

BENEFITS OF A REGIONAL, DISTANCE EDUCATION / INTERNET BASED POSTGRADUATE TEACHING AND RESEARCH PROGRAMME FOR EAST AND SOUTHERN AFRICA

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Abstract ¾ The generation and times in which we live today is characterised by unprecedented advances in technology especially in the Communications and Information Technology (IT) sectors. Free market economics comes with it intense global competition in commerce and industry. The new economy is now very much Internet based, corporations are now expected to be on-line. Along with the term new economy, comes another term globalisation. These two terms are very much associated with already developed countries. Developing countries, most of whom have still to fully understand and survive under the “old economy”, may consider the combination of new economy and globalisation as constituting a double shock to them. Some of these countries indeed consider globalisation as simply another form of colonisation. Meanwhile peasants in rural areas who understand nothing or care less about the precise meaning or motive behind these new ideas continue with their fight for survival. In many developing countries this means that whole communities spend all of their time looking for firewood, food and water, which commodities are usually in short supply. This proposal addresses the question of energy, in particular how developing countries can have sustainable energy programmes in their countries. While acknowledging the concepts and inevitability of globalisation, the proposal tackles renewable energy and renewable energy from a regional rather than a country-specific or global perspective. The reasons for this will be advanced in the later parts of the proposal..

Index Terms ¾ Renewable Energy, Regional Cooperation, Postgraduate Programmes

INTRODUCTION

WHY ENERGY?

In the abstract it was pointed out that peasants in many were mostly preoccupied with the pursuit for firewood, food and water. Our understanding of technology tells us energy is very central to our livelihood and indeed is crucial to easier facilitation of the basic necessity of food, water and shelter.

The object of the proposal is to set up the modalities for the setting up of a regional Masters of Science in Renewable

Energy. In this proposal it is envisaged that there will be three nodes operating as part of a regional network on Universities and institutions of higher learning within Southern and Eastern Africa. For the purpose of illustration, these are designated A, B, and C supported by additional resources R from the closest institutions. Each node is associated with a known capacity and know-how in certain core subject areas. These subject areas will be decided upon after a thorough study of the regional training requirements. It is expected that the institutions will make use of available capacity both in equipment and skills base terms without sustaining major expenditure. The aim of regionalisation and modernisation is precisely to share resources, and to avoid duplication.

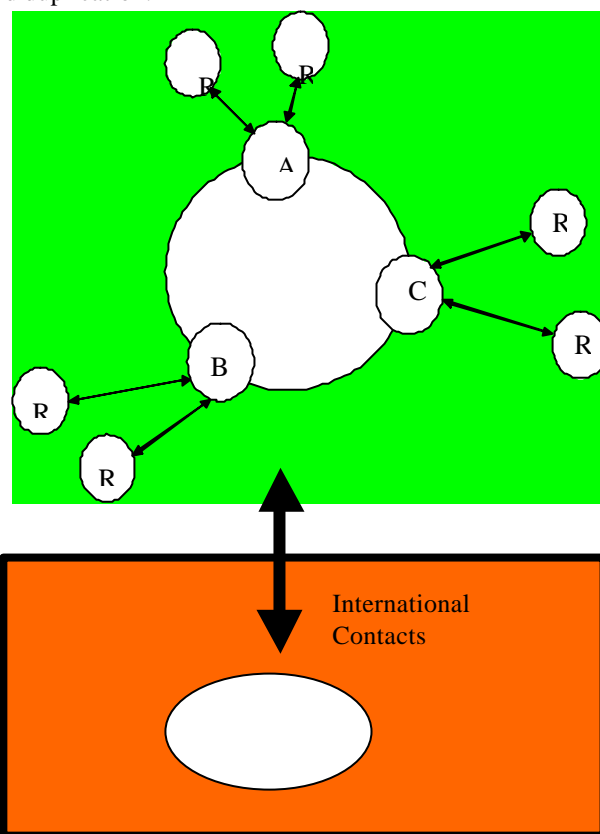


Figure 1

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POSSIBLE ACTIVITIES WITHIN THE NETWORK

Through a sequence of photographs we show some of the activities and experiences within the programme.

SHARED EXPERIENCES, EXPERIMENTS

Students may conduct the same experiment in different countries, and comparing results, over the Internet. Figure 2 shows an experiment constructed at the University of Zimbabwe, Department of Electrical Engineering in the area of Solar Home Systems (SHS). Here measurements are made to determine the efficacy of a SHS over a period of time through continuous monitoring of output. The experimental setup is now being modified to facilitate research into small scale PV-Grid integration using scaled down models. With suitable equipment it should be possible to share the results of such experiments on an on-line basis.



Figure 2

LOCAL DEVELOPMENT OF ENERGY RELATED DEVICES AND SYSTEMS.

Within the network we envisage meaningful research to be conducted by local academics who, through fast internet and where possible video-conferencing links can exchange results with their colleagues. Figure 3 shows locally developed water heaters, at the University of Zimbabwe and mounted on one of the roofs of the Mechanical Engineering Department.



Figure 3

TESTING AND EVALUATION OF LOCAL AND IMPORTED PRODUCTS

Universities can provide an independent testing and evaluation service to the industries that are in the renewable energy business. Figure 4 shows a solar cooker, made from imported components being evaluated in the Mechanical Engineering Department at the University of Zimbabwe.

