



Proposal identification number
(to be inserted by the Commission)

European Commission

Directorate-General for Energy and Transport

EIE Call for proposals 2003

Type 1 actions

related to COOPENER

Full title of the proposed action	Biomass Energy Platforms Implementation for Training in Africa.
Acronym	BEPITA



1. Proposal summary

Today, the energy supply rate and energy services available in African rural areas are still among the lowest in developing countries. Despite structural brakes to the development of electrical distribution, the demand for access to electrical distribution is increasing. Institutional actors such as the Ministries in charge of Agriculture and Energy, electrical companies, town councils etc...realise that even the continued extension of the national grid and the conventional electrification of remote sites cannot fully satisfy demand. Options such as Decentralised Rural Electrification (DRE) based on renewable energy, are therefore becoming increasingly integrated into national policies. However, unfortunately most of the current initiatives only target the 'comfort' needs of the population and are based on the use of solar kits. Therefore, although these initiatives improve the population's living conditions, they cannot satisfy production needs or contribute to the growth of economic development. The energy needs in rural area are not limited to electricity, there are numerous thermal application mainly for food processing and conservation which can be efficiently covered by renewable sources, particularly biomass. However, it is important to take into account that woody biomass might be subject to scarcity in some regions due to high pressure related to increasing demography and on the low productivity of native forests. Biomass is a renewable energy source which requires sustainable management but offers a tremendous potential if these aspects are correctly understood.

Large biomass resources in the form of agro and wood-based residues are available and remain unused in rural area. In the same time, many of the local industries such as the agro-alimentary industries, rural crafts (mills, soldering, etc) and agriculture require energy. Thermal energy needs or electricity needs are currently met through the use of conventional energy sources derived from petrol, thus representing a significant cost for the industries, and are becoming increasingly expensive as they rely on the use of fossil fuels which are subject to regular price increases. However, this demand situation could be cost effectively eased by introducing units running on wood or vegetable residues. This would result in an evolution of the energy sector and help prevent the production/transport/distribution monopolies currently existing. Recent experience demonstrates how the involvement of private companies in rural services (especially in the field of water servicing), presents real prospects to satisfy local production needs and also service rural populations.

Today, technological advances in this sector have made bio energy an economic and profitable tool that can satisfy the needs of various industrial sectors. However, the replication potential of these technologies is yet to be fully exploited. This is primarily due to a general lack of awareness and know-how among the project proposers, policy makers and technology developers who are responsible for setting up a favourable economic and technical context for the take off of such options. To address these issues, capacity building is required in order to raise stakeholders' awareness and help biomass developers market their products/projects. To do so, **BEPITA proposes to establish perennial specialised training platforms for biomass technologies covering two wide regions in sub-saharian Africa: the "dry zone" and the "wetland zone"**, each of them having specific energy needs and potentials as the quantities of biomasses available and processes used differ. This will build upon previous training activities undertaken within the CIABE, the « Coordination interafricaine de bioénergie et d'environnement" composed of seven organisations from France, Burkina-Faso, Cameroon, Ivory Coast and Senegal, and co-ordinated by Cirad since 1999 and whose mission is to promote on a long term basis, the use of biomass energy according to methods compatible with sustainable development. Energy policy makers, private sector representatives, professional associations and universities will be the major beneficiaries of this project.


For all this, BEPITA matches the EC's Communication **COM (2002) 408 final**¹ proposing a reference framework and operational recommendations to boost energy cooperation with developing countries. It is also in line with the **2002 EU Energy Initiative that aims at improving access to energy services in order to reduce poverty in developing countries**, through partnerships in the fields of institutional capacity building and technical cooperation/skills transfers.


