Dear ANSOLE members,

Dear friends and network partners in business, the public and nonprofit sector,

Africa is on the move!

With “ANSOLE News” we want to create a platform to share information and to network on renewable energy in Africa.

Thanks to all who sent us their contributions for ANSOLE News N°1.

Special thanks to Daniel A.M. Egbe, who has over the past years shaped and made ANSOLE into what it is now, a vibrant network across the African continent, a network of unity in diversity, a home for what Nelson Mandela described as the rainbow nation, transcending boundaries and striving for sustainable development on the African continent and in the world.

Please feel free to contact us, send us reports on your work, contributions related to renewables in Africa, conference reports or information on upcoming events.

Kind regards

your editorial team for ANSOLE News N°1

Dr. Bettina Schmidt, Dr. Kate B. Showers

PD Dr. Daniel A. M. Egbe

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ANSOLE - From the beginning to 2013

by Daniel Ayuk Mbi Egbe

The beginning

As destiny wanted it, I was invited to replace Professor Niyazi Serdar Sariciftci, (Director, Linz Institute for Organic Solar Cells (LIOS), Johannes Kepler University, Linz, Austria) as a keynote lecturer on “Polymer Bulk Heterojunction Solar Cells” at the International Conference on Conducting Materials (ICOCOM 2010), 3 -7 November, 2010 in Sousse, Tunisia. ICOCOM 2010 was organized by, among others, Professor Samir Romdhane of the Tunisian Physical Society.

Before the conference, Professor Romdhane did not know one of the participants, Professor Teketel Yohannes from the University of Addis Ababa, Ethiopia - an African expert in the area of Organic Solar Cells. This was not surprising; most African scientists interact more with their European and American counterparts than with their fellow Africans.

Although the situation is gradually changing, linguistic and other cultural barriers imposed by past and present external influences exist among African scientists.

Other factors like lack of transportation infrastructure (good roads connecting different African countries or direct flights between major African cities) contribute to the isolation of African scientists. This was demonstrated by the fact that it took Professor Yohannes more than 10 hours to get to Tunis. Due to the lack of a direct flight between Addis Ababa and Tunis, he had to fly through Dubai.

The Sousse Meeting, 4 November 2010

Conscious of this situation while in Sousse, the desire to connect African scientists in the field of solar energy research was born in my mind. On 4 November I was the chairperson of the session in which Professor Teketel Yohannes was to give his lecture. While introducing him, I said, “it will be good for African scientists in the field to start communicating with one another by creating a network”. This sentence or “these words” had a creative and dynamic power, which I myself did not expect: Professor Samir Romdhane came to me as soon as I sat down, told me he found the idea wonderful, and that we should convene a meeting with the other senior scientists present.

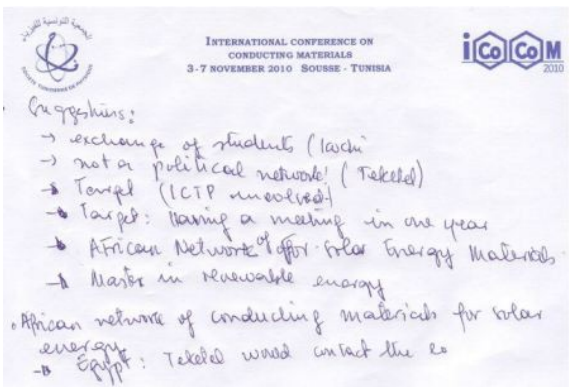
Professor Yohannes immediately embraced the idea when informed at the end of his lecture. The three of us, together with six other scientists from North Africa, met between 10 pm and midnight of 4 November 2010 in a conference room of Hotel Al-Mouradi in Sousse, Tunisia to initiate an African network for solar energy.



Hand-written list of participants at the kick-off meeting in Sousse, Tunisia, on the 4th of November 2010

We all agreed that Africa has been blessed with much sun, and can solve both its energy and environmental problems by developing the solar energy sector. This requires qualified manpower to be trained in the framework of such a network.

The nine participants decided to create “African Network on Conducting Materials for Solar Energy (ANCMSE)” in association with ICOCOM. For language reasons, I was asked by the participants to coordinate ANCMSE at the early stage of its existence.



Some documented suggestions made during the kickoff meeting in Sousse, Tunisia on the 4 November 2010

The Linz Meeting, 4 February 2011

The name “ANCMSE” was, however, found to be very exclusive (restrictive). It was dropped in favor of “African Network for Solar Energy”, having the acronym “ANSE”, during the second constituting meeting, which was held in the form of a mini-symposium exactly 3 months later, on the 4 February 2011 at the LIOS, in Linz Austria. The acronym “ANSE” was dropped that day when Lesley Tobin, a symposium participant, discovered that the web domain ANSE.ORG, which we wanted to purchase, was no longer available.

ANSOLE.ORG was available and was immediately purchased. Thus, the internet forced us to adopt the beautiful acronym ANSOLE, which formed the base for the design of our universally loved ANSOLE logo, with the “O” representing the Sun.

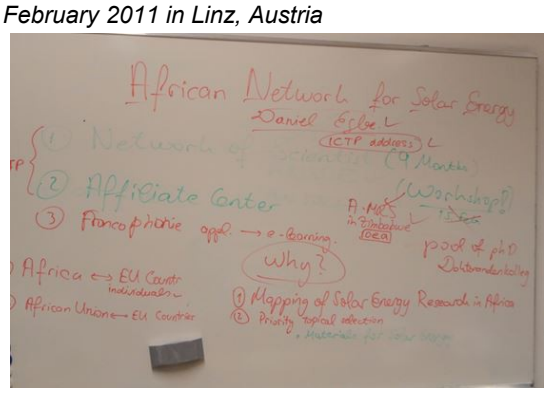
This second gathering was possible thanks to Professor Serdar Sariciftci, who succeeded in obtaining funds to cover the expenses of most of the African attendees.

Lesley Tobin of Glasgow-based Institute of Nanotechnology also contributed a great deal to the success of the mini-symposium. With the information she provided, we were able to invite interesting participants from different African regions, so that decisions taken during the symposium were binding. I am moreover very grateful to her for the practical help she offered, such as writing the minutes, helping to purchase the ANSOLE.ORG domain, and designing the very beautiful logo of ANSOLE (with inputs from Prof Amel Romdhane, Prof. Samir Romdhane and myself). The attendance of the ICTP (The Abdus Salam International Centre for Theoretical Physics) - a UN institution based in Trieste, Italy, which has a long history of working with African scientists - was highly appreciated. Its representatives, Dr. Ralph Gebauer and Prof. Joseph Niemela, pledged ICTP support for ANSOLE in various ways.

The following countries were directly or indirectly represented at the symposium: Algeria, Austria, Cameroon, Côte d’Ivoire, France, Ethiopia, Germany, Great Britain, Italy, Israel, Morocco, Nigeria, Tunisia, South Africa, Turkey and USA.



Participants of the ANSOLE launching meeting on the 4 February 2011 in Linz, Austria



Inputs from participants of the Linz meeting written on the board by Prof. Serdar Sariciftci

Goals of ANSOLE

The participants of the Linz meeting defined ANSOLE‘s three main goals as:

- Foster technical and vocational training and education (TVET) in renewable energy at various skill levels (capacity building)

- Foster research activities in renewable energy among African scientists and non-African scientists who are directly involved in the education of African students and experts (capacity building)
- Promote and encourage the use of renewable energy in Africa (sustainable development and economy, environmental protection, etc.)

Structure of ANSOLE

ANSOLE is constituted of five regional representatives and the national networks of individual scholars at universities and training institutions, of institutional members, experts and consultants of various disciplines in the profit, non-profit and public sector as well as in politics, of citizens and like-minded, all devoted to address the African energy problem using sustainable and environmental-friendly energy sources.

The international office of ANSOLE is located in Jena, Germany.

The greatest challenge we face is to make renewable energy services accessible and work for all on the African continent. ANSOLE is prepared to play its role and contribute to this cause.

Hence, during the Linz Meeting I (Daniel Egbe) was confirmed as the Coordinator of ANSOLE and the African participants of the meeting constituted the Advisory Board. The organizational structure of the network was extended later to include:

- Regional and Vice-Regional Representatives
- National and Vice-National Representatives
- Focal Point (at various institutions of learning)
- Members

Read details about ANSOLE membership.

ANSOLE Logo

The universally admired ANSOLE logo was designed by a Jewish woman, Lesley Tobin, assisted by a Muslim couple, Amel and Samir Rhomdhane, and a Christian man, Daniel A. M. Egbe, clearly demonstrating that ANSOLE welcomes all people, that it does not discriminate because of race, gender or religion, and is apolitical. ANSOLE is a peaceful movement that fosters gender equality and rejects any form of intolerance and hatred.

The logo has the three main colors found in the flags of most African countries: green, red and yellow. The **"O"** of ANSOLE is represented by the Sun, which has been positioned in the middle of the Sahara desert, the area with the highest solar radiation in Africa. The network is reflected by the net on the Sun, which, through its shape, reminds one of graphene (representing the research effort).

ANSOLE Website

As mentioned above, the process of purchasing a web domain led to the acronym "ANSOLE". ANSOLE.ORG was purchased on 4 February 2011.

ANSOLE first went online on 1 April 2011 using the domain ANSOLE.COM, which was purchased on the 14 March 2011 upon instigation of Pierre Telep, a Cameroonian based in Berlin and an early member of ANSOLE. He was the first webmaster.

I thank him because, thanks to his efforts, ANSOLE became quickly known through its appearance on the world wide web.

ANSOLE.ORG went online on the 27 June 2011, after ANSOLE.COM was no more operational. This was made possible by Mr Narcysse Ngada, who has become our faithful webmaster. He is doing the web duties during his free time and receives no remuneration for that. I thank God for him. Mr Ngada is a Cameroonian based in Hamburg Germany, whom I met for the first time during the "Solar Energy for Science" Workshop, organized by DESY (Deutsches Elektonen-Synchroton) Hamburg (19-20.05.2011). After our meeting, he joined ANSOLE and offered his talent as a hobby web designer.

ANSOLE e.V.

Following the first constitutional meeting (and general assembly of ANSOLE Germany e.V.) held on 11 September 2011 in Jena, ANSOLE gained a legal status as "ANSOLE Germany e.V." by registering it as an NGO at the local court of Jena, Germany, on the 26.1.2012 with the registration number VR 1505.

The electronic registration number VR 231505 was given to ANSOLE on the 19 December 2012 after a digitalization process at the local court of Jena. To reflect the international nature of ANSOLE, the 3rd annual general assembly of "ANSOLE Germany e.V.", held on 23 November 2013, adopted new statutes and changed its name to "ANSOLE e.V." These changes were legalized on the 16 December 2013 (link for the statutes of ANSOLE e.V.)



Participants of the constituting meeting of ANSOLE e.V. on 11 September 2011 in Jena, Germany

The first elected board of directors of ANSOLE Germany e.V. consisted of: PD. Dr. Daniel A. M. Egbe (Chairperson), Prof. Dr. Gerhard Gobsch (Vice-Chairperson), PD Dr. med. Oumar Camara (Secretary) and Dr med. Ines Koch (Treasurer).

ANSOLE e.V. members met twice in 2012, on the 17 March and the 31 October, the latter being the 2nd ordinary general assembly, which saw the reelection of the existing board of directors.

In 2013, an ANSOLE e.V. board meeting was organized on the 6 April 2013 in Jena to discuss past and future activities of the network, especially involvement in various EU-projects. The 3rd ordinary general assembly, on the 23 November 2013, was held together with the 65th birthday celebration of Dr. Eckhard Birckner, a founding member of ANSOLE e.V. A new board of directors was elected for a 3 year term.

