

## Training Workshop

### Centre Regional Agrhymet, Niamey, Niger

### 2-6 October 2006

The workshop involved around 36 participants from eight African countries and four European countries, representing government, electricity utilities, academia and research institutions. This report is a summary of the themes covered during the workshop.

- Sahel energy poverty situation
- Energy and poverty reduction strategies
- Low cost technologies
- Renewable energies mapping potential
- Sustainable energy buildings
- Needs assessment methodologies
- International, regional and national energy policies,
- Energy and the Millennium Development Goals
- Energy and gender
- Electricity reforms

#### **Day 1 - Tuesday 3rd October 2006**

The first day of the workshop was dedicated to the opening ceremony and to an introduction and discussion of the project, and the theme of energy in Sahel.

At the **opening ceremony**, **Mr. Faustin Gnoumou** from the department of Formation and Research, on behalf of the Director General of the Centre Agrhymet, opened the meeting and welcomed the participants.

Mr. Gnoumou, in his introductory speech, recalled the importance that energy has for the Centre Regional Agrhymeth and the several projects developed in the last 25 years, the first of which was implemented by CILSS in 1981. This project looked at the adoption of improved cook-stoves, followed by the launch of the Solar regional program PRS in 1986. In 1988, CILSS

created a network of professionals in domestic energy PESED and launched the regional program Gaz. In 2001, CILSS launched PREDAS, the regional program for the promotion of household and alternative energies in Sahel.

**Mr. Jeremy Lester**, an EU senior official, stressed the importance of energy in combating poverty and the commitment of the European Union through various funding channels and cooperation initiatives, to help developing countries find different solutions to fulfil the energy needs of the poor and achieve the Millennium Development Goals. Mr. Lester wished the participants a good and productive workshop, underlying the important role that policy dialogue, institutional and scientific capacity building might play.

After the opening ceremony, each participant briefly introduced him/herself and his/her institution. **Dr Luis Alves** from Instituto Superior Técnico, Portugal, introduced the project "Intelligent Energy for Sahel", its objectives and results so far. Mr. Alves explained the project rationale, the importance both of research and cooperation activities, the value of networking between professionals working in the energy and poverty reduction sector in Sahel and the centrality of CILSS and Agrymeth. Mr. Alves also introduced the main workshop themes and the methodology of work, the collaboration with PREDAS (many participants are already involved as national focal points of the PREDAS programme) and the expected results. At the first round table, participants discussed many items with the IE4Sahel European staff.

**Prof Albert Wright**, from "Ecole des Mines et de la Géologie" (EMIG) Niger, during his presentation introduced many themes that would be discussed extensively in the following days. He first illustrated the energy challenges in Sahelian countries, and illustrated the main politics and conferences on energy he witnessed in the last three decades, starting from the 1978 Cairo UN Conference on Science and Technology for the Development, to the 1980 Lagos Plan and to the most recent ECOWAS initiatives. Prof. Wright expressed his concern about the fact that too many meetings and high speeches gave birth to very few results on the field. In particular, Prof Wright noted:

- the importance of developing and producing local technologies, the knowledge and all

the political steps necessary to help the empowerment of Africans in the energy domain;

- the huge need for a long-term regional and global approach to energy, and for further cooperation and planning; and
- that too little time, energy, and money has been dedicated to human resource development which is urgently needed for the development of the region.

The debate between participants became very intense, especially on the strategies and policies to let African Countries diminish the gap with the developed world, learning from past failures.

### Day 2 - Wednesday 4th October 2006

The second day of the workshop was dedicated to technical and scientific issues.