2. Objectives of the proposed action

The main aim of BEPITA is to establish perennial training platforms for biomass technologies that allow their uptake by local operators within two African zones, the "dry zone" and the "wetland zone", each of them covering several countries with common specific energy needs and constraints. Platforms would be based in Burkina Faso ("dry zone" base) and Cameroon ("wetland zone" base), within the premises of the BEPITA partners, and clustering a wide range of training activities and services undertaken by experienced actors in training at master level and post graduate as well as

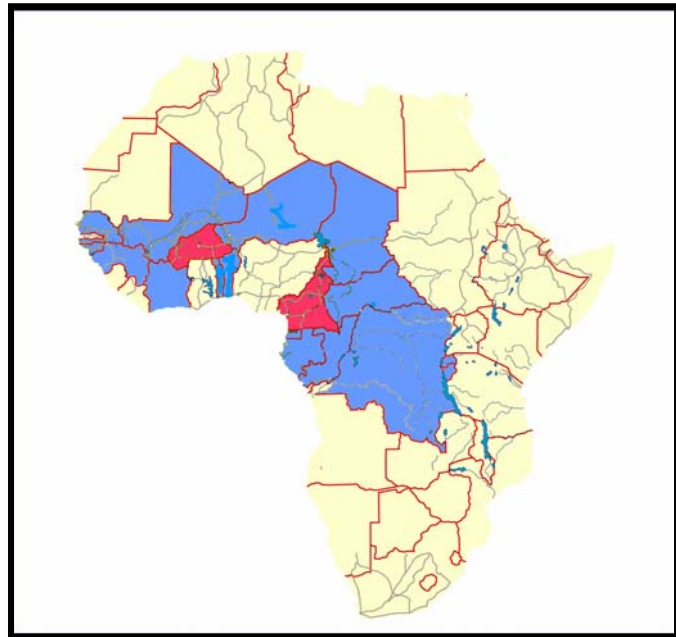
¹ COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT
"Energy cooperation with the developing countries"

professors and professionals. The scope of these platforms and the choice of the training institutions in Burkina Faso and Cameroon is to wider the audience of the project towards a regional approach of countries which are facing similar problems. The none limited associated country are: Senegal, Gambia, Guinea Bissau, Guinea, Benin, Mali, Niger, Chad, Gabon, Congo, Democratic Republic of the Congo, Ivory coast, Central African Republic, etc... and in practice all counties from West and Central Africa that would like to joint and which have existing co-operation with the two institutions.

 BEPITA platforms

 Concerned area

Map 1 - BEPITA platforms localization and sphere of activity



The project is based on a matrix of different technologies (combustion, gasification) and regional socio-economic context (with specific technical and non-technical areas as well as biomass availability) that provide interaction between common issues but retain the individual requirements and opportunities for implementation of adapted technology.

The foreseen networking will operate through a regular programme of meetings, training sessions and workshops that will address a range of technical and economic issues affecting those industries that are developing and potentially using these conversion processes.

General objectives:

- **Strengthening local energy expertise** through the setting up of extensive interactive training networks (communities) between Europe and Africa based upon shared knowledge and best practice in the field of biomass energy
- **Developing energy production capacity** in Africa through uptakes of biomass energy technologies

Specific objectives:

- Promoting an efficient use of natural resources for energy in Africa
- Create the conditions for an appropriate technology transfer targeting different groups of public and private stakeholders
- Providing training platforms to groups of stakeholders that link education activity, applied research and practical demonstrative applications
- Helping to increase the revenue of local populations through technology transfer, technical assistance to SMEs and reinforcement of local capacity building
- Encouraging institutional reform linked to rural electrification in the global context of energy market liberalisation in Africa
- Enlarge the concept of market aggregation through an integrated approach of the demand and the supply side, private sector involvement and of political/institutional framework conditions,

The project matches the second key action of the COOPENER work programme 2003 which aims *"to promote and support initiatives in developing countries which will help to build a critical mass of human capital with up-to-date knowledge and expertise in renewable and efficient energy technologies and best practices"*.

As a COOPENER project, it will also further contribute to meet the 2002 EU Energy Initiative by improving access to energy services in order to reduce poverty in developing countries by addressing the problems of 1) capacity and institutional building and technical cooperation, 2) transfer of knowledge and skills, 3) development of regional and sub-regional cooperation.

