

The Role of Academia in Capacity Building for Sustainable Energy Development: The Case of Namibia

Al-Mas Sendegeya¹, and Zivayi Chiguvare²

¹Namibia University of Science and Technology (NUST), Department of Electrical and Computer Engineering
E-mail: asendegeya@nust.na or asendegeya@gmail.com

²Namibia University of Science and Technology (NUST), Namibia Energy Institute
zchiguvare@nust.na

Short Abstract

Education contributes to both short-term and long-term institutional building and supports human resource development. Both formal and informal education systems contribute to the development and dissemination of any technology. To ensure long-term sustainability and continuity of any sectorial development, professional, technical training and research at tertiary level (technical institutions, colleges and universities) should be given high priority. This paper proposes Capacity Building through education as a strategy towards Sustainable Energy Development. This approach allows the building of abilities, relationships and values that enable institutions, groups and individuals to improve the development, utilisation and performance of energy systems in an efficient and environmentally benign manner. Results from a project implemented by the Namibia University of Science and Technology in partnership with National University of Lesotho, Botswana University and Hochschule Darmstadt - University of Applied Sciences (Germany) are presented. The findings show that capacity building in the energy sector is still needed in the three partner countries (Namibia, Lesotho and Botswana). The proposed approaches to address the problem include: development of academic programmes and an energy repository. Though academic institutions are at the centre of capacity building in sustainable energy development, the success will depend on consorted and collaborative effort by all key stakeholders.

Keywords: capacity building, challenges, education, priorities, sustainable energy

1. Introduction

The function of education may be summarized as: a process of preserving and transmitting cultural heritage; instrument for transforming; and a means for individual development (Okech et al.) Education contributes to both medium and long-term national building. It is an essential complement to many investments in physical infrastructure, and is an integral part of any definition of development. Human resource development must be supported by education and training (Keith M. Lewin, 1997). Through education learners develop abilities, skills and attitudes which enable them to become not only better acquirers of knowledge, but also better users and producers of new knowledge. The acquisition of knowledge involves: accurate observation; retention of essential information; organisation and classification of information; and maintaining useful records of information. Both formal and informal education systems can contribute significantly to the development and dissemination of any technology. For long-term sustainability and continuity of sectorial development, professional and technical training at post-secondary or tertiary (technical and vocational institutions, colleges and universities) levels should be given high priority. This paper considers education as a key driving factor towards capacity building in sustainable energy development.

Capacity building through education is vital in the development of any society. The key term in the objective of education is to develop abilities, skills and capacities, of individuals. Therefore, the success and development of sustainable energy systems depends on enhancing capacities of the local population. There are various definitions of capacity building. The definition adopted here starts by defining the word "capacity". Some of the sample definitions of capacity-development as in (Horton et al, 2003) are: Capacity of an organization is its ability to function as a resilient, strategic and autonomous entity (Kaplan, 1999, p20). Capacity stands for the potential to use resources effectively and maintaining gains in performance with gradually reduced levels of

external support (La Fond and Brown, 2003, p7). Capacity is defined as the potential to perform (Horton et al, 2003, p18). Capacity is the ability of people, organizations and society as a whole to manage their affairs successfully (OECD, 2006, p12). Capacity is that emergent contribution of attributes that enables a human system to create development value (Morgan, 2006, p8). Capacity is the ability of a human system to perform, sustain itself and self-renew (UNEP, 2006). The definition given by UNEP uses the term 'human system', which implies that the capacities exist in different scales or levels of human organization. In this regard, individuals can have capacities, teams have a capacity to do what they do, organizations have a capacity, networks of actors have a capacity to co-produce certain results and even socio-technical 'sectors' or nations have a capacity (UNEP, 2006). This approach is applicable to develop human capacity in a holistic capacity development in sustainable energy systems and applications. Capacity development is literally, therefore, changes in capacity over time. It is important to note that capacity development is in that sense a continuous process.

In this paper, the definition of capacity building as presented by UNEP (UNEP, 2006) which includes sustainable development has been adopted. This is vital in promoting sustainable energy in a broad manner and encompassing a number of activities in the energy sector. Thus, "Capacity Building for Sustainable Energy Development" is described as building abilities, relationships and values that will enable organizations, groups and individuals to improve the development, utilisation and performance of energy systems in an efficient and environmentally benign manner. In this aspect capacity building can also be referred to as initiating and sustaining processes (i.e. sustainable energy processes) of individuals and institutions to change that can equally be reflected to change within a country, society/community or the private sector. Therefore, the concept puts emphasis on three aspects: (a) capacity building as the catalyst and constant fuel for a process of change, (b) the importance of building institutional capacity, and the (c) involvement of a wide range of different groups in society.

