements make it especially

attractive to African researchers.

"With a little bit of money you can build your research labs and carry out your research. On this level we can compete with Europeans and Americans," Egbe says. "When it comes to silicon-based research, you need a lot of money and a clean room, which costs a lot."

However, organic semiconductors are still inefficient — the ratio between sunlight input and energy output is low — and they degrade when exposed to air or water. African researchers, such as Yohannes and PhD student Adam, who studies organic photovoltaics, are working on ways to solve these challenges.

Meanwhile, another field where African researchers can push science forward is solar thermal energy, according to Egbe. This uses mirrored troughs, dishes or towers to harness sunlight for heat or electricity.

Bertrand Tchanche, a Cameroonian researcher of thermal fluids at the Agricultural University of Athens, Greece, agrees that there is potential for African scientists to make headway with solar thermal research.

But, he says, "The lack of research facilities and funding are major obstacles".

### The long game

Already, ANSOLE has had some success building **networks**. Adam, for example, has been receiving valuable advice from professors in South Africa since ANSOLE began — it has allowed him to work in one country but get specialised advice from another.

As part of its online networking efforts, ANSOLE organised a webinar through **nanotechnology** project ICPC Nanonet in September. During his presentation, Abdelfattah Barhdadi, a professor at the University of Rabat in Morocco, revealed that he had the funding — but not the candidates — for five solar energy PhD places in his department, and was looking for Sub-Saharan African students.

"ANSOLE can help the movement of students from one country to the other, from poor countries to rich countries — in this way information will start to circulate between institutions," says Egbe.

One of ANSOLE's medium-term aims is to form an exchange programme for students to work in different institutions across Africa, improving the spread of knowledge.

But ANSOLE's long-term vision is to create a new African research centre for renewable energy, as well as starting a graduate programme in renewable energy.

There could even be one centre in each of main regions of the continent, Egbe says.

ANSOLE does not lack ambition, but what it can achieve may be limited by a lack of funding. To keep it running while filing for charity status, Egbe has already had to reach into his own pockets — although he will not disclose how much he has spent so far.

He spends half of his time volunteering on ANSOLE, which is supported by his university.

"Our plans need funding," says Egbe. "I hope that the UN can support such endeavours, since the UN has declared 2012 the year of renewable energies, and renewable energies are important for the protection of our environment."

For upcoming events, including the meeting in Cameroon, ANSOLE needs around US\$90,000. So far they have



There is great potential for solar energy in Africa  
Flickr/World Bank  
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pledges from a variety of organisations but the total is still far from the needed budget.

ANSOLE hopes to solve the funding challenges by attracting international investment from solar energy companies.

Philibert says this collaborative public–private approach could transform solar research in Africa especially in northern and southern Africa where both public and private actors are willing to develop a solar power industry.

Egbe seems optimistic: "We believe this will, in the long run, contribute to development of Africa."

See below for a short video of Egbe speaking about the network:

See below for a video of Egbe's lecture about the network:

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## COMMENTS (1)

**Elmar** ( Science Niblets | United States of America )  
7 February 2012

Here is another article which explains the physics of solar cells: <http://www.science-niblets.org/technology/solar-powered-electricity.html>

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<http://www.scidev.net/en/climate-change-and-energy/renewable-energy/features/the-solar-researchers-aiming-to-light-up-africa.html>

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