These are

- PD Dr. Daniel Ayuk Mbi Egbe (Chairperson)
- Dr. Gabriel Natura (Vice-Chairperson)
- Oberärztin Dr. med. Anne Egbe (Treasurer)
- Dr. Bettina Schmidt (Secretary)



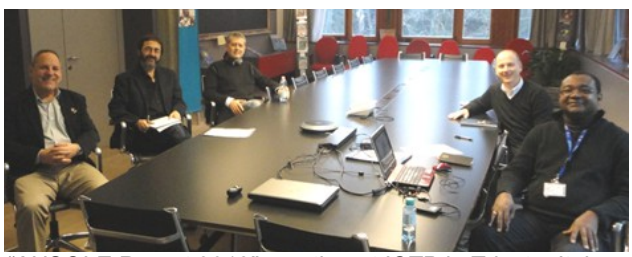
New board of directors of ANSOLE e.V. - f.l.t.r: Dr Gabriel Matura, Dr Bettina Schmidt, PD Dr. Daniel A. M. Egbe and Oberärztin Dr. med. Anne Egbe

ANSOLE: 73rd ICTP network

The Abdus Salam International Centre for Theoretical Physics

ANSOLE became the 73rd ICTP network on 4 November 2011, exactly 1 year after the idea was born, and 9 months after its launching, bringing a series of advantages to the network scientists. ICTP support to networks internationally can be read on their website.

ICTP financially supports the two ANSOLE student exchange programs and promotes the network at various international levels. The ANSOLE coordinator presents a financial and scientific report to ICTP once a year in the form of power point presentation and a written document.



"ANSOLE Report 2013" meeting at ICTP in Trieste, Italy, on the 7 February 2014, f.l.t.r:: Joseph Niemela, Fernando Quevedo, George Thompson, Ralph Gebauer and Daniel A. M. Egbe.

Numbers

ANSOLE is a dynamic and fast growing network. At present it has more than 630 personal members based in 36 African countries (Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Central African Republic, Congo-Brazzaville, Democratic Republic of Congo, Côte d'Ivoire, Djibouti, Egypt, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, South Sudan, Togo, Tunisia, Uganda, Zambia, Zimbabwe) and 19 non-African countries (Austria, Belgium, Britain, Canada, China, Estonia, France, Germany, India, Ireland, Italy, Jordan, Palestine, Netherlands, Russian Federation, Sweden, Taiwan, Turkey and USA).

So far two institutions are institutional members: The International Science Program (ISP) of the University of Uppsala, Sweden, and the DTSC Solar Training Centre in Accra, Ghana.

ISP International Science Programme DSTC

The logos of the two ANSOLE institutional members

Our aim is to be present in all 56 African countries in the next two years. We expect our members to help us achieve this goal.

Students exchange programs

Instigated by ICTP, ANSOLE created two types of students exchange programs:

- Intra-African Exchange Program (INEX)

- Africa-North Exchange Program (ANEX)

Both programs are presently mainly supported by ICTP (98%) and by ANSOLE e.V. (2%). Other donors are welcome to support these exchange programs – or propose new ones (bearing their names)- in order to sponsor a larger number of African students. So far the following students were or are involved in the programs:

- Ms Safae Aazou (ANEX, self-sponsor), from the University of El Jadida, Morocco (supervisor: Prof. Dr. El Mahdi Assaid) spent two months (15 January to 14 March 2012) at the Linz Institute for Organic Solar cells (LIOS) of the Johannes Kepler University Linz, Austria (external supervisor: Ass. Prof. Dr. Matthew White) to carry out experimental studies of her PhD. That led to two high quality publications (*Journal of Optoelectronics and Advanced Materials* 2013, 13, 395-404, *Nature Photonics* 2013, 7, 811-816). She will be defending her thesis in May 2014. The title of her thesis is: „*Simulation d'un Composant Optoélectronique par la Méthode des Différences Finies et Fabrication, Caracterisation et Modelisation de Cellules Solaires à Base d´'heterojonctions Organiques Distribuées en Volume*"

- Ms. Sameh Boudiba (ANEX) from the University of Tebessa, Algeria (supervisor: Dr. Louiza Boudida, then later Dr. Sabrina Bouguessa) used the ICTP sponsorship to spend 6 months (1.2.2012 to 31.7. 2012, then a further 3 months (1.6.2013 to 31.8.2013, using her university sponsorship) at the Johannes Kepler University, Linz, Austria (external supervisor: PD Dr. Daniel A. M. Egbe) to carry out synthetic work of her PhD thesis of title: *"Anthracene-containing conjugated materials for optoelectronic applications: Synthesis and study of the effect of side chains".* Her work has contributed so far to two articles (*Applied Physics Letters* 2012, 101, 053302-1-3, *Journal Polym. Sci: Polym. Phys* 2014, 52, 338-346, front cover illustration) and she has presented her research results at scientific events in Morocco and Turkey.

Mr. Armel Duvalier Pene (INEX) from the University of Ngaoundere, Cameroon (supervisor: Prof. Dr. Ing. César Kapseu) has received support in 2 phases. The first scholarship phase was spent at the Cheikh Anta Diop University of Dakar, Senegal (external supervisor: Prof. Dr. Grégoire Sissoko) from 1.4.2012 to 31.3. 2013, where he carried out the theoretical studies of his PhD. In the second phase, spent at the University of Mohammedia, Morocco (external supervisor: Prof. Dr. Bouchaib Hartiti) from the 1.4.2013 to 30.9.2014, he is focusing on the experimental part of his research. The title of his thesis is: "*Theoretical and experimental studies of a bifacial solar cell under multispectral illumination: Effect of magnetic field and light incidence angle"*

His research results have been presented as oral communications in 3 events in Morocco and Cameroon and were partially published in the *International Journal of Emerging Technology and Advanced Engineering* (Vol 3, Issue 9, Sept. 2013).

Dr. Allé Dioum (INEX) from the Cheikh Anta Diop University of Dakar (supervisor: Prof. Dr. Aboubakar Beye) spent 9 months, in the framework of his habilitation, at the University of El Jadida, Morocco (external supervisor: Prof. Dr. El Mahdi Assaid) from 1.10.2012 to 30.6.2013, before moving to Italy using the TRIL (Training and Research in Italian Laboratories) program of ICTP. The title of his research was: *"Finite Element Modeling and Characterization of Organic Photovoltaic Cell based on blend of Polymer (P3HT) and a Derivative of Fullerene (PCBM): Determination of Electrical and Recombination Parameters*"

Mr. Joël Hervé Nkuissi Tchognia (INEX) from the University of Yaoundé I Cameroon (supervisor: Prof. Dr. Jean-Marie Bienvenu Ndjaka) to the University Mohammedia, Morocco (external supervisor: Prof. Dr. Bouchaib Hartiti) has a 2.5 years scholarship from the 1.10.2012 to 31.3.2015. His research results have been presented as posters or oral communications in 4 scientific events in Morocco, Turkey and South Africa. He obtained the certificate and prize of the best PhD student oral presentation during the Regional Workshop on Material Materials Science for Solar Energy Conversion held in Cape Town South Africa from the 4-8 November 2013. He has coauthored 2 peer-reviewed publications (*Afrique Science* 2014, 10, 21-26, *Journal of Optoelectronics and Advanced Materials* 2013, 15, 1200-1203). The title of his thesis is: *"Elaboration and characterization of ternary and quarternary materials in thin films by low-cost techniques for photovoltaic applications"*

Ms Shaimaa Mohamed Ali Ahmed (ANEX) from Benha University/Zewail City of Science and Technology, Cairo, (supervisors: Prof. Dr. Mabrouk K. El-Mansy and Prof. Dr. Salah Obayya) spent 6 months (15.2.2013 to 14.8.2013) at LIOS, Johannes Kepler University Linz, Austria (external supervisors: PD Dr. Daniel A. M. Egbe and Dr. Philipp Stadler). She carried out studies on: "*CuI containing organic solar cells and quantum dots based organic solar cells*"

In the first part of her research, she was able to demonstrate that by replacing PEDOT:PSS with CuI nanoparticles in bulk heterojunction solar cells based on an anthracene-containing polymer a significant enhancement of the photovoltaic response is observed. In the second part of her research she experimented with PbS quantum dots and readily made quantum dots based solar cells of 5% efficiency. These results were publicized in prize-winning poster and oral presentations. Two publications are presently in preparation. She has been awarded an additional 3 months ANEX grant (1.2.-31.4.2014) to round up the PbS quantum dots project.



Sameh Boudiba (left): ANEX (01.02.2012-31.07.2012) between the University of Tebessa, Algeria, and the Johannes Kepler University Linz, Austria. Duvalier Pene (right): INEX (01.04.2012-31.03.2013) between the University of Ngaoundere, Cameroon, and Cheikh Anta Diop University of Dakar, Senegal.

Mr. Benjamin Victor Odari Ombwayo from the University of Nairobi, Kenya (supervisor: Dr. Robinson Juma) applied for a 2 years INEX fellowship program to carry out his PhD studies at the University of South Africa, Pretoria, South Africa (external supervisor: Prof. Dr. Malik Maaza). The process was halted by the welcoming lab's difficulties in sending the necessary documents for visa application. We are presently looking for another hosting laboratory for him.

ANSOLE has also been contacted by students with other sources of support seeking help in finding host laboratories either in Europe or in Africa:

Ms Nassima Bouguerra (University of Bejaia, Algeria) with sponsorship from her university used the ANEX program to spend 6 weeks (5.6. to 19.7.2013) at the Institute of Polymer Science of the Johannes Kepler University Linz, Austria.

A Zimbabwean female PhD student, Ms Sekai Lana TOMBE, of the University of the Rhodes University South Africa, laureate of The L'Oréal-UNESCO Award for Sub-Saharan Africa for Women in Science, submitted an application in December 2013 to use the ANEX program to spend one year of her PhD studies in Linz Austria (starting from June 2014)

A Swedish female student, Ms Samantha Nhi Huynh (of Vietnamese origin) from the University of Lund, Sweden, contacted ANSOLE in October 2013 seeking an African institution where she can carry out the experimental part of her bachelor's thesis. In January 2014, using the ANSOLE mailing list, we were able to put her in contact with Dr. Al-Mas Sendegeya, of the Polytechnic of Namibia. She will spend three months from June to September 2014 in Windhoek and will write her bachelor's thesis on „*Performance Analysis of Solar Cookers: A Practical Test in Namibia".*

ANSOLE was also contacted in September 2013 by Ms Sharlissa Moore, PhD candidate at the Arizona State University researching on: *Human and Social Dimensions of the DESERTEC Project in the Moroccan Society.* She was put in contact with Prof. Abdelfattah Barhdadi, the national representative of ANSOLE in Morocco, who assisted her upon her arrival in Morocco.