**Dr. Luis Alves** presented an array of "low cost" technologies that could be easily developed locally and that could significantly widen access to energy services for the poor. Cost and ownership of technologies are two particularly important barriers that halt the diffusion of energy services in developing countries, diminishing the possibilities of economic development and the effectiveness of poverty reduction strategies. The technologies presented by Dr. Luis Alves were characterised by simplicity, easy access and low maintenance cost, and the capacity of improving the quality of life of adopting communities. Between them, we can recall various solutions of distributed generation, Mini and Pico hydro can be built with low cost equipment already widely available (like water pumps), wind mill for water pumping or electricity production can also be built and run at very low cost and re-using materials and technology already available. Biomass is by far, the most used primary energy source in Sahelian countries, but in the majority of cases, biomass is used in traditional and inefficient ways, with severe impacts on both the environment and consumers. Improved and modern biomass can, on the other hand, really improve efficiency, safety and access to energy. Improved biomass is all about improved cooking/heating stoves and improved bio fuel kilns, while modern biomass is about conversion of biomass energy to advanced fuels/forms namely liquid fuels, gas and electricity. Modern Biomass technologies, easily applicable in developing and Sahelian countries, include biogas systems, modern use of agricultural residues (briquetting), jatropha oil biodiesel and others. Another area where important reductions of costs can be achieved is distribution technologies. For example, through the use

of SWER (Single Wire Earth Return) the costs of distribution can be cut in half, and the provision of community lighting through high-mast flood lighting can be both effective and more economical with respect to other solutions. Often technologies developed in subtropical, rich countries are not appropriate in an environment with different, culture, resources and climate. This is why, especially in areas where poverty is predominant, using simple, low cost, locally owned technologies, and inventing new ones on the basis of local needs and local available resources, can significantly increase the access to energy services and thus, the quality of life.

Debate and discussion concentrated on the availability and diffusion of different technologies in the countries, the importance of photovoltaics, its environmental and cost problems (batteries and costs of panels), as well as other solutions aimed at lowering the costs, e.g. standardization of electric boards, energy savings and energy efficiency technologies.

**Mrs Daphne Mavrogiorgos**, of the **Centre for Renewable Energy Sources (CRES)** introduced the theme of assessing the potential of renewable energy sources. Firstly, the methodology was presented to document the RES-related findings and assess the potential for new renewable energy (RES) projects for any given region, along with the parameters affecting RES exploitation and prospects for new RES investments.

Next, the two main steps were analysed (Step 1: Survey of current situation and Step 2: Analysis of RES Potential & investigation of alternative development scenarios with maps presented as examples). Then the Geographic Information System (GIS)-based Tool for the assessment of the technically and economically exploitable RES potential was presented. The tool's aim, innovations, system inputs, results and information, along with maps and screen examples of how the tool functions, were analysed. Both the methodology and the tool are based on: a) The assessment of the technical and economical potential of RES in Greece (National Operational Programme for Energy - [www.cres.gr/kape/datainfo/maps.htm](http://www.cres.gr/kape/datainfo/maps.htm)), and b) A Planning Tool for the Optimal Regional Integration of Renewable Energy Sources (OptiRES Altener Contract No. 4.1030/Z/01-089/2001 - [www.optires.info](http://www.optires.info)). Two previous projects carried out by CRES. Training material was distributed after the presentations and its content discussed.

**Prof. Manuel Correia Guedes, Director of the Architectural Research Centre of the Instituto Superior Técnico (IST)**, presented on the subject of sustainable architecture and urban planning. A general overview on the issue was first presented, underlining the importance of this area as a major contributor to the reduction of energy consumption and consequent environmental impact, such as the CO<sub>2</sub> emissions responsible for global warming.

Various energy-saving (passive) design strategies were presented, focusing on the particular context of developing countries. Issues such as self-building, the revision of conventional comfort standards, and the need to reduce the use of conventional energy (fossil fuels) by mechanical systems in buildings – in particular air conditioning, were discussed. Traditional building techniques were analysed and pointed out as positive examples of adaptation to the climatic context, constituting a good reference for energy efficient design – which may be further improved with modern (low tech) technologies, reducing energy consumption and simultaneously provide comfortable environments.

Several successful case studies were presented, including considerations on the use of low-energy active systems, mixed-mode systems and renewable energy systems such as solar thermal, solar HVAC, or photovoltaics.

**Ms Hannah Routh**, Energy for Sustainable Development Ltd (ESD), made a presentation on **the methodologies used to identify energy needs in rural areas**.