3. Expected results and potential impacts of the proposed action

The project intends to overcome non technical barriers to the development of biomass projects in Africa. Today, renewable energy sources and especially biomass technologies are developing rapidly. R&D has reached a point where these technologies are already applicable on a large scale. From an economic point of view, biomass can easily answer some specific problems like drying of agricultural products and electrification of remote areas when large biomass resources are available.

3.1 Direct outcomes of the action by the end of the duration of the project

1) Capacity building outcomes

- At least ten (10) training sessions will be implemented

- Between fifteen (15) and twenty (20) trainees (decision makers, programme managers, trainers...) will attend each training session
- Two (2) training modules will be developed and included in the normal graduation courses (master level) in each region
- Between fifty (50) and hundred (100) private agro-industrial owners will follow information/training sessions on the advantages of using biomass technology
- Reinforcement of two (2) training platforms in dry and wetland regions with specific technological focus, small scale combustion coupled to solar thermal in Burkina Faso and gasification with gas engine in Cameroon.

2) Technology transfer outcomes

- At least one (1) new biomass project will be developed in each of the two zones covered by the project based on the technologies promoted,
- A series of forty (40) local craftsmen trained on the platform with regards to fabrication and service technologies for biomass based technology and spare parts
- Four (4) training material packages produced and made available to organisations in the targeted countries e.g. training manuals, technical data, case studies, exhibition panels, leaflets advertising the project, project specific website, newsletters, articles about the training for inclusion in key trade press or in publications that the key target audience will read.
- An international conference and exhibition, as already organised by CIRAD in Burkina Faso in 2002, is proposed part way through the project to provide a media for the project to present its progress and results and to provide a forum for the bioenergy community to share experiences and move the technology forward.

Deliverable No	Deliverable title	Delivery month
	Capacity building outcomes	
1	Directory containing information about expert organisations and professionals qualified to work in the field of energy production, with an emphasis on biomass	7
2	A list presenting the geographical distribution of the demonstration installations	7
3	Prevision of number, content and type of training sessions as well as a list of identified trainers.	10
4	Website together with setting up email groups to receive periodically brief emailed update bulletins	12
5	10 targeted training sessions over the period of the project	All year round
6,7,8	a) Programmes of targeted training sessions including papers b) Reports on the targeted training sessions, including technical visits and trainee profiles and assessment for possible adjustment c) Leaflets, case study information, training manuals, technical information sheets, etc...	12, 24, 36
9	Two master degree modules on biomass energy (training courses sessions)	All year round
10,11,12	a) Programmes of the training courses b) Reports and evaluation assessment of the training courses, including technical visits c) Training materials, tools etc... to be provided by the project partners	12, 24, 36
13	A series of at least ten awareness activities in at least four major cities of the two regions covered by the project	34
14	Practical guidelines to access the training modules available at ENSP, ESTHER, and EIER	35
15	a) Two regional workshops in Cameroon and in Burkina Faso b) The proceedings of the two workshops	36
	Technology transfer outcomes	
16, 17	Four training material packages	12, 24
18	At least one new biomass project will be developed in each of two zones covered by the project	24
19	A series of forty local craftsmen trained with regards to fabrication and service technologies for gas generator and spare parts	36
	Management outcomes	
20	Kick off meeting	1
21,22,23,24	Project meetings between partners	6; 9; 18; 32
25,26,27,28	Progress reports	6; 12; 18; 24
29	Interim technical and financial report	18
30	Final technical and financial report	36
31	Final report	36

3.2 Potential impacts of the action by local stakeholders after the end of your project

1) Capacity building long-term impact

- The training centres involved will expand their current range of actions and develop their skills in the following areas: advice and assessment, training and workshops, seminars, conferences and exhibitions, dissemination tools such as publications, updated and upgrading technological platforms
- Multiplication of advice and assistance to industries and policy makers

2) Technology transfer potential

- Additional projects using biomass developed in Africa
- Reinforcement of capacity of SMEs associated to the project as well as new comers through the project implementation
- National level support, development and dissemination of energy supply equipment from biomass
- Availability of trainers who can further duplicate and disseminate the lessons learnt through further training activities

4. Target group(s) and key actors for the proposed action

The proposed action directly addresses the following target groups:

4.1 Targeted groups

- Public sector: Policy and decision makers at national, regional and local levels
- Private sector: Managers of private companies (e.g. agro-food and forest exploitation industries), technicians and local craftsmen; companies and advice centres offering technical assistance (e.g. consultancies)
- Teachers/Researchers / students
- NGOs and other associations representing rural populations, etc...