Scientific exchanges within the network

Fruitful scientific exchanges involving ANSOLE members from Algeria, Austria, Cameroon, Egypt, Ethiopia, Germany, Italy, Morocco, Senegal, South Africa, Tunisia, Russia have led to numerous high quality publications in 2012 and 2013, some of which are listed below:

1. *"Electron and hole transport in an anthracene-based conjugated polymer":* Camaioni, N.; Tinti, F.; Esposti, A. D.; Righi, S.; Usluer, Ö, Boudiba, S.; Egbe, D. A. M. Applied Physics Letters 2012, 101, 053302-1-3. (APL: Org. Electron. Photonics, 2012, 5, 165) *(involving researchers from Algeria, Austria and Italy, ICTP and ANSOLE are acknowledged)*

2. *"Influence of magnetic field on the electrical parameter of a bifacial silicon solar cell front side illuminated by a multispectral light under steady state*": A.D. Péné, L. Bitjoka, F. I. Barro, G.E. Nkeng, C. Kapseu, G. Sissoko, International Journal of Emerging Technology and Advanced Engineering, Volume 3, Issue 9, September 2013. (*involving researchers from Cameroon and Senegal, ICTP and ANSOLE are acknowledged)*

3. *"Synthèse et caractérisation du quaternaire Cu2ZnSnS4 (CZTS) par voie sol-gel associé au spin-coating":* Hervé Joël TCHOGNIA, Youssef ARBA, Bouchaib HARTITI, Jean-Marie NDJAKA, Abderraouf RIDAH et Philippe THEVENIN, Afrique Science, 10, 1 (2014) 21-26. (*involving researchers from Cameroon and Morocco, ICTP and ANSOLE are acknowledged*)

4. *"Effect of substrate temperature on physical properties of CZTS thin films":* Y. Arba, M. Rafi, H. Tchognia, B. Hartiti, A. Ridah, P. Thevenin, Journal of Optoelectronics and Advanced Materials, 15, 11-12 (2013) 1200-1203. (*involving researchers from Cameroon and Morocco, ICTP and ANSOLE are acknowledged)*

5. *"Tuning the properties of an anthracene-based PPE-PPV copolymer by fine variation of its macromolecular parameters*": Tinti, F; Sabir, F. K.; Gazzano, M.; Righi, S.; Ulbricht, C.; Usluer, O.; Pokorna, V.; Cimrova, V.; Yohannes, T.; Egbe, D. A. M.; Camaioni, N.; RSC Adv. 2013, 3, 6972-6980. (*involving researchers from Austria, Ethiopia and Italy, ICTP and the TRIL program are acknowledged*)

6. *"Franck-Condon analysis of the photoluminescence spectra of a triple-bond containing polymer as a solution and as a thin film":* Saidani, M. A.; Benfredja, A.; Ben Hameda, Z.; Romdhane, S.; Ulbricht, C.; Egbe, D.A.M.; Bouchrihaa, H.; Synthetic Metals 2013, 184, 83–85. *(involving researchers from Austria and Tunisia)*

7. *"Ultrathin, highly flexible, and stretch-compatible PLEDs":* White, M. S.; Kaltenbrunner, M.; Głowacki, E. D.; Kettlgruber, G.; Graz, I.; Aazou, S.; Ulbricht, C.; Egbe, D. A. M.; Scharber, M.; Sekitani, T.; Someya, T.; Bauer, S.; Sariciftci, N. S. Nature Photonics 2013, 7, 811-816 (*involving researchers from Austria and Morocco, ANSOLE and the ANEX program are acknowledged*)

8. *"Organic Bulk Heterojunction Solar Cells Based on P3HT and Anthracene-Containing PPE-PPV:* Fabrication, Characterization and Modeling" Aazou, S.; Ibral, A.; White, M. S.; Kaltenbrunner, M.; Glowacki, E. D.; Egbe, D. A. M.; Sariciftci, N. S.; Assaid, E. M. Journal of Optoelectronics and Advanced Materials 2013, 13, 395-404 (*involving researchers from Austria and Morocco, ANSOLE and ANEX program are acknowledged*)

9. *"Anthracene-Containing Conjugated Polymer Showing Four Optical Transitions Upon Doping: a Spectroscopic Study*": Gasiorowski, J.; Boudiba, S.; Hingerl, K.; Ulbricht, C.; Fattori, V.; Tinti, F.; Camaioni, N.; Menon, R.; Schlager, S.; Boudida, L.; Sariciftci, N. S.; Egbe, D. A. M., Journal Polym. Sci: Polym. Phys 2014, 52, 338-346. (*involving researchers from Algeria, Austria and Italy, ICTP and ANSOLE acknowledged)*

10. "*Effect of side-chains on charge transport of anthracene-based PPE-PPV copolymers*": Tinti, F.; Sabir, F. K.; Gazzano, M.; Righi, S.; Usluer, Ö.; Ulbricht, C.; Yohannes, T.; Egbe, D. A. M.; Camaioni, N., Macromol. Chem. Phys, 2014, DOI: 10.1002/macp.201300611 (*involving researchers from Austria, Ethiopia and Italy, ICTP and the TRIL program are acknowledged*)

Events

2011: The very first ANSOLE event after its launching was the "**First Encounter of Professionals in Solar Energy**" held on the 1st April 2011, and co-organized by the Cameroonian Ministry of Energy and Water. The gathering was located at the conference hall of the same ministry. It witnessed the attendance of about 100 persons. The report on the event can be downloaded in English and in French.

ANSOLE was invited to attend the "Solar Energy for Science" Workshop held from the 18 to 20 May 2011 at DESY Hamburg, which organized the event. The Workshop's main focus was the DESERTEC Project and ANSOLE members of the MENA region participated (Morocco, Algeria, Egypt and Tunisia). Link to the report on the event, including the position of ANSOLE with regards to the DESERTEC project.

In 2011, ANSOLE activities were presented at:

- the Congrès International sur les Energies Renouvelables et l'Efficacité Energétique (CIEREE) 20-21.4.2011, University of Fes, Morocco
- 3rd Annual ICPC Nanonet Workshop 24-25.5.2011, Sankt Petersburg, Russia
- ICTP- SISSA Workshop on New Materials for Renewable Energy, 17-21.10.2011, ICTP, Trieste, Italy.

2012: The first **ANSOLE DAYS** (ANSOLE DAYS 2012) on the theme "Solar Energy for Sustainable Development" took place from the 17 to 19 February 2012 at the University of Yaoundé I in Yaoundé Cameroon. More than 200 participants came from about 20 countries. The conference consisted of scientific presentations (keynote lectures of 45 minutes, lectures of 20 or 15 minutes, and posters) and an exposition of solar goods. Participants received a purposely designed conference bag containing a program and abstract booklet, a notebook, a pen and advertising materials of some sponsors.

The conference was highlighted by the performance of a theatre piece entitled "No bills with the Sun" (produced by Dr. Emelda Samba, senior lecturer at the University of Yaoundé I), portraying the energy situation in Cameroon, which is representative of most Sub-Saharan countries. The participants received certificates of participation. Three poster prizes were awarded, the best being a bag made from organic solar cells. Seven articles emanating from presentations during the conference underwent a positive peer-review process and were published in AJSTID (*African Journal of Science, Technology, Innovation and Development*, Vol. 4, 2012.

Download the abstract booklet on ANSOLE DAYS 2012. Side events to the ANSOLE DAYS were the general assemblies which were convened on the 17 and 19 February 2012.



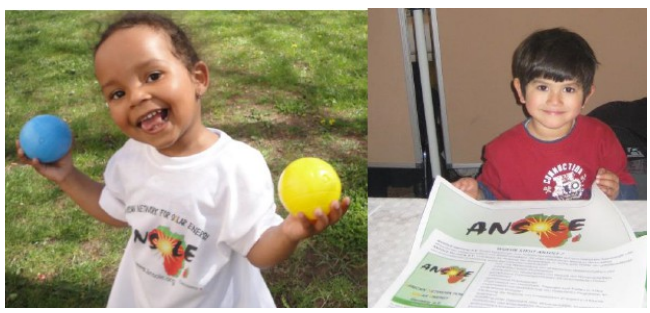
Participants of ANSOLE DAYS 2012, 17-19.02.2012, at the University of Yaounde I, Yaounde, Cameroon

ANSOLE assisted (and is still assisting) in the organization of numerous renewable energy- related conferences by both advertising the meetings on the ANSOLE website (www.ansole.org) and by using the ANSOLE mailing list. For instance, the organizers of the 1st European Physical Society Conference on "Physics for Development" (10-12.10.2012, in Brussels) greatly relied on ANSOLE to get attendance from Africa.

The same can be said, among others, for the SEPA (Solar Energy Partnership for Africa)-DESERTEC International Conference on Education and Capacity Building for Renewable Energies held from the 17 to 19 September 2012, at the Center for International Development and Environmental Research (ZEU), Justus Liebig University, Giessen, Germany, which saw a significant attendance of ANSOLE members from North Africa.

The activities of ANSOLE were presented during the following events in 2012:

- STUBE- Winterakademie über “Energiewende und Ressourcenknappheit. Was kommt statt Atomkraft und Öl?“ 18-22.1.2012, Bad Homburg, Germany
- International Workshop and Conference on Renewable Energy and Climate Change-Exploring Opportunities for Sustainable Development-IWCRECC-2012, 5-7.4.2012, Madurai, India
- Abschlußveranstaltung der “Woche der Eneuerbaren Energie” 28.4.2012, Ilmenau, Germany (open-air event)
- Advanced Workshop on Solar Energy Conversion, 21-23.5.2012, Bucharest, Romania
- 2nd International Symposium of Chemistry, Organic Materials and Renewable Energies, 28-29.5.2012, Tebessa, Algeria
- 16. Arnstädter Umwelt- und Erlebnismarkt, 9.6.2012, Arnstadt, Germany (open-air event)
- OE-A 8th General Assembly and 27th Working Group Meeting, 18.6.2012, Munich, Germany
- SEPA-DESERTEC International Conference 2012, Education and Capacity Building for Renewable Energies, 17-19.9.2012, Giessen, Germany
- DÄSAV (Deutsch-Äthiopischer Studenten- und Akademikerverein) Äthiopien Konferenz, 5-6.10.2012, Frankfurt am Main, Germany
- 1st EPS (European Physical Society) Conference on “Physics for Development”, 11-12.10.2012, Brussels, Belgium
- World University Service e.V. General Assembly, 9-10.11.2012, Leipzig Germany
- Engagementtag, Goethe-Galerie, 14.11.2012, Jena, Germany
- 5th International Conference on Appropriate Technology (ICAT), 20.-24.11.2012, Pretoria, South Africa
- EWACC (Energy, Water, Climate Change) Building Bridges, 10.-12.12.2012, Nicosia, Cyprus



Young ANSOLERS presenting the network during the “Woche der Eneuerbaren Energie” on 28.04.2014 in Ilmenau, Germany (left), and during the “Engagementtag” on 14.11.2012 in Jena, Germany (right)

2013: ICTP-ANSOLE Fellows’ Workshop (AIWF 2013) was the first scientific event organized by ANSOLE in 2013. It was held on the 5 January 2013 at the Hassan II University of Mohammedia, Morocco, and was attended by 13 participants. Four sponsored fellows and 4 non-sponsored PhD students who were ANSOLE members made presentations. Each participant was given a T-Shirt designed for the event and a certificate of participation. The main aim of the gathering was to evaluate the research activities of ANSOLE fellows. Prof. Dr. Bouchaib Hartiti, host of the

event (Mohammedia, Morocco), Prof. Dr. El Mahdi Essaid (El Jadida, Morocco), Prof. Dr. Abderraouf Ridah (Casablanca, Morocco) and PD Dr. Daniel A. M. Egbe (ANSOLE coordinator) chaired the event (abstract booklet containing pictures of the event).

It was evident from the presentations that two of the fellows, Dr. Allé Dioum and Mr. Duvalier Péné, had not been able to obtain practical training in their host institutions. During the ANSOLE report meeting held on the 21st of January 2013 at ICTP in Trieste in the presence of the ICTP director Prof. Fernando Quevedo and his coworkers Prof. Joe Niemela and Dr. Ralph Gebauer, it was decided that the two fellows should transfer to laboratories with experimental training facilities. Mr. Armel Duvalier was to move from Senegal to Mohammedia in the laboratory of Prof. Bouchaib Hartiti, Dr Allé Dioum was offered the opportunity to apply for a TRIL scholarship, which he did, and spent 6 months at the laboratory of Dr Nadia Camaioni at Consiglio Nacionale Delle Richerche (CNR) in Bologna.

Many other issues were addressed during the ANSOLE report meeting. For instance, it was suggested by the ANSOLE coordinator to change the name of ICTP to ICTP^2 (The Abdus Salam International Centre for Theoretical and *Practical* Physics) to reflect the present strong involvement of the institution in experimental training of its fellows. Prof. Quevedo decided to make the various ICTP fellowship programs available to ANSOLE members.



Participants at AIFW 2013 in Mohammedia Morocco

The next ANSOLE event, ANSOLE Mini-Symposium in Kenya (AMSK2013), held on the 9 May 2013 at the Chiromo Campus of the University of Nairobi, wasmade possible by the invitation ANSOLE received to attend the ICSU (International Council for Science) Regional Implementation Workshop on Sustainable Energy in sub-Saharan Africa (www.icsu.org/africa) from the 7 to 8 of May 2013. ICSU is acknowledged for the indirect financial support of AMSK2013.

The event was attended by 35 participants from 8 Kenyan Universities, a Ugandan University (Makerere University) and a Kenyan solar company (EPIXSOLAR).