A sustainable energy programme encompasses strategies put in place towards the development, provision and utilisation of clean energy that meets the needs of present society without compromising the ability of future generations to meet their energy needs. This includes the promotion of sustainable energy policies that can spur economic growth while protecting the environment. Throughout the energy chain (resource development, generation, delivery, consumption and decommissioning) environmentally friendly mechanisms and technologies must be given utmost priority. There is an increasing global concern about environmental issues resulting from energy use, hence sustainable development and use of energy focusing more on local resources especially renewable resources should be given the highest priority. Besides environmental issues, other driving forces for the adoption of sustainability in the energy chain include: fluctuating and drastic increases in prices, and deteriorating reserves of conventional fuels (oil, natural gas, uranium and coal). In developing countries, increases in prices of fossil fuels have negative economic consequences. The situation is worse especially in countries already overwhelmed with poverty, whereby the challenge is to choose between fuel and food, health care, education and other essentials.

The findings (from the review of documents, consultations with key stakeholders and workshops) indicate that development of energy sector is necessary for national development. The development of an energy sector requires skilled and competent human resources. Though there is no evidence to justify the availability of energy experts in Namibia, the scanty information available indicates that the country does not have sufficient skilled man-power to support the energy sector and to cope with the rapid industrial development. The paper summarises the proposed strategy to address the issue of capacity building through introducing academic programmes and initiating a reliable energy repository. These are seen as part of long-term sustainable approaches to address problems related to energy in any country.

2. Methods

This paper is part of the outcomes of the project implemented by Namibia University of Science and Technology in partnership with the National University Lesotho (NUL), the University of Botswana (UB) and Hochschule Darmstadt - University of Applied Sciences (Germany). The project "Southern African Sustainable Energy Initiative (SASEI)" is funded by the EU - ACP through the EDULINK-II programme. The main objective of the project is to enhance institutional, human and systems development capacity of the consortium of regional institutions in Sustainable Energy (Renewable Energy and Energy Efficiency). As part of the project activities, Namibia University of Science and Technology has carried out an Energy Sector Needs Assessment by reviewing

various documents and different sources in literature on energy issues in the country and/or region, and consulting with key stakeholders.

In order to address the problem, the conceptual framework demonstrated in Figure 1 was developed. The framework addresses capacity building as per the original project objectives. The areas of focus are built on three pillars: Academic and/or research institutions; decision and/or policy makers; and industrial and private sector to build capacity among society. The proposed training programmes for capacity building are aimed at addressing support for institutional development, policy and individual development to ensure sustainable energy development. In summary, the concept links between three pillars as outlined in Figure 1 as follows:

- Sustainable Energy Access and Security
- Energy Social–Cultural and Environmental management
- Energy technologies, applications and policies

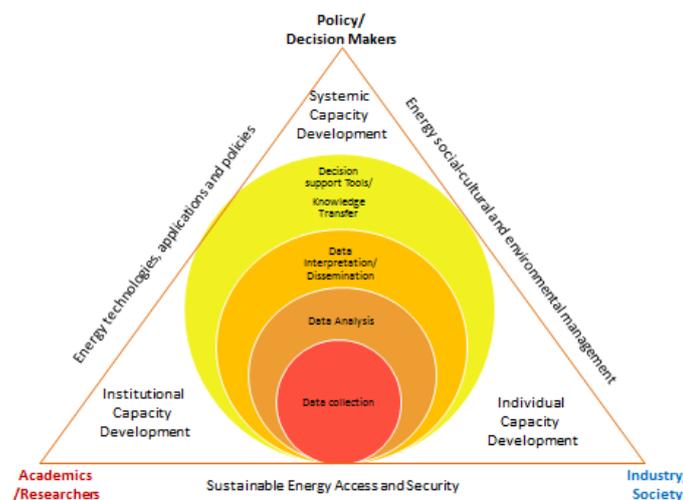


Figure 1: Conceptual Framework

3. Results and discussion

With reference to the key challenges faced by the energy sector, the strategy to support the government commitment in the energy sector and the SASEI project objectives, both long-term and short-term options have been proposed. The short-term approach includes the development of tailor made short courses for practitioners. Under the project, Training-of-Trainers (ToT) courses were designed and conducted. The ToT programme aimed at equipping trainees (trainers from institutions) with skills to understand the requirements and processes in the planning, designing, operating and managing sustainable energy systems and projects, while minimising impact on the environment and maximising socio-economic benefits. The courses covered under the ToT programme are: (a) Energy economics; (b) Energy and climate change; (c) Energy efficiency and management; (d) Sustainable energy and development; (f) Energy investment analysis; (g) Renewable Energy Resource assessment; and (h) Energy and gender. These short courses have been given by professors and experts with long-term experience and track record in sustainable energy training and development. The participants were engaged in analysing real life energy projects and preparing technical reports. At the end of the training participants or trainees are given certificates. These are members of the partner institutions and representatives from key stakeholder organisations, industries and companies in the corresponding countries.