This presentation began with a description of the various rural appraisal techniques that have been developed by DFID (Department for International Development). The ‘Rapid Rural Appraisal’ and ‘Participatory Rural Appraisal’ techniques were compared and contrasted, and the benefits of the Sustainable Livelihoods were described. The application of the Sustainable Livelihoods approach for assessing the suitability of energy projects was then described, by means of a case study, namely the Mpeketoni Electricity Project in Kenya. For this project, a Sustainable Livelihoods assessment was carried out, to assist with the planning and design of the project. A survey was administered to 97 households and 113 businesses in the area, and the data collected was used not only at project inception but also in current plans for an extension. More interestingly, the survey found that the population was prepared to pay higher than the prevailing national rate for electricity, as the ‘value added’ through commercial productive use is considerable. The community pays US\$ 0.36/ kWh, compared to an average national tariff of US\$ 0.09/kWh.

The next section of the presentation focused on the project cycle, and common success criteria for electrification projects. There are numerous examples of successful implementation where the electrification is focussed on productive uses (e.g. manufacturing, commercial enterprises, shops and bars) and essential services (e.g. schools, hospitals, communication). Many examples of this from elsewhere in Africa were described, including in Ethiopia, Kenya and Uganda.

Finally, the group split into four workshops to discuss:

- The priorities for energy and electrification in the countries of the Sahel
- Social, institutional, technical and other barriers to successful implementation
- The importance of actions at the local, national and regional levels.

### **Day 3 - Thursday 5th October 2005**

The third day of the Workshop looked at policy analysis and elaboration, and to the understanding of the underlying forces and interests that shape the elaboration of energy policies.

**Mr. Giorgio Gualberti**, from Instituto Superior Técnico (IST), started the day with a presentation on the role of energy policies in achieving the Millennium Development Goals. As a matter of fact, even if energy is not one of the eight MDGs, the role of energy in achieving the MDGs is central. This link has been formalized with the Johannesburg Plan of Implementation and later reaffirmed by United Nations, World Bank and academicians, researchers and policy makers all around the world, in several policy and scientific works. Mr. Gualberti analysed the role of energy in achieving each MDG and the priority actions and policy alternatives recommended by the Millennium project of the UN to help the poor reach their energy needs as an important step to break poverty trap. Discussions developed between workshop participants on the space that energy has in national poverty reduction strategies and in the Millennium Development Goals framework.

After this, **Mr. Giorgio Gualberti**, from Instituto Superiore Técnico (IST), analysed in more detail the relation between **gender and energy**. Gender issues are an important part of any

strategy aimed at reducing the poverty, not only because often women and girls are the poorest and more vulnerable between the disadvantaged classes, but also because cooperation projects specifically designed at addressing women and girls needs are beneficial to the entire community and often very successful. The evidence of the gender aspect is now mainstream in cooperation and development initiatives, especially after the works initiated by Grammen Bank in Bangladesh and other organizations all around the world. Specifically for the energy issues, and specifically for Africa, various studies clearly indicate how much energy (and water) scarcity affects women and girls, that may spend several hours a day carrying fuelwood and water for the family (several tonnes/km per year). This greatly affects school attendance, results and health. The use of traditional biomass in inefficient stoves is also responsible for many health problems and premature deaths for women and children, due to the toxicity of the smoke of interior. Finally, together with the participants, the well-known project of Multi Functional Platforms in Mali was analysed. MFPs have a strong gender component (they have to be managed by existing women cooperatives) and have been highly successful, not only as a source of decentralized energy production for rural villages, but they also had very strong gender advantages, in particular with scholar results of girls and incomes of women. Discussion took place on the role that gender has in the participants' respective countries', poverty reduction policies and energy policies, and if specific gender related energy projects have been developed.

In the second part of the morning **Mr. Giorgio Gualberti** (IST) introduced the theme of **International Energy Policies**. In particular the theme of the energy policies advocated by the International Organizations has been treated. International Organizations have played and continue to play a very important role in shaping the internal energy policies of developing countries, and between all IOs, Bretton Wood institutions have a prominent role. The World Bank Group has by far the most important role in international energy policies, through its research, advocacy, policy support and financing activities. The policies adopted by the World Bank have been analyzed, with particular attention to the policy for the electricity, fossil fuels and mining, and renewable sector. Specifically for electricity the Bank has been the main actor leading to the electricity reforms in almost 80 developing countries in the last decade. The Bank policy line has been, before 1993, to support state owned monopoly, and after 1993 private participation, commercialization and privatization (and unbundling) of the electricity sector.