The highlight was the presence of the Principal of the College of Biological and Physical Sciences of the University of Nairobi, Prof. Bernard O.C. Aduda, who not only sponsored the coffee break and lunch but, in his welcome speech, praised ANSOLE for organizing such a "spontaneous" event in Nairobi and expressed his wish to see a "bigger" ANSOLE international event take place in Nairobi with the support of his college.

Fourteen lectures were held, consisting of general information about research activities, instrumentation and practical training programs in Nairobi, research results, PhD. proposals, and a company presentation. The event opened the way to a range of cooperative relations within Kenya in research and training of technicians, which is the main purpose of such a one-day meeting. Everyone - from organizers and corporate representatives to students - wished for the involvement of ANSOLE in future training programs. The participants obtained certificates of participation at the end of the event. Almost all participants who were not yet ANSOLE members decided to join the network (download abstract booklet AMSK2013).



Participants at AMSK 2013 in Nairobi, Kenya

The strong experimental research observed in Kenyan Universities was very impressive, since this is not the case in many African countries. The research relates to, and is supported by, a series of renewable energy initiatives now in place in Kenya. It is worth mentioning that the Centre for Research on New and Renewable Energies (CRNRE) of the Maseno University (www.maseno.ac.ke), accommodates - and encourages collaboration amongst- professionals from different fields: natural sciences (chemists, physicists, geologists, mathematicians) and social sciences (sociologists, anthropologists), as well as environmentalists, economists, business and communication experts.

The last and major scientific meeting of 2013 with ANSOLE's participation was the Regional Workshop on Material Science for Solar Energy Conversion held from the 4 to 8 November in iThemba Labs, Cape Town, South Africa, co-organized by ICTP and the Nanosciences African Network (NANOAFNET).



Participants at the Regional Workshop for Materials Science for Solar Energy Conversion, 04-08.11.2013, Cape Town, South Africa

The event's chief organizers were Dr Ralph Gebauer (ICTP) and Prof. Malik Maaza (NANOAFNET). ANSOLE assisted in the selection of participants and in chairing some of the presentations. It contributed to the awards of best poster prizes and best student oral presentations prizes. ANSOLE also prepared advertisement gifts (mousepads, eye glass cleaners, bags, purses, t-shirts, tea cups, "solar" beverages), which were donated to the authorities present at the event

opening ceremony, invited lecturers, students as posters and lecture prizes, and “lucky” participants.

ANSOLE assisted in publicizing the Solar Energy for World Peace Conference (www.solar4peace.org) organized by the director of the Linz Institute for Organic Solar Cells (LIOS), Prof. Dr. Dr. hc. Serdar Sariciftci, by announcing the event to its members, as well as by selecting African participants whose attendance was financially supported. In addition, ANSOLE awarded prizes for the 4 best African posters.

Virtually all renewable energy related scientific events in Africa were disseminated by using the ANSOLE website and mailing list. In addition, ANSOLE endorsed a series of events by signing media partnership agreements.

ANSOLE was invited to attend and in most cases present its activities in the following events:

- 3rd RUAD-EURD Conference 2013: TU-Berlin, 13.4.2013, Berlin Germany
- Internationale Solarkochertagung (International Solar Cookers Conference), Altötting, 20-21.4.2013, Alötting, Germany
- ICSU Regional Implementation Workshop on Sustainable Energy in sub-Saharan Africa, 7-8.5.2013, Nairobi, Kenya
- Deutscher Entwicklungstag (German Development Day), 25.5.2013, at the Holzmarkt in Jena with an open air event where ANSOLE and other NGOs exhibited. A solar cooker and “solar” drinks (a drink is called “solar” beverage, when at least 25% of the energy needed for its production is from solar energy) were a public magnet for the ANSOLE stand. A young woman from Egypt, ICTP-ANSOLE ANEX scholar, Ms Shaimaa Mohamed Ali Ahmed, actively participated.
- Jenaer Umwelttag (Jena Environmental Day), 8.5. 2013 at the Goethe-Galerie in Jena. ANSOLE distributed information flyers and publicity gadgets bearing ANSOLE´s logo, demonstrated a solar cooker and gave out «solar» drinks, the last two items being the public magnet. Another female ANEX PhD student, Ms Nassima Bouguerra, from Bejaia, Algeria actively participated.
- Solar Energy for World Peace, Istanbul, Turkey, 17-19.8.2013
- Technical and Vocational Training and Education (TVET) for Renewable Energy Sector in Africa: Developing vocational training activities in the framework of the Africa-EU Renewable Energy Cooperation Programme (RECP), 16-17.10.2013, in Maputo Mozambique. Most participants suggested that ANSOLE should become a certification body for renewable energy training programs in Africa.
- Regional Workshop on Materials Science for Solar Energy Conversion, 4-8.11.2013, Cape Town, South Africa

At these events ANSOLE could attract new members.



ICTP-ANSOLE ANEX Fellow, Ms Shaimaa Ali Mohamed Ahmed, during the German Development Day, 25.5.2013 in Jena, Germany



RECP Workshop on TVET in Africa, 16-17.10.2013, in Maputo, Mozambique



Participants at the ICSU Regional Implementation Workshop on Sustainable Energy in Sub-Saharan Africa, 7-8.5. 2013, in Nairobi Kenya

Since the beginning of April 2013, ANSOLE has organized a photo exposition with the title "Science meets Art" at different locations in Jena, Germany, which had local media coverage.

Involvement in international project proposals

1. Together with ICTP, ANSOLE was involved in a consortium under the leadership of the Glasgow-based Institute of Nanotechnology, which submitted a project proposal on the 4.12.2012 at the European Commission in the framework of FP7 program. The title of the project is: "*Nanosciences, **N**anotechnologies, **M**aterials and new **P**roduction Technologies-**D**eployment in **A**frica and the **Me**diterranean Partnership Countries (**NMP-DAME**)"*

2. In the framework of the ACP-EU program on Science, Technology and Innovation (STI II)’s call for project proposals, the national representative of ANSOLE in the Netherlands, Dr. Ineke Malsch, together with the ANSOLE coordinator, set up a consortium of 7 partners (under the leadership of ICTP) to submit a project proposal with the title: "*Database of African Renewable Energies (DARE)*"

3. ANSOLE was also involved in a second ACP-EU STI II project proposal under the coordination of the Glasgow-based Institute of Nanotechnology. The consortium was made up of 2 European and 4 African partner institutions linked to ANSOLE. The title of the project was: “*Building endogenous capacity for the*

deployment of solar power (Photovoltaics and Organic Photovoltaics)"

In all cases ANSOLE was instrumental in getting partners to build up the various consortia, underlining the importance of having such a network. Unfortunately none of the projects were granted funding.

Media coverage

The opinion of ANSOLE has been sought in issues related to renewable energies in Africa.

In 2011, after its launch, a series of online reports- mostly based on interviews with the coordinator, Dr. Egbe, and other ANSOLE members - and radio broadcast (ie Cameroon Radio and Television, CRTV, South African Broadcasting Corporation, SABC) were made about ANSOLE. The two national media in Cameroon (Cameroon Tribune and CRTV) and a series of local Cameroonian news organs thoroughly covered the first solar event organized in Yaoundé on the 1st of April 2011. The same can be said for ANSOLE DAYS 2012.

In June 2011, Lisa Friedman, a freelance US- based journalist, wrote an article on ANSOLE in relation to the DESERTEC initiative, which appeared in the New York Times and, later, in USA Today. This boosted the international visibility of ANSOLE.

In 2012, interviews with ANSOLE were published/ broadcast by the -Cameroon Radio and Television (CRTV), -British Broadcasting Corporation (BBC), -Radio France Internationale (RFI), -ORF (Austrian Radio and Television), -The Hindu (Indian newspaper) -La lettre de CADE (French online journal), -SciDEV.net (British publication on sustainable development), -pv-tech.org (London- based publication), -Energy Intelligence (New York -based publication), etc.

In March 2012, immediately after ANSOLE DAYS 2012, the magazine "Appropriate Technology" (www.appropriate-technology.org) published a three paged article on ANSOLE with the title "Africa to light up Africa" reporting on the creation and activities of the network (Appropriate Technology 2012, 3, 58-60).

In 2013, a three paged article reporting on ANSOLE appeared in the Austrian based international cooperation magazine "Südwind" based on an interview by a freelance journalist. A local TV station (Jena TV) and a local newspaper (Ostthüringer Zeitung) reported on ANSOLE during the Photo Exposition event "Science meets Arts" and after the German Development Day, respectively.

Media Partnership Agreements

Between 2012 and 2013, ANSOLE signed media partnership agreements with the organizers of the following events:

1. Solar South Africa, 19-20.6.2012, Johannesburg, South Africa

2. The Solar Future: South Africa 2013, 12-13.2.2013, Cape Town South Africa

3. Africa Photovoltaics Solar Energy Conference and Exhibition, 27-29.3.2014, Durban, South Africa.

4. Sub-Saharan Solar Conference, 24-25.4, Accra, Ghana (organized by Singapore-based Magenta Global).

5. Africa Energy Indaba, Solution for Africa, Conference and Exhibition, 18-20.2.2014, Sandton Convention Centre, Johannesburg, South Africa.

The media agreements enabled conference fee discounts between 10 to 25% for ANSOLE members, among other advantages.

Recommendation letters

In 2013, the ANSOLE coordinator wrote recommendation letters in favor of ANSOLE members which, among other things, facilitated the issuance of a green card to a Kenyan citizen in the US; the award of a top job in Namibia's renewable energy sector; and the appointment of an associate professorship in Turkey; as well as enabling participation in an ICTP event in Trieste.

Others…

- In 2013, ANSOLE was contacted by the USAID to publicize the Obama Power Africa Initiative using our website and mailing list.

- To avoid jobless, trained skills, technical and vocational training (TVET) in renewable energy sector need be paired with jobs creation. A possible area of jobs creation is in food and beverage industries where solar (renewable) energy can constitute the main energy source in the industrial process.

This is a growing sector for example in Germany, where a number of "solar" breweries (and slowly solar food processing industries) have emerged in Bavaria during the past 10 years. ANSOLE is ready to mediate North-South and South-South joint-ventures.

In 2013, a successful mediation was made between an ANSOLE member and businesswoman in South Africa and a brewery in Germany producing "solar" beverages, with the long term plan to create jobs in South Africa and elsewhere in Africa by constructing local "solar" breweries.

What next?

ANSOLE was initiated in Tunisia, the country which gave the name to our sun-blessed continent Africa. It is a network initiated by Africans on the African soil for Africa. However, because Africa is part of the global village and, many of our members live out of Africa, ANSOLE is of global interest and will attain its present and future goals through inputs from Africans and non-Africans. ANSOLE can only be sustained if our members actively participate in the running of the network by supporting it with their prayers, ideas, yearly dues, initiatives, etc, and speaking about the network to non-ANSOLERS.

Based on the following two biblical quotations which have motivated the actions of ANSOLE from the beginning:

I shall bless you…and you shall be a blessing (Genesis 12:2)

I have set before you an open door, which no one is able to shut (Revelation 3.8)

I am convinced that this network shall withstand all adversities to remain a blessing for the African continent and the rest of the world.

Acknowledgements

I would need to write pages of acknowledgements to thank all those who have been instrumental in the swift running of ANSOLE till date. They are too many. God knows you and will reward you! A few names that come in my mind are Samir and Amel Romdhane, Yohannes Teketel, Serdar Sariciftci, Lesley Tobin, César Kapseu, Pierre Telep, Edouard Nkeck, George Elambo, Jean-Marie Ndjaka, George Sissoko, Abdelfettah Barhdadi, Izzedine Zorkani, Bouchaib Hartiti, Safae Aazou, Gehard Gobsch, Emelda Samba, Helmut Becker, Kambiz Ghawami, Petra Loch, Julia Boger, Harald Hoppe, Walter Werner, Christian Beese, Ineke Malsch, Michael Dürer, Carsten Agert, Adenike Boyo, Robinson Juma, Emmanuel Ramde, Mammo Muchie, Zivayi Chiguvare, Sosten Ziuku, Heidi Hornickel, Christian Leier, Ines Koch, Kate Showers.