The key organisations and actors involved in this proposal are well known and actively involved in the bio-energy domain. These organisations have already undertaken similar activities for years to promote bio-energy. The team that will undertake this project comprises experienced experts who have all a sound background in training.

BEPITA participants have been actively involved in the preparation of this project from its initial concept. Each of them has provided inputs based on their knowledge and experience. The partners will be particularly responsible for piloting the platforms and actioning the dissemination activities.

When trained, the target audience will be able to further replicate and build upon this in order to maintain momentum.

4.2 Key actors

The key actors are located in:

- Universities where much of the scientific and technological research is being done and where future industrial plant designers, builders and operators are trained. This step is fundamental to allow the technology transfer. It justifies the networking and the directory of the African expertise as a few of them are known even in their own country.
- SMEs in the agro industrial sector and the equipment suppliers which are involved with technology development and implementation. It is this industrial sector that is particularly important since companies will be responsible for implementation of successful bio-energy projects and will require support from all the other actors to develop and maintain a competitive technology for rural area.

5. Contribution to energy-related policies as well as other EU policies and Community added value

5.1 Project contribution to energy policies and poverty alleviation

Thermal processing of biomass has the potential to offer a major contribution to meeting the increasing demands of the developing country energy sectors and to help EU and its partners to meet the targets set by the EC for CO₂ mitigation.

This project will allow the development of biomass energy in developing countries by awareness raising of the technologies and know-how available.

This project should also allow improved conditions for designing and implementing local level biomass energy projects for rural electrification and energy production. This, in turn, should help to promote rural development and increase the local populations' revenues. Indeed, the scope is to deliver energy based on the requirements for economic development, i.e. irrigation, drying, manufacturing, etc...

The project will enable potential users to identify the best situations and conditions where alternative practices, technologies and approaches in support of biomass energy are likely to succeed. Discussions and project ideas developed during the training sessions should result in proposals for adapted and/or new energy policy measures that match local sustainable

development requirements. The link with the GAA and the world bank as well as other agency like DANIDA which is strongly supporting the project and intend to co-finance some of the activities carried out in Burkina Faso is therefore fundamental in its role of biomass energy technology awareness and information dissemination.

In the global context of power sector liberalisation in most of developing countries, the BEPITA sessions should help in the preparation of new or ongoing legislative and/or institutional reforms.

Being adapted to the reality of the socio-economic context with an adequately analysed maturity of the technology, the regional dimension of the project and the involvement of SMEs should offer enough potential for national replicability.

Finally, the dependence of most of the people in developing country on the natural resources for their livelihood, and the necessary management of these resources, reinforce the role of biomass in poverty eradication.

5.2 Project contribution to regional and national policy priorities in the developing countries

Most developing countries are opting to improve their use of natural, renewable resources for electricity production due to the growing environmental constraints and the role of international conventions endorsed by many States. On the supply side, such technologies exist, however most Developing countries experience difficulties when trying to access these. Therefore, it is necessary to organise training sessions as a means of enabling technology transfer and uptake.

It is of particular interest the planned interaction between this proposal and the GAA ("Groupe Africain d'Appui", see attachment) which regroups the 13 African countries Energy Directors as a group of reflection for the establishment of sustainable energy policies particularly in the field of biomass and which focuses on technology transfer, trade, barriers and commercialisation. This will be carried out by joint working groups, the GAA being supported by the World Bank.