After 2001, the Bank had a stronger focus on the energy needs of the poor and on the effects of policy reforms. Regarding the fossil fuel sector, in the period 2001-2003, an important independent review of the Bank financing for extractive industries took place. The central point of the policy review was to what extent extractive industries might contribute to sustainable development and poverty reduction and so be justifiable for the bank's financing. The review final report, named "striking a better balance" contained a set of recommendations to the World Bank management, in particular on the principle of affected communities, on pro-poor public and corporate governance, on more strict social and environmental policies, and on the respect of human rights. EIR also recommended the Bank to concentrate its financing on renewable energy sources and to halt financing to oil extraction by 2008. The World Bank management accepted the majority of recommendations (but not to halt financing to oil extractions). Regarding the renewable energy sources, the World Bank Group declared in 2004 at the Bonn Conference on Renewables, to increase of 20% annually its portfolio in renewable energies and energy efficiency. The other important international player shaping energy policies in developing countries is the United Nations. A great number of UN Agencies deals with energy issues, including UNDP, FAO, WHO, UNIDO, UNFCCC and UNEP. To coordinate all this work, a new UN Inter-Agency has been created, UN-Energy, whose first works are some policy papers on the importance of Energy in order to achieve the MDGs.

Extensive discussion has been carried out by participants on the impact and influence that international organizations have in shaping national energy policies.

After having analyzed the main pillars of international energy policies, **Mr Giorgio Gualberti (IST)** introduced the theme of **Regional Energy Policies**. Regional approaches are particularly important nowadays and the African political scene has seen many initiatives addressing the relation between energy and poverty, and the urgent needs for investments in energy infrastructures. Two important initiatives are the NEPAD Energy Agenda and the Forum of Energy Ministers of Africa (FEMA), which together with the African Energy Commission (AFREC), are aimed to enhance coordination and information between African States. More specifically for the Sahel Region, the 29th Conference of the Heads of State of ECOWAS/UEMOA in Niamey on the 12th of January 2006, with the decision A/DEC.24/01/06, adopted an ECOWAS/UEMOA regional policy on access to energy services for populations on rural and peri-urban areas for poverty reduction in line with achieving the



MDGs in Member States. The regional ECOWAS/UEMOA policy is summed up in the **White Book for a Regional Policy**, probably the most ambitious initiative on energy and poverty in the continent, that has been developed with the collaboration, between others, of UNDP and the Millennium Project. The White Book starts from the principle that, in order to reach the MDGs, the poor have to obtain access between other factors to certain energy services. There is, in each country, an energy gap that must be fulfilled to reach the Millennium Development Goals. The white book for a regional policy fixes certain targets of energy access that are necessary to reach in urban and rural areas and estimates the cost of providing the services and the cost for the investments in infrastructure. The general objective of the regional policy is to provide half of the populations of members countries with access to modern energy services by 2015, that means to increase fourfold the share of people with access to modern energy in 2005. In the ECOWAS/UEMOA plan, there is also the creation of a specialized regional agency with the role of coordination and investment promotion (financed through a leverage on the additional investments mobilized).

The workshop participants' discussion centered on the role of CILSS and of CRA in the ECOWAS regional policy, and the importance of coordination between regional institutions, academia, and policy makers.