I am grateful to all our members who are paying their yearly dues. ANSOLE is extremely grateful to ICTP, not only for financial support but also for promoting the network in diverse ways. Special thanks to the director Prof. Fernando Quevedo, Dr. Ralph Gebauer, Prof. Joseph Niemela and Dr. George Thompson. Dr Bettina Schmidt is thanked for many things, especially for drafting the new by-laws of ANSOLE e.V. and initiating and chairing the editorial board of ANSOLE News.

Oberaerztin Dr med. Anne Egbe is thanked for the multiple supports I am receiving from her and for caring for the finances of ANSOLE e.V. Special and heart-felt thanks go to Mr Narcysse Ngada, who is taking care of our website without any remuneration. I thank God for him! The secretary of LIOS, Nadja Denklmaier, is acknowledged for efficiently assisting me in managing the finances put at ANSOLE disposal by ICTP.

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Country profile: Ghana

Meeting the energy needs of off-grid rural communities in Ghana- The ARB Apex Bank/AGSI way

by Samuel Adu-Asare

The need to accelerate electricity access in Ghana, necessitated by a low access rate of 15% in the late 1980's, ushered in various electrification programs by the government such as the National Electrification Programme (NEP), the National Electrification Scheme (NES) and the Self-Help Electrification Programme (SHEP) with the active support of donors. This significantly increased the access rate of electricity to about 75% currently, making Ghana one of the leading countries in sub-Saharan Africa in having a high rate of electricity access. The government's policy direction is to "ensure a universal access to electricity through the choice of alternative modern forms of energy to all Ghanaians by 2020".

Despite the successes of electric grid extension in the country, the reality today is that more energy is needed to provide socio-economic development and expand the economy in order to address poverty alleviation challenges and job creation expectations of Ghanaians.

Pursuing alternative energy options such as solar energy for lighting in rural off-grid communities has witnessed a new impetus through the implementation of the Ghana Energy Development and Access Project (GEDAP) – Solar sub-component by the Association of Rural Banks' ARB Apex Bank since 2009. The Project was financed by the International Development Association (IDA), Global Partnership for Output Based Aid (GPOBA) and the Global Environmental Facility (GEF).

The objective of the project was to promote solar electricity to communities that are not likely to be connected to the grid within the next five to ten years. Off-grid communities within eleven districts in Northern, Upper West, Upper East, Brong Ahafo and Eastern Regions were identified for the implementation of the project.

Considered a success, the project exceeded its initial sales target of 15,000 installed systems in March 2013, leading to a revised target of 16,500 - which was also exceeded by the end of 2013. How, did this happen?



The implementation of the GEDAP-Solar Component project took into consideration the need to assist customers with loans from participating rural banks in the districts of Sissala, Builsa, Kassena-Nankana, Bongo, Gonja, East and West Mamprussi, Sene, Dambai, Krachi and Fanteakwa to enable them to purchase and own solar products offered by solar dealers from the Association of Ghana Solar Industries (AGSI). The solar companies involved were Wilkins Engineering, Deng Limited, Toyola Solar, Mascot Energy Systems, Power World Ltd, Novai Energy Ltd and MonoEGE Ltd.

To complement the loans offered to customers in the off-grid communities within the project areas, the project offered a grant component of about 50% of the cost of lighting products purchased by beneficiary customers within the districts where the project was implemented. Island communities within the Krachi and Sene districts were also included in the project.

For most of the beneficiaries, the provision of solar lighting that enables mobile phone charging, watching of television and having access to light in the evenings is now a reality worth looking forward to each day. Darkness at night, which hitherto had been an aspect of life in most rural communities in Ghana, is gradually being transformed through innovative solar energy systems that range from smaller systems such as lanterns to 100watts systems that provide lighting for av-

erage households, and enable activities worth enjoying in the evenings.

Challenges

Ghana has, in the past, implemented various solar energy projects - mainly in the northern parts of the country. Though its impact has been high during the project phases, sustaining the use of solar energy has been a huge challenge. In some cases, the issue of the ownership of solar systems in schemes such as "fee for services" for solar lighting, did not sit well in off-grid areas. Where peasant farming is the major source of income, regular amounts are not earned throughout the year.

Also, the availability of dealers to provide replacement parts and technical services for solar energy users leads to the abandonment of solar lighting systems which require basic maintenance to keep the systems running.

Impact

The success of the project - with its positive soio-economic impacts - has been phenomenal, despite initial scepticism of the project's sales goal being met. The



AGSI marketing of solar energy for lighting and sensitization to off-grid communities influenced the communities to patronize the project. Consequently, women and children are able to use solar energy to learn at night and attend to household chores. Availability of DC televisions in households has enabled beneficiaries to hear and have access to information about what is going



on in the country among others in the project areas.

Way forward

Sustaining the gains of the project was perceived as a major challenge. Capacity development in the form of solar PV technical training programs for the AGSI solar company dealers and community technician agents was undertaken during the implementation of the project.

The objective of this training is to help develop technical capacities for installers and technicians to become PV agents in the off-grid communities who will in turn, attend to complaints and educate customers/users on how to handle their solar systems. Availability of products and spare-parts is a challenge for users of solar energy products. A supply chain for product availability in the community is, therefore, needed to ensure a sustainable use of solar lighting in off-grid communities.

To ensure the sustainability of the systems, the ARB Apex Bank and AGSI are rolling out a battery replacement program to help beneficiaries replace their batteries after 2-3 years of operation. All replaced batteries will be disposed of in an environmentally friendly way.

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Samuel Adu-Asare has been, since 2007, a freelance consultant, and since 2010 worked for the Association of Ghana Solar Industries under the World Bank Ghana Energy Development and Access Project, Solar Component (GEDAP). Prior to this, he was the Country Manager for Global Sustainable Energy Solutions, Ghana (GSES) a consultancy company involved in Renewable Energy and a subsidiary of Global Sustainable Energy Solutions, based in Australia. Within the same period (2007-2009) he served the Association of Ghana Solar Industries (AGSI) as its secretary. He graduated in the Social Sciences (Law & Sociology) from the Kwame Nkrumah University of Science and Technology (KNUST) Kumasi, Ghana in 1889.

Agency Profile: UNREA

Uganda National Renewable Energy Association - UNREA

Harnessing the Environment for Clean Energy

The Uganda National Renewable Energy Association (UNREA)

by Esther Mukooza

Uganda National Renewable Energy Association is a confederation/Association of Ugandan private companies dealing in the distribution of Solar Photovoltaic (PV) and other Renewable Energy Technologies in Uganda. It is a nonprofit making company/Agency limited by guarantee, incorporated under the laws of the Republic of Uganda, founded by a group of private companies that distribute solar power systems and other renewable energy solutions in Uganda.

Uganda's potential

Uganda is richly endowed with renewable energy resources for energy production and the provision of energy services, but they remain largely unexploited. The total estimated electrical power potential is about 5300 MW. So far, only large hydro resources along the Nile have been developed to some extent to provide electricity through a national grid. The other resources that remain largely untapped include small hydro, biomass, solar, wind and geothermal sources.

Uganda is, however, facing many energy-related challenges that threaten to undermine its development: poor access to energy, inadequate electricity supply; inefficient use of the energy available (mainly biomass); lack of awareness about the environment; insufficient streams of modern energy services; low profitability and productivity of enterprises resulting in weak job creation.

Energy needs

Uganda's per capita energy consumption of 0.3 tons of Oil Equivalent (TOE) is among the lowest in the world. Just around 9% of the population - in rural areas only 3% - has regular access to electricity. For the Ugandan energy sector biomass, which supplies over 90% of the country's energy requirements, has continued to be used in its traditional form, largely as firewood, charcoal and crop residues. These biomass energy resources are utilized inefficiently and unsustainably. Petroleum products, currently wholly imported, and the limited hydropower plants, provide the balance of modern energy requirements.

As oil exploration in the Albertine Graben (located along the border of Uganda and DRC and further stretching to Southern Sudan), is going on - and with huge government emphasis on it - Uganda's energy balance will change considerably in a few years. The country's near-term self-sufficiency in gas will be ensured, and a small surplus energy balance will be produced.

Diversify: access to energy

Even after oil is finally part of the 'energy stream', access to electricity in rural areas will still continue to remain a serious challenge in the foreseeable future; dependence on biomass for cooking will prevail for a considerable period of time.

The overall objective of the Ugandan Renewable Energy Policy is to diversify the energy supply sources and technologies in the country. In particular, the policy goal is to increase the use of modern renewable energy from the current 4% to 61% of the total energy consumption by the year 2017. To achieve this very ambitious target, the role of the private sector needs to be addressed. It is private sector vendors that actually get the technology to the end user through direct sales and installations of solar home systems and commercial systems, as well as through public awareness campaigns promoting the use of these kinds of technologies.

UNREA

UNREA is an organization representing the various actors working in the Renewable Energy (RE) subsector in Uganda. It includes experts in solar PV, biomass energy and biogas, and energy auditing. The association was registered as the Uganda National Renewable Energy Association (UNREA) over five years ago by founder members that were largely Ugandan private business companies involved with Solar PV technology. The expanding and changing nature of the industry, however, has necessitated that the association be transformed into an inclusive entity representative of all RE technologies under one umbrella body, including energy efficiency, its use, and planning.

Partners

In an effort to increase and expand, as well as improve the private sector, UNREA has been supported by a number of entities, ranging from the Government of Uganda to the end user.

It is important, however, to emphasise the extent to which the German government through its Ministry of Economic Cooperation and Development has impacted the RE Sub sector in Uganda. The German Agency for International Cooperation (GIZ) has, since the year 2009, facilitated the association in the area of capacity building. For example, several advanced training courses in solar PV were undertaken by participants from the association and education sector. The objective was to train trainers whose skills had been deemed not sufficient, and also to enable them have a multiplier effect by demonstrating the quality of the services provided in the sector as well as propel sectoral growth.

Through the provision of finance and resource persons, SEQUA gGmbH (http://www.sequa.de) - a German development cooperation agency operating worldwide - and the Berufliche Fortbildungszentrum (bfz gGmbH) in Germany, have has since 2012 also supported the East African Renewable Energy Associations. This has strengthened the Association in many ways including - but not limited to - facilitating networking activities and fostering collaboration between the regional RE Sub-sector associations.



Participants of the bfzgGmbH 2nd short term project aimed at strengthening RE Associations in East Africa held in Kampala on 8-9 May 2013 - Front Row, l.t.r.: Esther Mukooza- UNREA Secretariat Executive Secretary , Cecilia Richards-TAREA Secretariat, (Next Row, Right to Left) Matthew Matimbwi- TAREA Executive Secretary, Charles Muchunku-KEREA Chairperson, Jean Bosco Rwiyamirira-RREA Chairperson, Cliff Owiti-KEREA Executive Secretary. Third Row, r.t.l: Emmy S. Kimbowa-Chairperson UNREA, Donatien Nzokira-BUREA Board member, Martin Straehle-bfzgGmbH Expert,Evariste Gatete-RREA Executive Secretary. Back: Theodore Kwigize; BUREA Chairperson

Currently, UNREA is in talks with the Horizont3000 development cooperation organisation with roots in Austria, about a possible partnership as well.

UNREA mission

The association's mission is to pursue realistic development by promoting the use of sustainable clean energy solutions for the entire population of Uganda through aggressive lobbying, empowerment of rural communities by public awareness campaigns and capacity building (more details on our website).

UNREA activities

Our activities as an association are currently geared mainly towards building capacity and market development. An Assessment and Training Package (ATP) for solar technicians is in its final stages of development. With this tool, a modularised training program will be conducted at least twice a year.

Participants from both the formal and informal sector will be able to access this competence based training. At the end, participants will be certified by the Directorate of Industrial Training, the mandated body under Uganda's Ministry of Education and Sports. The Ministry of Energy and Mineral Development, GIZgmbH and bfzg GmbH have all been key partners in this activity.

