

Enhancing the Capacity for Renewable Energy Application in Developing Countries

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Editorial

Developing countries constitute over seventy percent of the world's population. They are found mostly in Sub-Saharan Africa, Asia and Latin America. These countries are characterized by low per capita income, high population growth rate, high level of poverty, low level of industrialization, poor state of health, education and infrastructure among other things. In particular, energy use in these countries is not only low but the sources are mostly dependent on fossil fuels which are not only un-renewable but unsustainable. Yet energy plays a key role in the socio-economic and political development of any nation.

Inadequate supply of energy restricts socio-economic activity. It limits economic growth and adversely affects the quality of life. Conversely abundance of energy results in the improvement of a nation's living standard manifested in increased food production, increased industrial output, provision of efficient transportation, adequate shelter, health and other human services. Renewable energy, in particular, is vital to the much needed socio-economic development of the developing countries. It is generally defined as energy that comes from resources which is naturally replenished on a human timescale. Rapid deployment of renewable energy results in significant improvement in energy security. It also results in the reduction of the consequences of climatic change on the environment.

Renewable energy sources include solar, hydro, wind, geothermal, tidal and biomass energy. In contrast to other energy sources which are concentrated in limited areas, renewable energy resources exist over a wide geographical area particularly in the tropical regions where most of developing countries lie. Solar, in the form of thermal energy, is used for heating, cooling, etc. Solar thermal applications in some developing countries include crop drying, poultry chick brooding, egg incubation, water heating, water distillation, food preparation, refrigeration, evaporative cooling, etc. In form of photovoltaic, solar energy has been used in street lighting, water pumping, and drug preservation in rural hospitals among other things. In some countries, it has been integrated with the national grid. Biogas and other biofuels are used for cooking, and as fuels for automobiles and other such equipment. Small and large scale hydropower as well as geothermal and tidal energy is used for electricity generation. Wind power is also used for electricity generation and as a source of mechanical power for operating such items as water pumps and agro-processing equipment.

Despite the numerous advantages of renewable energy, the bulk of its development and deployment to date has occurred mostly in developed countries instead of in developing countries where these innovative technologies are most needed. Among the factors responsible for this is the comparatively high cost of deploying renewable energy coupled with the usual low flow of investment funds

in developing countries for renewable energy financing, development and application. Dearth of policy and regulatory framework for the inducement of investment in renewable energy, poor capacity for the development and deployment of renewable energy as well as limited awareness of the applications and opportunities by potential consumers, suppliers and investors are other reasons for the low level of application of renewable energy technologies in developing countries. Others are the monopoly structure in the energy sector of some developing countries which discourages competition, high subsidies on fossil fuel based energy sources, etc. These barriers must be addressed if the application of renewable energy in developing countries is to be rapidly scaled up.

Capacity improvement can be in form of provision of physical equipment, devices, infrastructure, utilities and support services for the development and utilization of renewable energy. It can also be in form of improvement in skill for innovation/research and for the development, deployment, marketing, financing, operation and maintenance of renewable energy facilities. The latter can be achieved by integration of renewable energy into the curriculum of secondary and tertiary institutions of developing countries. In particular, there should be exchange of staff (especially at the tertiary level) between the academia and the industries such as obtains in medical fields where consultants and senior registrars in teaching hospitals are appointed to honorary academic positions in medical colleges. Undergraduates should be encouraged to embark on voluntary community projects aimed at promoting the development and application of renewable energy in rural areas of the developing countries. Demand driven and well-funded research should be intensified (with emphasis in low tech applications in the field) to drive down the cost of renewable energy technologies as well as enhance product and system performance, reliability and efficiency. Awareness creation should also be intensified. Although there are a number of renewable energy technologies that have been developed, most people in especially the rural areas of developing countries are hardly aware of them. And, even where they are aware, getting them to accept the technology is another issue. For example, although biogas technology is widely used in China and India, some people in Africa may still find it difficult to accept that gas generated from their domestic sewage disposal system can be used for food preparation.

Monopoly structure in the energy sector of some developing countries reduces competition and vastly denies the private sector access to the energy market. Subsidies on fossil fuels as practiced by many developing countries such as Nigeria also makes renewable energy less viable. Deliberate policies to kill monopoly and to discourage such subsidies should be put in place to make the price of fossil fuel based energy sources less competitive and so encourage the development and deployment of those based on renewable energy. The

high capital and transaction costs currently associated with renewable energy development should also be addressed through deliberate policies that will enhance access to affordable credit for renewable energy technology development and application. For example, a renewable energy development fund can be established and all players

in energy industry made to pay a percentage of their profit as energy development tax into this fund. This fund can be used to fund researches in tertiary institutions and renewable energy research centers.