The partnership with regional high recognised education institutions is on line with national policies in favour of education and training as education and awareness are crucial in order to change attitudes and behaviour, and research and technology are integral to driving change.

More important, we believe BEPITA matches the EU energy initiative by improving access to affordable and sustainable energy services. Firstly, it definitely contributes to increase the efficiency of the EU's energy-related activities in the developing world. Secondly, BEPITA helps to lift people out of poverty and at the same time protect the environment through a more rational use of natural resources. Finally, BEPITA makes also a con-

tribution to economic growth as the more cost-efficient and more-environment friendly alternatives are used, the more local people can save their energy needs.

5.3 Value added of the European team

UCL and CIRAD are involved in energy related project for developing countries and are used to work together. Merging their effort will take benefit of their respective experience, UCL has a larger experience on agricultural residues as CIRAD activities were mainly devoted to wood, but in addition will concentrate effort and funding to avoid overlapping. UCL has installed a research platform at ENSP on wood gasification through the Belgium government However this project do not finance much running costs. The Coopener project and the long tradition of training activity in developing countries from CIRAD will allow a better use of existing facilities and reduce the funding required. ADEME the French energy agency for energy Saving and Environment is willing to support the project which will enlarge the visibility of activity to compare to bilateral co-operation actions.

In addition, CIRAD is carrying co-operation projects with other developing countries like Brazil and India where small scale energy technologies exist and which would allow south/south transfer of technology.

Coopener programme would encourage subsidiarity between European countries (Belgium, France and Denmark) in the set up of integrated education facility.

6. Project work plan, methodology and approach

The structure of the work plan and the methodology applied are quite simple as the project concerns capacity building which will be realised by local existing internationally recognised institutions and universities. The main originality of the BEPITA project is the reinforcement of two training platforms as a support to the training activities.

Its aim is to remove barriers to the development and commercialisation of renewable energy [RE] systems in Africa by the demonstration of the technology. These barriers currently impact national efforts to reduce long-term increases in greenhouse gas [GHG] emissions from fossil fuel uses, especially diesel. The main objective of the project is to accelerate the adoption rate and commercialisation of feasible and applicable renewable energy technologies.

The BEPITA project will be implemented over a period of thirty six (36) months through a progressive process of knowledge generation, transfer and development via the learning process. It will start with an initial inven-

tory of training past/ongoing results and experiences in the field of biomass energy.

The project will be implemented within two African zones, the “**dry zone**” and the “**wetland zone**”. Each zone has specific energy technology needs as the quantities of biomasses available and processes used differ:

- energy needs in “dry zone countries” - mainly devoted to drying application for agricultural products with a biomass constituted mainly from agro-based residues. The hybridisation of the technology suggested, solar thermal with biomass combustion technology will allow to overcome the barrier related to fuel seasonality and take the best from two renewable resources.
- energy needs in “wet zone countries” - mainly devoted to rural electricity production as biomass is generally largely available and might be planted with economic return prospects.

This dichotomy is nevertheless in many cases not so obvious. The construction of such structure is done with the objective of the specialisation and the creation of centre of excellence avoiding duplication. The venue of seminars, training sessions and workshops won't be separated so strictly unless necessity and will allow the exchange of experience and a wider dissemination

The training needs within each zone will be addressed by a platform devoted to the organisation of training sessions targeted to meet the needs of the various stakeholder audiences.

The project is divided into five main work packages:

WP1 - Evaluation of training capacities and their potential in the field of biomass energy. The following issues will be investigated and assessed: existing biomass energy training programmes (including those carried out by the “CIABE” network), audit of educational equipments/materials available for hands-on training, inventory of current trainers and people with the skills required to become trainers, inventory of operating biomass plants for site visits during the study tours planned as part of other WPs. The partners will develop a database of the people and programmes involved, using criteria such as main qualifications, diplomas delivered, cost/benefits of plants, replication potential, etc...