Needs assessment exercises, public awareness campaigns and the development of a renewable energy data bank are activities UNREA is also currently engaged in for purposes of improving the business environment and rendering its members more competitive, especially amidst challenges arising out of a market infiltrated with many sub standard solar products. It is believed that the standards problem will be solved by working very closely with the Uganda National Bureau of Standards (UNBS), and with the formation of a regional Renewable Energy Association



UREA office located at Agip House, along Kampala Road in Uganda. Eng. Matthew Matimbwi-TAREA Executive Secretary and Dr. Klaus Winkler paying us a courtesy visit.

UNREA is also very actively involved in the current drive to establish a regional Renewable Energy, Energy Efficiency and Energy Conservation association which will comprise (but not be limited to) the five East African countries Burundi, Kenya, Rwanda, Tanzania and Uganda.

We update the public on activities on our website (www.unrea.or.ug).

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Esther Mukooza is Executive Secretary of UNREA. She is a teacher by profession and taught undergraduates in the social work department of St. Lawrence University-Uganda before receiving training in the field of Renewable Energies in Germany in 2010 with support from the German donar agency InWEnt - Capacity Building International (Interationale Weiterbildung und Entwicklung gGmbH) with a focus on capacity building, and is now part of GIZ.

DSTC Solar Training Centre

by Hellena Buabeng

Energy plays an integral part in achieving sustainable development. However, its inadequate supply has caused great difficulty for some sectors, such as in agriculture, education and health.

In Ghana, two major institutions are involved with renewable energy vocational training and education. They are DSTC Solar Training Centre in Accra and the Energy Centre at the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi.

DSTC Solar Training Centre was established in 2009 in technical cooperation with Global Sustainable Energy Solutions of Australia and the department of Mechanical Engineering and Agriculture of KNUST.



The DSTC Training Centre

Initial co-financing was secured from the German development bank DEG (Deutsche Investitions- und Entwicklungsgesellschaft mbH), Germany. Other sponsorships have been received from the Australian High Commission in Ghana.

With the inability of the electricity sector to live up to current demand coupled with the increasing price of crude oil, it has become necessary for West Africa to divert its attention to other forms of energy.

Though Sub-Saharan Africa receives huge amounts of solar radiation on a daily basis, this has yet to be utilised in full. Among other factors, this can be attributed to lack of proper education and qualified personnel, such as technicians and engineers, to handle renewable energy effectively. Policy makers who will be able to influence decision making for vocational training and education are equally not well informed on renewable energy. This worsens the already bad situation of vocational training and education on renewable energy in West Africa.

DSTC Solar Training Centre bears a torch in vocational training and education on renewable energy, specifically solar power. It is a challenging sector to belong to in a country where little attention is given to re-

newable energy. However, since its establishment in 2007, DSTC has trained about 800 participants from Ghana, Sierra Leone and Liberia.

DSTC's clientele includes individuals, polytechnics, the Association of Ghana Solar Industries, the Ministry of Energy under the Ghana Energy Development Assess Project (GEDAP), and some private companies. Participants are taken through theory and practical sessions of solar systems design, installation and maintenance for a period of one to two weeks. At the end of the training period, there is an exam after which certificates are awarded to students who passed. DSTC solar training centre is certified by the Institute of Sustainable Power (ISP) in Australia. Periodically, a master trainer from Australia visits the training centre for monitoring.

Challenges in vocational training

Vocational training and education on renewable energy is faced with numerous problems, ranging from unfavourable policies to limited finances. The solar option of renewable energy, which is used in Ghana, has yet to be fully utilized by a majority of the population. It is seen as expensive to acquire. This automatically creates a lack of interest in people to be trained as technicians because they think: "Why train as a technician if there are no systems to maintain or install?". Even when people are trained, the question of job security rises again. There are not enough jobs to employ trained people. For this reason, many of the trained participants have to become self employed, relying on the installation of small solar home systems to make a living.

There have been instances in which donor agencies have supported training programs in rural communities, but one does not have to go too far to hear stories of programs gone bad as some participants only show up for the food and per diem. In such instances, the whole aim of the training is defeated.

In Nigeria, for instance, Solar Sister, a renewable energy capacity building company, recruits women and assists them with vocational training. However, at the end of each session, only a handful will be left as fully trained technicians. They are either not interested, or they think it's a man's job to learn technically inclined subjects. This makes it difficult for gender equality to be achieved in renewable energy training.

Positive trends

DSTC Solar Training Centre has organized training programmes on "Design, Installation and Maintenance of Solar Systems" in collaboration with some polytechnics in Ghana. Moving forward for more training has met financial bottle necks, thereby bringing such programmes to a standstill.

All the above notwithstanding, there have been some positive results in vocational training and education. For example, under the Ghana Energy Development Assess Project (GEDAP) with the Ministry of Energy in Ghana, over 150 participants have been trained.

This has helped tremendously in the sustainability of the projects. Systems which hitherto would have collapsed for lack of maintenance are now working properly, and a lot of off-grid communities in Northern Ghana now have access to electricity from solar energy.

West African governments and policy makers should make a concerted effort to formulate policies in favour of renewable energy that would boost the sector and increase the potential for vocational training and education on renewable energy.

More information under www.dstc-africa.org



Hellena Buabeng is the head of the DSTC Secretariat and coordinates the day to day operations of the Training Centre

ANSOLE signs MOU in Rabat

École Normale Supérieure, Rabat, Maroc

African Network for Solar Energy

by Abdelfettah Barhdadi & Daniel A. M. Egbe

The Ecole Normale Supérieure of Rabat (ENS-UM5A) and the African Network for Solar Energy (ANSOLE) have formalized their partnership by signing a master agreement of scientific and technical cooperation.



Signing of the MOU between ENS-UM5A and ANSOLE

The purpose of this agreement is to define the general conditions of cooperation and to establish the contractual basis to promote scientific and technical exchanges and to facilitate the execution of joint projects on training, research and development in solar energy field.

The creation and implementation of an international center of excellence for education, research and innovation in solar energy at ENS-UM5A is the main objective of this agreement which was signed on Friday, 21/03/2014 at ENS-UM5A in the presence of administrative officials and heads of local structures of training and research.



f.l.t.r: Prof. Abdelfettah Barhdadi, (ANSOLE National Representative in Morocco), Prof. Daniel A. M. Egbe (ANSOLE coordinator) with Prof. Rajaa Cherkaoui El Moursi (Vice-President of UM5A)

After the signing ceremony a meeting with the Vice-President of UM5A in charge of Research, Cooperation and Partnerships, Mrs Prof. Rajaa Cherkaoui El Moursi was held in her office together with the Director of ENS-UM5A, Prof. Hassane Jaziri, the Coordinator of ANSOLE, Prof. Daniel A. M. Egbe, and ANSOLE Representative in Morocco, Prof. Abdelfettah Bardadi, full Professor of Physics at the ENS-UM5A of Rabat. It was agreed to draft a scientific cooperation agreement between ANSOLE and UM5A to be signed in the course of this year.

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Interviews with ANSOLE scholarship students

Interview with Joël Hervé Nkuissi Tchognia



PhD student at the University of Yaoundé I, Cameroon, currently at University of Mohammedia, Morocco

Q. What is your area of research?

I am working on the synthesis and characterization of ternary and quaternary materials in thin films by low cost techniques for photovoltaic applications. This is important because today both ecology and energy are important, and new technologies based on new materials - often in thin films - compete well with the old technology of massive silicon. Ternary and quaternary materials in thin films require fewer materials than earlier photovoltaic surfaces and there are low cost technologies that are relatively simple to implement for their production.

Improvements in thin films properties are required for making a quality photovoltaic absorber. I tried to synthesize the Cu_2ZnSnS_4 (CZTS) compound used recently as an absorber in thin films solar cells by sol-gel method without sulfurization I also studied the effect of the substrate temperature on properties of CZTS elaborated by Spray Pyrolysis technique. The results have shown the improvement of CZTS properties with the increase of substrate temperature - the best result was found with the temperature 375°C. My research results have been presented as posters and oral communications in 4 scientific events in Morocco, Turkey and South Africa where I obtained the certificate and prize of the best PhD student oral presentation during the Regional Workshop on Materials Science for Solar Energy Conversion held in Cape Town from the 4th to 8th of November 2013. These events allowed me to see other aspects in the synthesis of this material and how to better improve their properties. These results were also published in 2 peer-reviewed publications which appeared in 2013 (third author) and in 2014 (first author). ANSOLE has opened my way and allowed me to build my scientific career by offering me the Intra African Exchange Program (INEX) scholarship.

Q. How did you learn about ANSOLE?

I learned about the ANSOLE network from my supervisor Pr. NDJAKA when he had co-organized the ANSOLE DAYS 2012 held at the premises of the University of Yaoundé I from 17th to 19th of February 2012. He advised me to browse the ANSOLE website to learn more about the network and scholarship programs.

I applied for Intra African Exchange Program (INEX). The main thing to do was to find a host laboratory; it was not so difficult because Prof. Egbe had sent the list of renewable energy laboratories in Morocco. After that, things progressed very fast. I was hosted by the Laboratoire de Physique des Matériaux et Applications des Energies Renouvelables, Faculté des Sciences et Techniques, Université Hassan II Mohammedia, Mohammedia, Maroc. The visa procedure was long and a little difficult due to the long stay that I required. I take this opportunity to thank Prof. Bouchaib HARTITI, my host and external supervisor, who helped here in Morocco so that I obtained the entry visa. I flew from Cameroon on Royal Air Maroc; the air ticket cost 579 800 FCFA (885 Euros), which ANSOLE has paid.

Q: What were your experiences in the host laboratory and living in a host country?

The warm welcome of my supervisor and my colleagues made me feel at home. With my Moroccan friends and sub-Saharan colleagues everything was well and continues to be like that, thanks to God. All students must have a residence permit, which is applied for upon arrival. Two documents are required – a certificate of coverage issued by the student's embassy, and a lease contract from a landlord to demonstrate that accommodation has been arranged. The first thing a foreign student must do is register with his embassy to get the certificate of coverage; this was not simple. at my embassy. Because there are no student's accommodations in Mohammedia, flats are expensive, and it is common for students to share one with friends. I thank one more time my supervisor Prof. HARTITI, who put me in touch with a Ghanaian colleague who helped me get a room in his flat. I had a problem because the landlord did not want to sign a

lease contract with me. But after some discussion between the landlord and the authorities, everything became easy. Once your application is accepted, you are given a receipt, and after 2 or 3 months, your residence permit is ready. My colleagues created a suitable environment for work, showing me how things operate in the laboratory. They have always had a sense of sharing and open minds.

Q: Where do you come from and what education did you receive so far?

I was born on 4 December 1984, the 2nd of 5 children, in Kekem, western region of Cameroon. My father is a retired teacher and my mother a housewife. I obtained my high school graduation in Mathematics and Physics "Baccalaureate C" at Lycee de Kekem in June 2003. This allowed me to attend the University of Yaoundé 1 where I obtained my Bachelor of Physics in September 2007. I started my Masters thesis in Materials Science on April 2008 and obtained it in August 2010. In March 2011 I was selected for a PhD under the supervision of Prof. Jean-Marie NDJAKA at the Laboratory of Materials Science, University of Yaoundé I.

Q. What are the immediate challenges in your work and in the RE sector?

My PhD research is not yet complete. I have some studies to do again like to see the effect of annealing atmosphere, temperature and time on the sol-gel process, the effect of solvent, and the effect of copper ratio on the film quality. We will use also the TAGUCHI's design of experiment to optimize the Spray Pyrolysis process in the synthesis of CZTS material. If everything goes well, I hope to round up these studies before March 2015.

Our main challenge - and certainly in coming months - lies in characterization techniques. We only have synthesis techniques in our laboratory. After the synthesis of our different materials, the samples must be sent to partner laboratories in Europe or at CNRST (Centre National de la Recherche Scientifique et Technique) here in Morocco for characterization. The results take a long time to reach us.

