

# STRENGTHENING THE INSTITUTIONAL CAPACITY OF THE SOUTH IN RENEWABLE ENERGY TECHNOLOGIES

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Paper presented at  
International Conference on Promoting Global Transfer Activities for Renewable Energy,  
World Council for Renewable Energy,  
Berlin, June 2001.

## 1. Introduction

Renewable Energy technologies are seen as playing an important role in providing sustainable energy services to many people in the South who do not have sufficient energy to meet basic needs (see for example, World Bank, 1996). However, many of these energy technologies are manufactured in the North and have to be imported into the South. Technology transfer is always a risky business and needs specific levels of capabilities in the receiving country to ensure that the technology is absorbed and utilised to its design capabilities. It is not only engineering skills that are needed to ensure that the technology works successfully, but also the same sort of institutional framework found in the country where the technology is designed and produced. Technology is more than hardware. It is a complete system of laws, regulations, technical support services, management practices, information systems etc. forming a framework at the heart of which is the hardware. Without the complete system, the hardware will function imperfectly. This system also reflects the culture in which the technology is developed and it is the non-hardware components that often do not get transferred. Institutional development is part of creating an environment that will ensure effective and sustainable technology transfer. It is not only the institutions themselves but also the capacity of their people, that is their skills and capabilities, which are important components for any technology to embed itself in society. This paper looks at how institutional capacity in the South can be built up to ensure the successful transfer of renewable energies.

## 2. Institutional Development

It should not be forgotten that the governments of the South are not only interested in renewable energy technologies for their end-applications, they also want to develop their own industrial capabilities to eventually replace imports by locally produced technologies which in the longer term can be exported. Technology transfer is part of an industrialisation strategy that also helps to create jobs. Part of that process is the development of institutional capabilities linked to renewable energy technologies which can import, use, develop for local markets and eventually export the technologies.

The institutional framework includes:

- Legislation – for example, environmental standards, which need to be enacted and enforced.
- Standards – countries need to develop standards that can be applied in their own situation, for example Botswana recently developed its own standards for photovoltaic systems which reflect the local operating conditions.
- Research – local institutions need to improve their performance and have good outreach to local entrepreneurs so that they can work together to develop technologies for the local market

- Market – there are a number of components that needs to be developed; for example, the financial sector needs to be able to access consultants with knowledge about renewable energy technologies, the consumer needs to be able to assess and make sensible choices about renewable energy technologies.
- Management – skills need upgrading to understand Northern management approaches; for example, the need to train staff, and the willingness to invest in a culture of maintenance and after sales service.
- Education and training – renewable energies need to be in the curriculum at all levels, renewable energy technology technician courses, and management courses for entrepreneurs, need to be established.

The development of this type of framework, based on an assessment of local needs and circumstances, has been supported by the UNDP, for example, in the United Republic of Tanzania (Mwihava et al., 1998).

Within the framework, there are two broad areas in which institutional capabilities need to be improved :

- technical information and skills
- non-technical information and skills

Whilst the first area is probably not surprising, the second might need further explanation. Two important non-technical skills are technology assessment and proposal writing. Technology assessment is more than cost benefit analysis and looks at the complete energy system, not only at the hardware. It involves the systematic assessment of the technical and non-technical options available in terms of their economic, social, cultural, environmental and political implications. The analysis also examines the policy framework in which the technology is intended to operate. For example, import/export regulations and taxes, price and tax structure of petroleum fuels, technology dissemination methods, and rural electrification policies. At the government level, energy technology assessment requires a multi-disciplinary team approach. The South needs its own skilled professionals to staff these teams. Amongst their skills, they need to be able write good project proposals to enable the South to access cleaner technologies, for example, through the funding opportunities created by international responses to Climate Change. The Technology and Development Group of the University of Twente offers a short training course in this area and there has been significant interest in participation. In addition, entrepreneurs need to be able to write business plans if they are to obtain financing from formal lending sources.

Consumers also need to be able to carry out technology assessments. They need to be able to make informed choices about the benefits, limitations, requirements and costs of renewable energy systems. The Government, the media and NGOs can play an important role in consumer education. Children can also play a valuable part in educating their parents, underlining the need for schools to include renewable energies in their curricula.

### 3. The Form of Training

Training is the key to developing institutional capabilities. The form of this training is defined by the answers to the questions: Who? What? Where? How?

#### 3.1 *Who needs training?*

The answer to the question “Who needs training?” determines the nature of that training. Institutional capacity building requires various stakeholders to acquire new skills and capabilities. Some examples include:

- Decision makers need to be aware of the options and their implications for the economy
- Users need to be aware of the options and their costs as well as financing opportunities
- Entrepreneurs need to assess different technologies and understand government policies which promote the use of renewable energy technologies.
- Researchers need scientific skills to adapt the technologies to local circumstances.
- Teachers need to understand the way the technologies work and how they can best meet local circumstances

- Technicians need to have the technical skills to install and maintain the technologies.

### *3.2 What needs to be included in training programmes?*

They need to:

- Reflect a Southern perspective. Training should reflect the local conditions encountered in the South, for example, materials availability, weather conditions.
- Recognise the dual nature of energy use in the South. There is a mixture of energy sources used in different sectors of the economy: modern fuels, such as electricity and LPG, and traditional fuels such as biomass. Energy courses need to reflect this as well as promoting energy management.
- Recognise that energy technologies are part of a system. There have to be skilled people who can install and maintain renewable energy technologies. A pool of local consultants needs to be developed who can be called upon to advise governments, banks and end-users.

Technical education in the North also needs to change its nature. Many renewable energy engineers from OECD countries will work in the South or design equipment to be used there. Their education needs to reflect this so that they are sensitised to differences and able to develop technologies that are adaptable and sustainable in a variety of operating conditions.