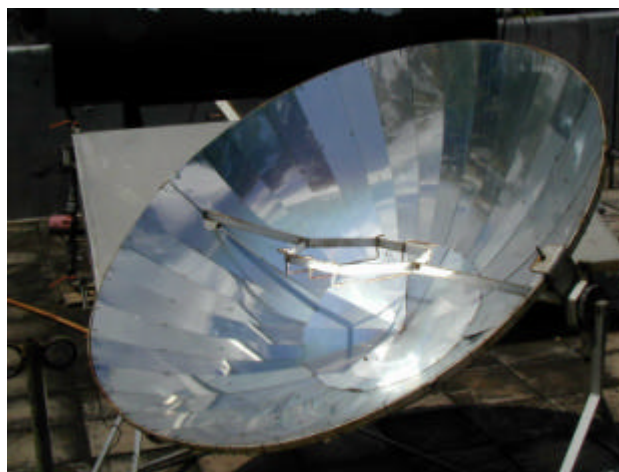


Figure 4

REGIONAL SCIENTIFIC JOURNAL, REGIONAL CONFERENCE

Although they conduct research, many academics in the region find it difficult to publish their work. Often they send their submissions to publishers in Europe and USA and find that they wait many months before they are even acknowledge. The outcome is unpredictable and many good

scientific papers are turned down not because they are substandard but because there are too many contributions to same journal. A focused regional scientific journal would go a long way in resolving this problem. An international editorial panel would be drawn up to act as referees for submissions. The journal itself could take an on-line format, if necessary. To ensure maintenance of standards and to ensure that both students and academics are well acquainted with the latest scientific developments, “north-south” exchanges are still necessary and the node model shown in Figure 1 has to be modified to include one or more north-located node. Figure 5 shows a student and programme coordinator from Zimbabwe during a visit to the Renewable Energy Laboratory, University of Oldenburg, Germany.



Figure 5

HOW WOULD IT WORK

THE CURRICULUM

To get an insight into how such a programme would work, it would be useful to describe the MSc. Programme currently being offered at the University of Zimbabwe. This is a two year programme consisting of a combination of a taught component (1 year), industrial attachment (six months) and project (final six months). It was motivated as one of the important areas of technical co-operation between the German and Zimbabwe governments. The courses and descriptions are in Figure 6. As part of the cooperation agreement some of the students proceed to do their six months attachments with educational, research and industrial organisations in Germany. In Figure 7 we show a picture of an academic on the programme examining one of the latest solar-thermal converters. Figure 8 shows an outside view of the Energy Centre at the University of Oldenburg which was deliberately designed not to depend on the electricity grid for its operations. The cooperation can be truly described as

having been successful especially considering the economic and political problems affecting the country today

Code	Description	Exam	Wt
CORE			
MRE501	Statistics & Metrology	1x3hr Paper	1
MRE502	Radiation Physics	1x3hr Paper	1
MRE503	Photovoltaics	1x3hr Paper	1
MRE504	Solar Thermal Collectors	1x3hr Paper	1
MRE505	Storage Components	1x3hr Paper	1
MRE506	Renewable Energy Systems Components	1x3hr Paper	1
MRE508	Case Studies	1x3hr Paper	1
MRE570	Dissertation	Report	
OPTIONS			
MRE509	Wind Energy	1x3hr Paper	1
MRE510	Micro Hydro Power Plants	1x3hr Paper	1
MRE511	Thermodynamic Engines	1x3hr Paper	1
MRE512	Biomass and Biogas	1x3hr Paper	1
MRE513	Computer Simulation of Renewable Energy System Performance	1x3hr Paper	1

Figure 6

The central philosophy behind the Masters programme is that it is truly regional and that its running is independent of influence from the host University. The programme will be guided by a multinational Board of Governors consisting of persons of high standing in Energy, Economics or Developmental matters. Any institution electing to host a node will not only have to guarantee this independence but also offer facilities necessary for its proper operation through a process of negotiation. These include high-speed Internet, video conferencing and multimedia facilities as well as suitably.



Figure 7

TEACHING PROGRAMME

THEORY

The programme will consist of specially written study texts suitable for distance education or posting on to the internet as well face to face contacts with lecturers as indicated in the course schedule. Students are allocated tutors with whom they interact on a regular basis and to whom they can address their academic problems. It is expected that students can complete this programme on a largely non-residential basis but will still be able to achieve the required level of knowledge.

PRACTICAL WORK

The course will include practical laboratories and these will be designed to take advantage facilities available to the student's closest institution. In addition a prolonged project is required which can be done at the student's current work place or at a participating company. Companies in both private and public sectors are particularly encouraged to assist students with industrial attachments / internships for the duration of their project. These companies are encouraged to suggest projects from which they may derive some benefit provided that these projects fall with the standards and parameters of their degree.

COSTS AND BENEFITS

One of the prime objectives of the network is the reduction in overall cost of running a programme at this level resulting in lower tuition fees. There will also be additional benefits from a fruitful exchange of ideas and interaction among

course participants. The network will also be useful among academics through exchange of research results and information as well as providing discussion *forums* on a wide variety of topics in the renewable energy field.

6. Financing Alternatives

It is expected that the project will eventually be self-financing and will derive income through consultancy work, development and presentation of course material. However in the initial phase some donor support would be required and this may be from a combination of national government and international donors and in the form of computer networks, and course development equipment together with the initial technical and human resource backup. We feel that it would be of advantage to both potential donors and the regional project if the donors themselves operate as part of a group, possibly a group of nations. Contradictions, duplications and confusion have been observed when several projects with conflicting philosophies have been implemented in one country.



Figure 8

REFERENCES

- [1] E. Chikuni, "Solar Energy in Botswana" Proceedings of the International Conference on Solar Energy for Development, Varese, Italy, 1979, Martinus Nijhof Publishers

BIBLIOGRAPHY

- 1 Schumacher E. *Small is Beautiful: A study of economics as if people mattered*, Harper & Row, 1975