

Open University for Renewable Energy (OPURE)

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1. The Need of Human Capacity Building for Renewable Energy

Market liberalisation, the introduction of modern information and communication technologies and the decentralisation of energy services in many countries of the world have changed the structure in energy supply. Renewable energy sources play an increasing role for energy systems and are unavoidable for a sustainable energy future. Many countries have already introduced policy frameworks for the promotion of Renewable energy. Germany, e.g., has successfully boost its renewable energy industry through a Renewable Energy Feed-In-Tariff; some states have introduced quota based systems like the Renewable Energy Portfolio Standards (RPS) in the U.S.; and more and more developing countries consider renewable energy as a realistic chance to bring energy in rural areas. However, all over the world – both in industrial and developing countries – the increase of renewable energy demands new qualified human resources in science, economy and politics.

In general, the existing education systems were able to support up until now the increasing demand of human resources in the field of renewable energy. Technical and non-technical education provided at least some basic knowledge of renewable energy systems and their application. People interested in Renewable Energy Technologies were able to apply to a certain extend conventional knowledge about electrical systems, energy networks, certain farming or constructing methods etc. Nevertheless, the more sophisticated renewable energy technologies become and the more they need to be integrated in the existing energy infrastructure the less specified and appropriate are traditional training schemes for engineers, farmers and architects. Alone in Germany with over 130,000 employees the renewable energy industry provides already today more jobs than the whole coal, gas, oil and nuclear industry together. However, the choice of university courses, vocational training programmes and school education material in the field of conventional energy systems is much larger than for renewable energy. With the ongoing international expansion of the renewable energy industry, the lack of trained engineers, craftsmen, entrepreneurs, farmers, architects etc. will increase more and more if no appropriate education schemes are introduced.

The existing education and research sector is in general not yet adequately prepared for the special demand of education and qualification that is necessary for successfully implementing renewable energy. Moreover, it can only react comparatively slow to this new demand and will be able to adjust only in a mid- to long-term perspective.

Therefore, already existing research and educational efforts that are aimed to extend the technical and economical potential of renewable energy need to be strengthened in order to achieve little by little the mainstreaming of renewable energy issues into the whole education system.

Today the main problem for the further distribution of renewable energy does not seem to be so much the lack of materials about the physical, technological and economic potential of renewable energy and their application, but more the accessibility to research results and education materials. Some research and educational programs for renewable energy exist already – although they are still too few. The range of the particular educational and research efforts differ very much depending on available human and financial resources or political and economic support. Often renewable energy is not part of the curricula or of research programs. Some research and education institutions have included renewable energy aspects in their schemes. Not too often, but increasingly programs are elaborated at regional or national level that are solely focused on renewable energy issues. However, up until today the exchange of curricula and research material between research and education institutions is not yet fully developed and needs to be improved. Some networks work already in this field at national level – such as the Solar Research Association (FVS) in Germany – and at international level – such as the the Global Renewable Energy Education and Training (GEERT) Programme of the UNESCO that provides education material and technical information for, in particular, developing countries.

The lack of exchange of already existing research results and education materials is an essential barrier for the national and international distribution of renewable energy. Scarce financial and human resources are often spent inefficiently if similar research projects are carried out or education material is conceptualized on the same matter by different institutions. This leads to unnecessary long capacity building and research processes, but also to a delay and inefficiencies in product developing and further development of political frameworks for levelling the playing field for renewable energy. In order to improve the individual performance of these institutions and to give important impulses for new initiatives it is vital to create a global network mechanism that allows to share information, curricula and research results and common work on renewable energy. The exchange of research results is not just necessary for improving research efforts, but also for the continued development of educational material and their adaptation to the particular socio-economic conditions of a region. In the same sense, it is important that not just knowledge and curricula about technologies for using renewable energy are shared, but also about their economic competitiveness, their introduction through adequate political framework conditions and their geographic and cultural adaptation. Such a network can provide education material for all different aspects on renewable energy and will be able to develop on the basis of existing material own curricula in the particular technology and socio-economic field and can link them together in an interdisciplinary manner.

2. Historical Development of OPURE

Already in 1993 EUROSOLAR-President Dr. Hermann Scheer has proposed at the *World Solar Summit* of the UNESCO to establish an international university for renewable energy. As a follow-up the government of Cuba took over this proposal and established in 1995 the *Technical University for Renewable Energy* (UTER) and appointed Hermann Scheer to become the honorary chairman of the senate. EUROSOLAR donated the basic equipment of

the library. Today UTER is focused on the postgraduate education and carries out the international conference for renewable energy, energy saving and education, which will also take place this year in May.

In June 2001 EUROSOLAR organised the international conference “Promoting Global Transfer Activities for Renewable Energy. At this conference the concept for a University for Renewable Energy was drafted in a EUROSOLAR-Memorandum¹², which was used for first talks about the implementation with the research ministry of the biggest German state North-Rhine-Westphalia. The concept was to establish a University for Renewable Energy as the nucleus of a network other research and education institutions who are involved in renewable energy issues.

For the preparation of the *Second World Renewable Energy Forum* the *World Council for Renewable Energy (WCRE)* presented the draft of a *World Renewable Energy Agenda* in February 2004. The WCRE picked up the proposals of EUROSOLAR and called for the creation of an international university for renewable energy with special emphasise on post-graduate education.¹³ In April 2004 talks between WCRE, EUROSOLAR and UNESCO established the further cooperation among these institutions in this matter. One of the outcomes was that UNESCO expressed its will to take over the patronage of this initiative.