In Morocco the government is involved in the field of renewable energy and the entire Kingdom has been educated about it. There are many conferences, workshops, schools, events in the field organized by universities and businesses in order to share recent developments and achievements in the field. So much is happening in the field of renewable energy here in Morocco that it could be the African pioneer in the field in coming years.

Q: How are the facilities in the laboratories?

Morocco is already a host country for many foreign students, particularly Sub-Saharan Africans. I found the education system to be very well organized and good for foreign students. Our laboratory is open to everyone who shares our philosophy of working collaboratively. I could recommend both my laboratory and Morocco for study.

Q. From whom did you receive assistance?

I am very grateful to ICTP and ANSOLE for their assistance, especially to its founder and international coordinator, Prof. Daniel A. M. Egbe, for his advice and encouragement.

Interview with Shaimaa Ali Mohamed Ahmed



Research Assistant, Center for Photonics and Smart Materials (CPSM), Zewail City of Science and Technology, Egypt

Q. What is your area of research and how did ANSOLE assist you?

A scholarship grant from the ANSOLE Africa-North Exchange (ANEX) Program allowed me to spend 6 months at the Linz Institute for Organic Solar Cell (LIOS) lab of the Johannes Kepler University (JKU), Linz, Austria where I learned about the importance of PbS quantum dots and their applications in photovoltaic solar cells, and began research on them for my dissertation entitled „Inorganic nano-particles for solar cell fabrication and technology application"..

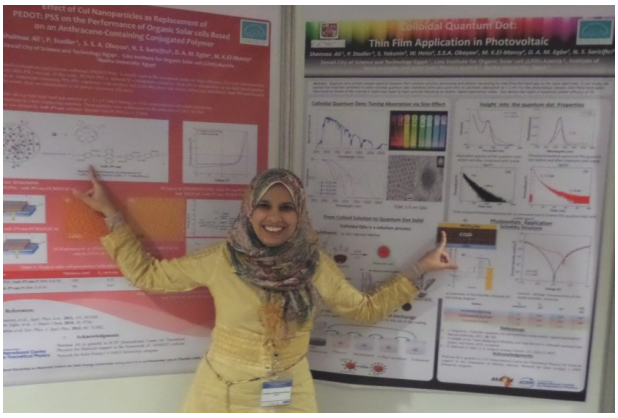
In one study, we applied hot-injection synthesis to yield colloidal quantum dots stabilized with oleic acid with an excitonic absorption at 1.3 eV. For the photovoltaic devices, thin films were fabricated by means of dip coating in multi-step layer by layer process following an atomic ligand passivation route.

The as-prepared quantum solid shows excellent electronic properties including narrow trap bands and high mobility – as characterized by transient photo-induced absorption and field-effect transistors. The time-resolved PL measurements show that atomic ligands do not quench emission of PbS nanocrystals drastically, so they are more preferable for photovoltaic application than other type of ligands used to improve electronic transport in quantum dots. We studied photoconductivity properties of quantum dots after ligand exchange and found that although the samples have moderate photoconductive gain, the rather high bandwidth of the response makes this material promising for application in fast photodetectors. In addition, both the film quality and the optoelectronic features make the system most interesting for a single-junction photovoltaic device.

This work was presented as a poster in the international conference "Solar Energy for World Peace", Istanbul, Turkey, 17-19 August 2013, and as a talk at the Regional Workshop on Materials Science for Solar Energy Conversion, 4-8 Nov. 2013, Cape Town, South Africa, and received the prize for Best Student Lecture. A paper is in preparation for submission in a peer-reviewed journal.

I also investigated the effect of CuI nanoparticles with/or as a replacement of PEDOT:PSS in anthracene – containing poly(*p*-phenylene-ethynylene)-*alt*-poly(*p*-phenylene-vinylene) (PPE-PPV) (known as AnE-PV*stat*) based solar cells. AnE-PV*stat* is used as electron donor in bulk heterojunction solar cells to-

gether with the conventional fullerene-based material, phenyl C60-acidbutyric-methyl ester (PC60BM). The results showed an enhancement in the power conversion efficiency upon replacing PEDOT:PSS with a layer of CuI nanoparticles, which might be due to the transparent nature of CuI films allowing better light absorption of the active layer.



Shaimaa Ali Mohamed Ahmed presenting her work at the conference in Cape Town, South Africa

This work was presented as a poster in the Regional Workshop on Materials Science for Solar Energy Conversion, 4-8 Nov. 2013, Cape Town, South Africa, where it won the Best Student Poster Prize.

I was unable to complete my lab research during the 6 month scholarship period, and my home institution, the Faculty of Science, Banha University, Egypt lacked the facilities needed to continue my research. ANSOLE offered me another three months to finish my work. I expect to finish and submit my thesis within a year.

Q: How did you learn about ANSOLE and how was the application procedure?

My PhD supervisor at Banha University, Prof. Mabrouk El-Mansy, introduced me to the ANSOLE website which has information about the network and scholarship programs for student exchange. I applied for, and received, an ANEX scholarship. The main problem was finding a host laboratory. I was helped by ANSOLE's Coordinator, Prof. Daniel Egbe, who introduced me to Prof. Sariciftci, Director of LIOS. After an interview, I was accepted. The Austrian Agency for International Mobility and Cooperation in Education, Science and Research (OEAD) organized and facilitated my stay in Austria. The visa was issued in 3 days. I flew to Austria on Egyptian Airline, and the ticket cost me 280 Euro, which was refunded by ANSOLE.

Q: What were your experiences in the host laboratory and living in a host country?

When I arrived, the warm welcome of my supervisor and colleagues made me feel at home. I stayed at the JKU student hostel, where I made many friends from different countries and cultures. I had a very nice and comfortable single room, whose cost was covered by my scholarship. At the lab, I was first instructed in safety and laboratory procedures, then I was trained on different machines and techniques available in the lab. Once certified, I was able to work as an individual. I had my own desk with the other members at the institute. The atmosphere encouraged me to do good scientific research. Dr. Philipp Stadler, who introduced me to the topic of the quantum dot in solar cell fabrication, supervised my lab work and research project.

Q: Where do you come from and what education did you receive so far?

I was born on 2 June 1979 in Shubra El-Khaima, Cairo Egypt, and am the 2nd of 5 children. My childhood was spent in Saudi Arabia, where I graduated from secondary school. For university studies I joined Egypt's Ain Shams University, receiving my Bachelor degree in physics and chemistry in 2001. The next year I took an integrated training course in Information Technology at Faculty of Computing and Information, followed by a pre-master course in experimental physics at Cairo University. Prof. M. A. Zaki Ewiss, Faculty of Science, supervised my Master´s study of the physics of semiconductor glasses "Liquid crystal and Laser spectroscopic lab" from 2004 until my degree in 2008. Afterwards, I worked as a teaching assistant for Physics in Faculty of Engineering and Technology, Arab Academy of Science and Technology, Cairo.

In 2012, I became interested in solar energy and photovoltaic research and was hired as a research assistant at the Center for Photonics and Smart Materials (CPSM), Zewail City of Science and Technology. CPSM is headed by Prof. S. Obayya.

Q: What are the immediate challenges in your work and in the RE sector?

Our challenges are to produce high efficient solar cell devices at low cost and with easy manufacture using intelligent engineering fabrication. Research in the field of renewable energy is attracting attention from both research and industrial companies. A lot of projects are conducted in different areas with many research groups working in different institutes and research centres. The field also attracts a lot of joint Master´s and PhD students all over the country. There are many conferences, workshops, schools, and events in the field organized to share recent developments and achievements. There is progress in the field of renewable energy here in Egypt.

Q: How is the working environment at Zewail City?

Zewail City as city of science and technology has a new vision for the future. It already has many Arab and foreign scientists, its board of directors has six Nobel laureates, the institution has been designed to achieve effective participation in the sciences, and the advancement of Egyptian technology to the global level. The environment of study and work is very welcoming to foreign students and scientists. In addition, laboratories of very high standards are under construction in different fields of research. For all of these reasons, I would encourage it to be one of the host institutions for ANSOLE students and scientists.

Q. Any further comments?

I am grateful to ICTP for financial support in the framework of ANSOLE's ANEX fellowship program. I would also like to thank Dr. Egbe for his big effort to create this network, and for the assistance he has given to support ANSOLE members and projects to ensure success in all ways. I want to encourage all enterprises interested in scientific research, especially in developing countries and the countries of Africa, to

support this network to continue success in the coming years.

Study visit in Morocco

Visions for sustainable energy in North Africa: Social science fieldwork on solar energy

by Sharlissa Moore

Building sustainable energy systems to address environmental problems, while providing universal access to electricity and meeting skyrocketing demand in places such as North Africa, is a pressing global challenge. In the Mediterranean region, several long-standing initiatives seek to address this challenge by deploying hundreds of gigawatts of large-scale renewable power facilities and integrating the electrical power systems of the Mediterranean. These initiatives include the Mediterranean Solar Plan, a political process; the Desertec Industrial Initiative (Dii) and Medgrid, industry consortiums; and Medring, an EU funded process to study Mediterranean grid integration. My dissertation research analyzes how stakeholders envision and design a regional sustainable energy system, asking: How are regional 'socio-technical' systems envisioned? What are the anticipated social consequences of a system for a region with broad power and wealth disparities, heterogeneous energy needs, and deep cultural differences? How can energy equity be best evaluated in such systems?

Case study Morocco

My research focuses on Morocco as a case study within plans for renewable energy integration in the Mediterranean region. I seek to understand Moroccan goals for, and framings of, solar energy and how Moroccan solar energy policy fits into plans for an integrated renewable energy system in the Mediterranean region. Morocco has developed, on its own, one of the world's most ambitious renewable energy programs aimed at meeting increasing demand, increasing energy independence, and fostering green jobs. By the end, Morocco is anticipated to be a global leader in concentrating solar power (CSP) technology. Evaluating these policies is important to developing best practices for renewable energy development in the region.

The Moroccan Agency for Solar Energy (MASEN) is chiefly responsible for solar energy planning in Morocco. MASEN was founded in 2010 to put solar technologies on a level playing field with other energy technologies. Their ambitious primary objective is to build 2 GW of large-scale solar energy capacity by 2020, or 14% of Morocco's total energy generating capacity in 2020. To put this in context, Morocco's total installed generating capacity in 2011 was 6.3 GW. The stakes for achieving these goals are high. Morocco's energy electricity demand is projected to double in the next ten years and quadruple in the following ten years, which is large compared to OECD countries. Further, Morocco is already suffering under the weight of an energy subsidy bill and trade imbalance. Morocco imports 95% of its energy because it lacks fossil fuel resources. It seeks to decrease this dependency and lost opportunity for national revenue through renewable energy. Morocco also expects to reduce its carbon dioxide emissions by 3.7 million tons per year through the Moroccan Solar Plan, which they emphasize is a voluntary effort made when the nations responsible for the problem are taking fewer mitigation measures. The solar development will occur on five sites, starting with the Noor solar complex near Ouarzazate where construction is underway.

Research

My research methods include document analysis, interviews, and site visits to better understand discourses on renewable energy at three scales: local, nation-state, and regional. During the summer of 2013, I co-led a study abroad trip in Morocco and Spain for 30 Arizona State University students to study renewable energy interconnections in the Mediterranean region. Among other activities, we visited the site of the first solar trough power plant, Noor I, experienced grid intermittency in the desert town of Merzouga, and visited the solar research platform in Almeria, Spain. In July and August, I conducted interviews with 30 German renewable energy companies, Dii stakeholder companies, policymakers and non-profit organization about plans to build CSP in North Africa. I spent the remainder of the year in Rabat, Morocco, interviewing energy stakeholders including the Moroccan Agency for Solar Energy, development banks, embassies, and policy officials in the energy and research sectors. I returned to Morocco in February 2014 to join a team of German, Egyptian, and Morocco researchers that is rigorously evaluating the potential positive and negative local impacts of the Ouarzazate solar power complex. We will publish a report later this year that explores the social sustainability of large-scale solar energy development in Morocco and Egypt and provides a framework for evaluating sustainability in future large-scale solar projects.