### *3.3 Where should the training take place?*

Should training in renewable energy technologies take place in the North or in the South? There are advantages and disadvantages to both locations. When Southerners are trained in the North, they are exposed to the latest developments in the technology, make contact with suppliers and learn from the experiences of users of the technology. This latter aspect is not well recognised as being an important mechanism for reassuring Southerners that they are not getting a “second class” technology.

Training courses in the South are also important. This is the appropriate location for more hands-on type of training and mini (one or two day) intensive or specific training courses. Courses run in the South enable more people to be trained due to lower costs. The establishment of such courses is also part of institutional capacity building. SADC TAU has set up a regional training programme on various subjects related to rural energy planning and these courses are held in a number of institutions throughout Southern Africa. Training of trainer courses are valuable as these enable the establishment of training programmes that reflect local circumstances. The Asian Institute of Technology in Bangkok has for many years been running training courses and producing journals and newsletters which are tailored to the SE Asian region’s needs.

### *3.4 How should the training be organised?*

Apart from the obvious classroom type training, there are exciting new possibilities opening up through the Internet. However, it is all too easy to become over focussed on this modern approach and forget that not everyone has access to electricity, or good access to quality telecommunications where there is a power supply. The Internet is also very much orientated to a literate target group and many people who need training do not have sufficient levels of literacy. There are some exciting challenges in this area of electronic media.

Capacity building can also be achieved informally, for example, through networking. Exposing people to the latest developments through professional meetings and attendance at exhibitions. Professional institutes in the North can play an important role in networking; for example, the UK’s Institute of Energy allows access to its material through overseas membership, enabling professionals to keep in touch with the latest developments in the sector. Journals can be prohibitively expensive for Southerners. However, there are opportunities to acquire good quality information at low cost; for example, the publishers James and James supply their magazine “Renewable Energy World” without charge.

Southerners also respond to challenges and establish their own professional organisations which can provide informal capacity building through organising workshops and meetings. For example, the

Indian Association for the Advancement of Science has organised workshops on biomass energy, and in Tanzania a Solar Energy Association is being established which aims amongst its objectives to provide a group of accredited consultants that can provide professional advice on renewable energy technologies.

Although many people talk and write about the need for capacity building and its important role in renewable energy technology dissemination, funding for such initiatives seems to be less forthcoming. From our own experience, the Technology and Development Group has seen that while the interest in its training programmes shows no sign of diminishing, the number of people receiving funding has fallen dramatically since the beginning of the 1990s. Northern funding agencies need to be more flexible and be prepared to fund participants for training in other Northern countries; the Carl-Duitsberg Foundation is a good example of an agency that considers the appropriateness of the training, rather than its location, as a criteria for funding support.

#### 4. WOMEN: THE FORGOTTEN FACTOR

When it comes to capacity building, women are often the forgotten factor in the efforts to disseminate renewable energy technologies. This is strange when one looks at the role of women in both the supply and demand sides of the energy equation. Women are strategic energy decision makers at the household level – it is their responsibility to provide energy for their families needs. Women are energy suppliers, they collect and purchase biomass, kerosene and candles. They balance budgets to pay for electricity. However, when it comes to installing solar home systems, it is the man of the house who gets the training on how to use the system and what to do when the “little red warning light” flashes – irrespective of whether or not he is likely to be at home when it flashes.

It is surprising that the energy sector has not taken on board the lessons from the water sector: train women to maintain the equipment and the job gets done. This is not to say that men are lazy or technically incompetent -far from it. However, train a man and he is more than likely to head off to town to use his newly acquired skills to get a better-paid job. Women stay in rural areas. Energy provision is a women’s responsibility – just as with providing water for the household, women have a vested interest in ensuring energy equipment keeps working.

Opening up rural markets for renewable energy technologies could also make good use of women’s skills; women are good business entrepreneurs. Women are capable of running Energy Service Companies (ESCOs). However, their capabilities need to be assessed to see if they need special forms of training. Selection criteria can sometimes inadvertently discriminate against them, for example requiring a background in electrical engineering for access to training in establishing ESCOs. Few women have such qualifications, but with limited appropriate training they could be brought up to a sufficient level of familiarity with the technologies that they could make good use of their business acumen. After all, women can hire in the technical expertise if need be. The arguments about women’s role in energy provision set out above also hold good here; in addition women may find it easier than men to make contact with women in rural areas.

It is not only at the technical level that skills are needed. At the policy level, women are needed who can make sound assessments of the potential for renewable energy technologies. In this context, the training course by UNEP for women leaders from the South held in Australia in June 2001 is to be welcomed. Women are still in a minority in the renewable energy field and it is important that they can from time to time be given a supportive environment in which to exchange experiences and to network. Women are serious about renewable energy. Evidence of this can be seen in any issue of ENERGIA News produced by ENERGIA<sup>1</sup>, the international network on gender and energy.

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<sup>1</sup> See [www.energia.org](http://www.energia.org)

## 5. CONCLUSIONS

To summarise, building institutional capacity needs to take a more holistic approach. Capacity building is more than formal training courses. Within this context there are two important issues that need to be addressed:

- Sustainable financing for capacity building; development agencies that fund renewable energy technologies should assess whether or not they include training in their portfolio.
- Including women in the provision of renewable technologies. Women's response to capacity building might very well be:

“Give us the tools and we'll do the job!”

## 6. REFERENCES

N Mwhava, G John and J S Clancy (1998), *A Framework for the Development of A National Programme to Promote Renewable Energy Technologies and Energy Conservation in Tanzania*. Prepared for the Ministry of Energy and Minerals, Tanzania.

World Bank (1996), *Rural Energy and Development: Improving Energy Supply for Two Billion People*.