On May 31 2004 the *World Renewable Energy Agenda* was adopted at the *World Renewable Energy Forum* of the WCRE. The *World Renewable Energy Forum* was one of the main impulse conference for the International Renewable Energy Conference (June 1-4) hosted by the German government and for the International Parliamentary Forum for Renewable Energy organised by the German Parliament. Initiated by Hans-Josef Fell, Chairman of EUROSOLAR Germany and Member of the German Parliament, the Federal Ministry of Research and Science sponsored an *International Science Forum on Renewable Energy* on June 2. EUROSOLAR and the Institute for Solar Energy Technology (ISET), presented at this *Science Forum* the concept for an international network of research and education institutions for renewable energy how it was drafted and proposed by EUROSOLAR and WCRE. The participating international research and education community underlined the necessity for internationally linking research and education institutions and offered their support. Together with the support of the UNESCO, the German Research Association for Solar Energy (FVS) and the German Federal Ministry for Education and Science, these proposals (working title: *Open University for Renewable Energy*, OPURE) were integrated in the International Action Programme for Renewable Energy, which was adopted by the international state community on June 4 2004.¹⁴

Since June 2004 the concept of OPURE was further developed by EUROSOLAR, WCRE, ISET and the UNESCO. In the same month the German Bundestag passed a resolution regarding the UN decade on education and expressed there once again the need to establish the proposed OPURE as an effective measurement for promoting sustainable energy in education and research. In another resolution on the national research and education strategy the German Bundestag repeated on December 16 its request that the German government should support the establishment of OPURE. In several discussions between the German Bundestag and the German government an initial budget for OPURE could be secured.

¹² EUROSOLAR, 2001: Memorandum zur Solaruniversität, Grundzüge einer Konzeption, Bonn

¹³ World Council for Renewable Energy (WCRE), 2004: Civilisation at the turning point. A Breakthrough for Renewable Energy. The World Renewable Energy Agenda, Bonn, S. 9

¹⁴ Internationale Action Programme, 2004, www.renewables2004.de/pdf/International_Action_Programme.pdf,

3. Objectives of OPURE

OPURE is mainly designed as a network of existing research and education institution in the technical and socio-economic field of renewable energy. Its objectives are

- the systematic investigation of existing research and education programs;
- promotion of existing education programmes from all over the world;
- promotion of exchange among research and education institutions for better know-how-transfer;
- to improve the comparability of research and education efforts;
- to specify the definition of research projects;
- to provide access to existing curricula and educational material for academic studies, vocational training and school education;
- evaluation of existing educational material and further developing of own curricula;
- integration of latest research results in curricula and standards in order to achieve a high level of education;
- elaboration of strategies to integrate all renewable energies and conventional energies in terms of technology, economy and social aspects both for research and education;
- actively encouraging governments and international institutions to develop research and education programs in the field of renewable energy.

In the beginning the board of trustees will take up its work, which will define the organisational set up and the working procedures of OPURE. In addition, the technical prerequisites for the information exchange mechanisms will be established. This contains the creation and management of the computer server and of a communication centre, which will be in charge of the general queries and the public relation work regarding the platform.

Scientific Peer-Review-Committees – established for each subject areas by the board of trustees – will define the technical and non-technical subjects in more detail and will elaborate quality standards and curricula. The independent evaluation of the information and education material will be carried out by at least three experts. For the education part ECTS-credits (European Credit System) should be used in order to enable an easier integration of the material in existing education programs. In parallel, potential participating OPURE network partners will be identified all over the world. Once they are identified they will be offered to participate into the network. Research and education institutions from both the technical and non-technical field of renewable energy are encouraged to actively participate in this network.

If the network is sufficiently established and exchange mechanisms start to work OPURE's scientific Peer-Review-Committees can start to elaborate in cooperation with its members educational material and curricula. In the long-term these curricula will be provided to the public via adequate e-learning and distant learn systems.

4. Implementation Organisations

Under the patronage of UNESCO in Paris OPURE is organised by the Institute for Solar Energy (ISET) in Kassel, Germany, and EUROSOLAR/WCRE in Bonn, Germany. The ISET was established 1988 as an Institute at the University of Kassel and is a leading institute for applied research and development in the field of renewable energy sources and distributed energy supply technologies. Its activities range from theoretical works to experimental analyses, and technical developments. The institute is primarily focused on wind energy, photovoltaic, biomass, energy conversion and storage, hybrid systems, energy economy and information and capacity building. The European Association for Renewable Energy EUROSOLAR was founded in 1988 in Bonn and is not just active at sub-European and European level, but also at international level since the foundation of the World Council for Renewable Energy (WCRE) in 2001. EUROSOLAR/WCRE has elaborated numerous political concepts and strategies for the successful implementation of renewable energy at national and international level. It was one of the main driving forces behind the successful Renewable Energy Feed-In Law and the 100.000 Solar-Roof Programme in Germany; it proposed the German government to organise the international governmental conference for renewable energy “Renewables 2004”, which was successfully carried out from June 1-4 2004; EUROSOLAR/WCRE is calling since years for the establishment of an *International Renewable Energy Agency* (IRENA). For pushing through these initiatives EUROSOLAR sections – which were established in most European countries – and regional chapters of the WCRE sections are organising numerous international and national conferences annually.