WP2 – Establishment of platforms and design of training sessions. This work package consists of creating two complementary platforms (one for the dry zone and one for the wetland) with the support of BEPITA partners. These platforms will operate as a network and offer a series of integrated training programmes specifically designed for different groups (private

sector, public sector, students, etc...). The first platform will be set up in Ouagadougou (Burkina), a dry West African region that has few forests but a lot of biomass from agricultural activities available. The second platform will be set up in Yaounde (Cameroon), a wet Central African region where biomass is abundantly available, mainly as forest and wood industries residues. The platforms will inventory, classify and organise global educational packages covering the entire biomass energy chain.

WP3 - Implementation of targeted training sessions. This work package will focus on the implementation of targeted training sessions for different stakeholder groups (private sector, public sector and professional organisations/NGO sector) each of which have specific needs as indicated below: *Private sector:* the training sessions for this target audience will be short and concise with either general awareness raising of 2 days or more technical trainings of one week.

Public sector: the training sessions for this audience will be addressed to teachers, researchers and political decision makers. The sessions will last between two weeks minimum and one month maximum. They will cover potential issues and barriers such as economic/social factors, political measures, and new technologies.

Professional associations/NGO sector: the training sessions for this sector will be addressed to NGOs, industrial associations, trade unions, and organizations involved in development projects. The sessions will be either awareness campaigns of 2 days or more technical trainings of one week. These sessions would differ from the training sessions for the private sector as they should have different funding and financial rules and constraints.

Dry zone training: to take place in Ouagadougou

Wetland training: to take place in Yaounde

WP4 - Training course for students. During these training courses, presentations will be made on all the currently available technologies for the conversion of biomass into energy. The presentations will cover the specific requirements of the two regions ("arid region" and "wet region") with interventions by energy specialists performing under each of these specific platforms. The training courses will be in a modular format and undertaken as part of existing schools' programs (ENSP, EIER, ESTHER). They will include both theoretical and practical course work.

WP5- Dissemination activities. These will be undertaken throughout the project, to ensure a wide impact not only in Cameroon and Burkina-Faso but also to other neighbouring countries with replication potential. To this aim, a full communications campaign will be worked out. Bearing in mind the importance of public opinion, a special focus will be put on media and press campaigns.

WP6 – Management.

The members of the consortium have a well established relationship as they have worked together on previous training projects in Africa (CIABE et RABEDE). Their activities allow complementary collaborations to be implemented. The following are brief profiles of the partner organisations:

- **Cirad**, the French development-oriented agricultural research organization serving the tropics and subtropics, undertakes RTD activities in the field of biomass energy and has a broad knowledge of the African context and countries, especially Cameroon and Burkina Faso;
- **EIER** (Ecole Inter Etats d' Equipement Rural) and **ESTHER** (Ecole Inter Etats des Techniciens Supérieurs de l'Hydraulique et de l'Equipement Rural) are Burkinabese Centres that are very experienced in training engineers and technicians for the building, implementation and maintenance of infrastructures for energy supply in rural areas;
- **ENSP** (Ecole Nationale Supérieure Polytechnique) in Cameroon offers training for engineers, doctors in the field of engineering sciences, continuous development, experts from national administrations, companies and international organisations. Over the years, ENSP has successfully organised workshops in the field of biomass energy and has recently established an experimental platform for decentralised electrification power production from biomass.
- **UCL** (Université Catholique de Louvain): The Division of Thermodynamics and Turbomachinery of UCL (TERM) Division is involved in closely integrated scientific disciplines of applied thermodynamics, energy sciences, heat transfer and environment. Research activities related to energy systems and Climate Change are carried out with special emphasis on developing countries since 1998. Several projects in Sub-Saharan African countries were developed.
- **ISOMET**: Sarl (Innovation en SOlaire et METallique) is a private sector partner in Burkina Faso. Since 1995, it has concentrated on the creation of new and innovative energy solutions for the domestic and industrial needs of its home country and beyond. During this time it has accumulated examples of best practice and local know-how about how to adapt renewable energy solutions for African markets. ISOMET is a member of a worldwide expert network in solar thermal energy use. ISOMET enlarged its activities in 2003 in order to produce industrial goods and services.