After international and regional policies, **Mr Giorgio Gualberti**, from Instituto Superior Tecnico (IST) introduced the theme of the national policies and **reforms in the sector of electricity**. Firstly, a general overview of the more common structures and reform paths in the sector of electricity was discussed, in particular referring to the different options of property, management, vertical integration and concurrence. The main regulatory options have been discussed with the participants, subsidy policies and design, and the problem of the most appropriate sequencing of electric sector reforms. After this general introduction, the electric power reforms in the 9 Sahelian countries were briefly analyzed. All the countries started some reform process. The vertical structure of the market has been subject to few changes, but all the countries started some form of privatization or private participation in the electric market and half of the countries now have an independent regulatory commission. The particularity of the electric utilities privatization process in Sahelian countries is that all the countries that moved faster and completed privatizations or external management contract, at a certain point

reversed the process and the state regained control or the ownership of the electricity sector. This occurred, with different modalities, in Cape Verde, Senegal, Mauritania and Chad. The U-turns in privatization in these countries were attributable to the contrast of interests and conflicts between the state and the privatized utility, especially on two points: tariffs fixation and readjustment and contractual obligations. In the other countries the process of privatization is still formally active but the research of technological partners and/or buyers is made even more difficult by the failure experience in neighboring countries.

As seen in the previous section, one of the reasons for the failure of the electric utility privatisation in the Sahel, are the conflicting interests and points of view between the different stakeholders, the state, the citizens and the private sector. To better explore this concept, **Mr. Giorgio Gualberti**, of Instituto Superior Técnico (IST), proposed a **Role-Playing Game on Energy Policies Formulation**. The participants were introduced to the reality of an imaginary country, the "Sahterre", with all detailed data on economy, demography, energy characteristics, poverty etc, and were divided into four groups, the government, the private sector, the middle-higher class, and the poorest part of the population. The role-play began with the Government calling for a national conference with all the groups, in order to shape a new energy policy and undertake energy reforms. Each group set its priorities and requested the government that later took some decisions that were furthermore analyzed and judged by the groups and the public opinion. The game clearly highlighted the difficulties of "squaring the circle" in a situation of great needs and few budgetary resources, and the legitimate different visions and priorities between the various groups (and even within the same group, as the government was divided on which solution to undertake).

#### **Day 4 – Friday 6<sup>th</sup> October 2006**

The last day of the workshop started with a presentation made by **Dr. OUEDRAOGO**, Director of the Institut d'Application et Vulgarisation des Sciences (IAVS) of Burkina Faso, on **The Household Renewable Energies in OUAGADOUGOU city: potential axes of action in a context of fight against poverty and desertification**. Firstly, the general elements of the Burkina Faso energy and poverty were explored, and later more details were given on the domestic energy system of Ouagadougou, characterised by a very high percentage of fuelwood usage. The research showed a strong correlation between revenue and fuel choice, and the share

of income spent in energy is much higher for low income families. Moreover there is a correlation between type of habitation and type of fuel. The fuel choice is not only a pure economic choice but also something that depends on cultural and social factors, like food habits, prejudices and religious beliefs. After the main national energy policies were analysed, especially referring to the production and distribution of fuel wood, and three alternative policy scenarios were discussed and analysed. The three alternative scenario discussed were: 1) total fuel substitution of fuel wood with gas, electricity and solar energy; 2) sustainable use of fuel wood, creation of new exploitable forests and transform it in a source of national wealth; and 3) Expand the integrated management of forests, production of technologies and substitution fuels.

The Workshop Participants discussed the similarity between the Ouagadougou case and the other situations in Sahel and especially the alternative policy option scenarios.

The last session of the workshop, **the round table**, was coordinated by **Dr. Matheu Badolo**, of the Agrymeth Center. Dr. Badolo focused on the next steps of the IE4Sahel project, on the collaboration and networking between the workshop's participants and their respective institutions and on the preparation of the second IE4Sahel Workshop.

The results of the discussions were as follows:

1. validation of the draft documents already prepared by the project
2. preparation of the second workshop for February - March 2007
3. maximum development of linkages and synergies between the IE4Sahel and PREDAS projects.
4. networking activities, through: a) a network of experts coordinated by CRA on the theme "energy and poverty in Sahel"; b) Virtual Network of Sahelian Institutions of research and education; c) organisation of a little committee between ARC, IST, PREDAS and CONACILSS to effectively coordinate all the actions.

**At The Closing Ceremony Mr. Faustin Gnoumou from ARC and Dr. Luis Alves from IST** thanked the workshop participants for their active participation and contribution.

A Workshop Evaluation Questionnaire was given to participants and returned back with

comments and suggestions.