To ensure long-term sustainability of the sector, an academic programme and a reliable energy repository are proposed and initiated. It is necessary to strengthen and support Energy Sector Management starting from policy level down to the final beneficiaries through recommended and appropriate programme development processes. Therefore, it is envisaged that the developed academic programme should focus on the following priority areas:

- Energy governance and policy; accessibility to sustainable energy and energy security; linkage among energy, society, culture, development and environment; and energy resources, technologies and applications.

- Advisory services: Energy Sector Governance support both public and private sector through advisory services
- Developing and managing an Energy Database: A one-stop centre for all energy related issues in the country is necessary. The project facilitates a framework for developing an open access data centre which coordinates all energy related activities including collecting data on available resources, existing projects, planned projects, experts in various areas of energy, etc.
- Public awareness: Increasing and enhancing the quality of public awareness programmes.

The proposed postgraduate programme is designed to provide state-of-the-art education in the field of energy by emphasising sustainability in resource assessment, exploitation, development, delivery and applications. The programme is multidisciplinary to attract the wide range of students with relevant first degree in applied/physical science, engineering or other related discipline as will be evaluated by the university to be equivalent to the minimum entry requirements. The interdisciplinary curriculum is aimed at equipping graduates with skills to plan, design, operate and manage sustainable energy systems and projects, while minimising impact on the environment and maximising socio-economic benefits to the society.

The programme broadly structured as follows:

- Introductory and homologation core courses, which are foundation courses helping students understand the basics or background knowledge about various aspects of energy;
- Specialisation courses (some core and elective to students opting for specialisations);
- Research project and Internship or industrial attachment; and
- Master thesis.

4. Conclusions

The paper has discussed the concept of capacity building, sustainability in energy issues and importance of education as a catalyst in capacity building. The concepts of the trio (education, capacity building and sustainability) have been used to achieve the Southern African Sustainable Energy Initiative project. The need for capacity building in Namibia has been realised or confirmed after the survey or consultation with the key stakeholders/public. The academic institutions have been considered to be at the centre of capacity building in the sector. To ensure long-term sustainability of the sector, academic approaches have been proposed which include: academic institution to consider training in higher degrees (the institutions of higher learning advised to develop a postgraduate in sustainable energy) and initiating a reliable data repository. The conclusion to the approaches is based on findings from the needs assessment carried out among key stakeholders in the country. The interesting finding from the study shows that the challenges and priorities in the energy sector are common even in other partner countries in the region (Botswana and Lesotho). A similar approach (development of academic programmes and data repository) was also proposed in partner countries. However, the academic programmes proposed in these countries are at lower levels (bachelors and short-courses leading to award to certificates of competence).

5. References

1. Horton, D. et al. Evaluating Capacity Development: Experiences from Research and Development Organizations around the World. Ottawa, ISNAR, CTA, IDRC, 2003
2. Jack G. Okech and Adams J. Asiachi. Curriculum Development for Schools. Nairobi: Educational research and Publications Ltd, 1992
3. Jan Ubels, Naa-Aku Acquaye-Baddoo and Alan Fowler (Ed). Capacity Development in Practice. London: Earth, 2010
4. Kaplan, A. Developing Capacity, Community Development Resource Association, Cape Town, 1999
5. Keith M. Lewin. Education and development the issues and the evidence. Education Research Paper No. 06, Centre for International Education University of Sussex, 1997
6. LaFond, A. and Brown, L. A Guide to Monitoring and Evaluation of Capacity-Building: Interventions in the Health Sector in Developing Countries, MEASURE, 2003
7. Morgan, P. The Concept of Capacity: Capacity, Change and Performance, European Centre for Development Policy Management, Maastricht, 2006
8. OECD. The Challenge of Capacity Development – Working Towards Good Practice, Organisation for Economic Co-operation and Development, Paris, 2006

9. United Nations Environment Programme. Ways to Increase the Effectiveness of Capacity Building for Sustainable Development. Discussion Paper, 2006 IAIA Annual Conference, Stavanger, 2006