Preliminary findings

Green electrons are generally not seen as goods in-and-of-themselves in Morocco. Rather, they are valued as part of an integrated and ambitious plan for Morocco's industrialization and development. These intermediary goals are rarely part of the conversation about integrated renewable energy infrastructure in the Mediterranean but are high priorities in Morocco. First, Morocco seeks to develop green jobs in the solar energy sector and is working to develop education and training opportunities to increase this workforce. Second, Morocco wants to develop related industries to ensure the majority of the materials (e.g., mirrors, steel, turbines) for the power plants come from local sources. The third goal is research and development to stimulate a knowledge economy in Morocco and create "disruptive technologies" that reduce the cost of solar power. One policymaker told me that without the achievement of these goals, Morocco might as well develop its energy system in a more conventional way.

Generally, policymakers and researchers in Rabat were supportive of the proposal to export renewable energy to Europe. Some even thought they were being unfairly cut out of the European market. MASEN is also supportive of eventual regional integration with

the EU grid and the export of solar electricity after meeting the 2 GW goal.

A representative from MASEN said 'for us, 2,000 MW is only like an appetizer…especially if we reach grid parity.' Since there is a cable connecting Morocco to the Spanish grid under the Strait of Gibraltar, they argue that "Morocco is already electrically European." The Moroccan grid operates on the same frequency as Europe and 'we produce the same electron as Sweden.' If there is a will and the conditions for exporting, they will do it. The conditions for export must be right though, as this goes "way beyond electricity" into issues of geopolitics, security of supply, and the Eurozone crisis. Getting an agreement between Morocco and 27 EU countries is very complex. Therefore, they emphasize that Desertec is a concept or a vision for the distant future.

I expect to publish my findings next year, which will include a history of large-scale solar technologies, the evolution of visions for an integrated renewable energy system in the Mediterranean, a complete evaluation of Moroccan energy needs, expectations for renewable energy, and a framework that can be used to analyze equity issues in energy systems. My research is funded by a doctoral dissertation grant from the National Science Foundation, grant # DNS0307; the Consortium from Science, Policy, and Outcomes at Arizona State University; and the Quantum Energy and Sustainable Solar Technologies research centre at ASU. I am grateful for their support.



Sharlissa Moore, is a Ph.D. Candidate at Arizona State University in the Human and Social Dimensions of Science and Technology program and a graduate fellow for the Walton Sustainability Solutions Initiative. Her research explores the human and social aspects of energy innovation and renewable energy development, with a focus on the Mediterranean region as well as solar siting controversies in California. Sharlissa is the President of Student Pugwash USA, which is a nonprofit organization that promotes social responsibility in science and technology. She works to bolster the network of young science and technology policy researchers by serving on the Governing Board of the student Journal of Science Policy and Governance and formerly the STGlobal conference organizing committee. Sharlissa received her B.A. in Astronomy from Smith College.

Study programs & courses

Ernst-Abbe-Fachhochschule Jena
Hochschule für angewandte Wissenschaften

New Study Program in Jena, Germany

by Andreas Schleicher

The department of Industrial Engineering of the University of Applied Sciences Jena offers a new undergraduate program for "Environmental Technology and Development". The program has the goal to educate environmental engineers who are qualified for international co-operation with a focus on emerging and developing countries. The fast growing industry and rapid urbanisation have a severe impact on the environment of developing and emerging countries and the global climate. Sustainable development requires clean technologies which help to reduce emissions and to increase resource efficiency. A successful implementation of technologies needs to consider social and economic conditions. The new study program includes these interdisciplinary aspects.

The study program will include green technology courses on process technology, waste water treatment, water purification, waste treatment and resource efficiency, energy technology, decentralised energy supply by solar-, wind- and bioenergy, environmental management, environmental metrology and environmental analytics. The students will study special applications of clean technologies and energy supply in projects related to developing countries.

The four year degree course of "Environmental Technology and Development" includes one year abroad, which should preferably be done in an emerging or developing country. The year abroad is composed of a study semester at a university and an internship. The University of Applied Sciences Jena has partnerships with several international universities. An exchange program with the Swiss-German University in Indonesia will give up to 20 students the opportunity to earn, in addition, an Indonesian bachelor's degree. The University of Applied Sciences Jena is interested in establishing other partnerships, especially in Africa.

Our institution co-operates with several partners to realize attractive and practically oriented education.

The African Network for Solar Energy (ANSOLE) is one of these partners, and supports the university by providing contacts to African researchers and institutions.

Most lectures in the program are taught in German. The courses which are part of the exchange program with Indonesia will be taught in English.

The new program will start in October 2014. The international and interdisciplinary program is set to attract students who have an interest in energy and environmental issues, a good foundation in mathematics and natural sciences, interest in international co-operation and sufficient knowledge in English. The university expects highly motivated students who wish to contribute to the sustainable development.



Andreas Schleicher is professor for environmental meteorology at the University of Applied Sciences (Ernts-Abbe-Fachhochschule) in Jena (Germany). He worked for three years in Ethiopia as Dean of a school of engineering. He is interested in applications of renewable energies for rural areas in Africa.

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More Information

Conference reports

Renewable energy workshop in Fes, Morocco

by Daniel A. M. Egbe

ANSOLE was invited by Prof. Izzedine Zorkani, co-founder of ANSOLE, and ANSOLE focal point at the Sidi Mohamed Ben Abdellah University of Fes (USMBA), to attend the ”Atelier International sur les Energies Renouvelables et l´Effacité Energetique“, which was co-organized by the “Cité de l´Innvation de Fès“ of USMBA and the Morocco-based Renewable Energy University Network (REUNET). The two day workshop (19.-20.3.2014) held at the conference room of the presidency of the university was attended by approximately 40 participants. Among them were representatives of most of the major renewable energy institutions in Morocco: MASEN (Moroccan Agency for Solar Energy), IRESEN (Institut de Recherche en Energie Solaire et Energies Nouvelles), SIE (Société d´Investissements Energétiques), ADEREE (Agence Nationale pour le Développment des Energies Renouvelables et de L´Efficacité Energétique) and AMISOLE (Association Marocaine des Industries Solaire et Eoliennes) and SMADER (Société Marocaine de Développement des Energies Renouvelables).

The workshop started with a welcome speech by Prof. Moulhine El Bekkali, Vice-President in charge of research at USMBA, representing the President of USMBA, Prof. Esserrghini Farissi, and was followed by lectures and round table discussions, which were grouped in 3 sessions, namely:

- *Moroccan national strategy on renewable energy and energy efficiency*: This session consisted of 6 main lectures from representatives of REUNET (Mustapha Ayaita), IRESEN (Badr Ikken), CNRST (Centre National de la Recherche Scientifique et Technique) (Driss Zeiji), MASEN (Mohamed Bernannou). ANSOLE (Daniel A. M. Egbe) and SIE (Moncef Rami), 6 short presentations by laboratory heads on renewable energy research at USMBA, and a round table discussion on the USMBA plan of action.

The highlights of this session were the first and second lectures. The first lecture by Prof. Ayaita entitled „Morocco embarked in the green revolution“ was very instructive. The energy situation of Morocco within the global context was presented.

The second lecture from the General Director of IRESEN, Mr Badr Ikken, on funding possibilities for R&D projects was of great relevance to ANSOLE because IRESEN is ready to finance South-South R&D projects between Moroccan research groups and research groups from other African countries. It was agreed that future IRESEN calls will be posted on the ANSOLE website, in addition to sending the information to various African embassies in Morocco.

- *Energy efficiency in building and in industry*: 7 lectures and a round table discussion on partnership between institutions, universities and industries made up this session. The highlight of this session was the presentation of Mr Ahmed Bouzid, Chief of Division at ADEREE, who gave details on law 47-09 relative to energy efficiency and thermal regulations in buildings.

The other lectures were either presentations by university lecturers or company presentations (Energy Poles SA, Orobrique, ROCKWOOL, TRUSTED ENERGY)

- *Training and Education in renewable energies and energy efficiency*: This last session had 4 main lectures and a round table discussion, which was used to exchange ideas about how to start up a renewable energy training program at USMBA.

ANSOLE was asked to assist USMBA in this process. In addition, the Moroccan participants formed research consortia to respond to IRESEN published calls. The workshop was officially closed by the Vice-President, Prof Moulhime, and a group photo was taken.



Participants of the workshop in Fes, Morocco, 19-20. March 2014

Parallel to the event, ANSOLE’s coordinator was introduced by Prof. Zorkani to the President of the University of Fes, Prof. Esserrghini Farissi.



From Left to right: Prof. Izzedine Zorkani, Prof. Daniel A.M. Egbe and Prof. Esserrghini Farissi

It was agreed to draft a scientific cooperation agreement between USMBA and ANSOLE, which will be signed this year during the ANSOLE Coordinator’s next visit to Morocco.

ANSOLE e.V. (intern)

ANSOLE e.V. Annual General Assembly 2013

by Bettina Schmidt

ANSOLE's 3rd General Assembly took place in Jena, Germany on 23.11.2013.

Members and guests listened with great interest to the impressive report of the Coordinator on activities during the past year. He showed us so vividly how the ANSOLE -family has grown and matured to a key trans-national actor in the field of renewable energy. The Coordinator thanked all across the African continent and in other parts of the world for their contribution and commitment as members of the ANSOLE network.

A highlight of the meeting was the discussion of the revised by-laws of ANSOLE. With the adoption of the new by-laws came the change of its name from "ANSOLE Germany e.V." to "ANSOLE e.V."

Another highlight was the election of board members, which was addressed in detail in this newsletter's first article, "ANSOLE - From the Beginning…'



ANSOLE e.V. members at the General Assembly

Besides the formalities of the General Assembly, all stayed to celebrate the 65th birthday and commemorate the life's work of ANSOLE member Dr. Eckhard Birckner. Prof. Dr. Ulrich-Walter Grummt discussed Dr. Birckner's importance in the history and development of the Institute of Physical Chemistry, University of Jena where he worked prior, during and after the unification of Germany.



Participants at the ANSOLE e.V. At the birthday commemoration of Dr. Birckner

The ANSOLE Coordinator honored Birckner's life work in his presentation "Made in Jena" - a review of Egbe's and Birckner´s joint research and findings in more than 18 years.

In ANSOLE fashion, we celebrated the day and the achievements, with family and friends by sharing food at a Cameroonian-German diner.



Get-together and networking during diner

More information on ANSOLE e.V.

Events calendar (conferences, courses)

23 - 24 April 2014, Accra, Ghana

Sub-Saharan Africa Solar Energy Conference 2014

More Information

25 - 26 April 2014, Kumasi, Ghana

ANSOLE Regional Meeting in West Africa (ARMWA 2014)

For participation contact ANSOLE under eventing-hana2014@ansole.org

More Information

21.-22. April 2014, Agadir, Morocco

3rd International Congress of Thermal Sciences (AMT'2014)

The event is co-organized by the Moroccan Association of Thermal Sciences (AMT) and the University Ibn Zohr of Agadir.

More information

Check the events calendar on ANSOLE's Website

Publishing information

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About ANSOLE

Goals and Objectives of ANSOLE

The Network promotes research, education and training in the field of solar energy among Africans as well as non-Africans with a special focus on - and relationships with - Africa.

As outlined in its statutes, ANSOLE supports nonprofit activities in the field of development aid and cultural exchange with the aim to strengthen the dialogue between the North and African countries (north-south) and between African countries (south-south) on renewable energy.

It endorses the use of solar energy to the benefit of the social and economic development of Africa as well as the environmental protection through for example

- ➔ Education and training of African scientists, experts and students
- ➔ Exchange of students and visiting scientists
- ➔ Workshops, conferences and meetings in Africa
- ➔ Organising and implementing projects and programmes on renewable energy
- ➔ Promoting capacity building in the use of renewable energy in Africa for all

➔ *ANSOLE members and those acting in the name of ANSOLE accept and act in accordance with the association's by-laws.*

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