

Book Review

Technology and Innovation Report 2011: Powering Development with Renewable Energy Technologies, by Padmashree Gehl Sampath, Michael Lim and Carlos Razo, New York: UNCTAD, 2011, 151 pp.

The theme ‘powering development with renewable energy technologies (RETs)’ in the *Technology and Innovation Report 2011* by the United Nations Conference on Trade and Development (UNCTAD) is most timely when the world needs to respond to a phenomenon. On the one hand, access to energy is essential for fuelling development in order to ameliorate the living conditions of 7 billion people and yet on the other hand it is becoming more evident that continued usage of conventional energy (primarily fossil fuels) is causing climate change. As acknowledged in the report, recent events, from both economic and environmental perspectives have further spurred the efforts toward looking at new ways to fuel development. Researchers, governments, NGOs and businesses can benefit from examples of the experiences of the developed and developing economies described in the report.

It is a brilliantly structured report with an introduction that debates issues from four different perspectives: energy; climate change; developmental; and equity and inclusiveness. The other five chapters (including a summary) are well organised, first looking into the increasing importance of renewable energy technologies in the whole energy system, followed by a chapter on the different catalysts available, then with succeeding chapters on the international scenario and the different policy options at the national level.

Chapter one sets out the tone of the report by highlighting recent issues and predicaments which necessitate the need for renewable energies. Top of the list is an energy debate where the discovery of oil and gas has enabled steady economic growth globally. This has led to unprecedented growth in productivity and improvements in living standards for the majority of the world’s population. The authors however offer a cautionary note, where energy consumption can have a variety of impacts on productivity, depending on the level of each country’s development. The second perspective is on climate change, where the continued usage of conventional energy sources (primarily fossil fuels) are believed to have given rise to GHG emissions which in turn have led to an increase in global average temperatures. Global warming has recently caused frequent weather catastrophes worldwide. Based on recent estimations, developing countries are now suffering more than 75 per cent of

the environmental damages due to climate change. The third perspective calls for an urgent effort by developing countries and LDCs to embark on a transition to low carbon economies. Equity and inclusiveness is the fourth perspective in considering renewable energy technologies (RETs). It is estimated that 85 per cent of the 1.4 billion people excluded from electricity grids globally live in rural areas. Since supplying power to rural areas through building electricity grids is costly, investing in RETs is one way to help reduce energy poverty.

In Chapter two, the authors look at the role of RETs and how access to energy can be expanded in order to fulfill the demand and drive global growth. Since configurations are flexible and mixing with conventional energy is possible, RETs can play a role in alleviating energy poverty. Since 2003, the use of renewable energy has expanded especially whenever there was a hike in hydrocarbon prices. However this energy contributes only a small fraction of total energy capacity. In 2008, the usage of renewable energy accounted only for 12.9 per cent, with the remaining being dominated by fossil fuels. It has been estimated that new and renewable sources of energy at present meet only 5-10 per cent of global energy requirements, and this figure is expected to rise to 30 per cent by 2050. RETs, provided they are cost competitive, would be a way forward to create job opportunities and alleviate energy poverty. The various sources of established and emerging RETs discussed include: hydropower, biomass, wind, solar, geothermal and ocean. For developing countries the fastest growing RETs are wind, solar and modern biomass sources for electricity generation. However, technological development in RETs is dynamic and growing rapidly.

Chapter three highlights the strong link between knowledge, innovation and growth. The whole chain of producing, adapting and disseminating RETs would require a critical base of knowledge that includes technical and managerial capacities. Hence, this chapter offers a framework for technology development and innovation, the necessary foundation that will ensure the success of RETs. Public policy should focus on three main areas: i) greater integration of RETs in each country's socio-economic development strategies; ii) creating greater capacity for increased technology absorption; and iii) clear policy supporting the aim of integrating rates with the national energy system.

Chapter four discusses repositioning of RETs' issues in debates within international forums. The discussion on mitigating climate change has to be taken up together with eliminating energy poverty in developing countries. In this regard the debate should be on how to tackle issues such as the lack of financial and technological capability among developing countries. This chapter discusses several proposals in the context of financing within the climate change framework. Some of the readily available funds and financing sources that can be utilised by developing countries are the World Bank Climate Investment

Funds, the Clean Technology Fund and the UNFCCC Green Climate Fund. However, these funds are insufficient compared to the needs of developing countries. A better management of funds would make them more sustainable.

Chapter five outlines two necessary conditions for a successful virtuous cycle of interaction between RETs and science, technology and innovation. First, the national innovation system has to provide for RETs development and second, establish energy policies that promote the gradual integration of RETs into the industrial development strategies. Highlighted in the report is the absence of strong and solid policies to support the development of renewable energy technologies in developing countries. Many countries do not have adequate plans and strategies, laws and regulatory frameworks, market mechanisms, financial tools and incentives. However, as noted in the report some developing countries managed to develop comprehensive plans and policies. Among these are: the Chinese Renewable Energy Plan; India's Renewable Energy Programme; Korea's Basic Plan for Renewable Energy Technology Development and Dissemination; and Thailand's Small Power-producer Program. The authors suggested five areas to be included in developing a national integrated innovation framework. These elements are: i) setting policy strategies and goals; ii) providing policy incentives for R&D, innovation and production of RETs; iii) providing policy incentives for greater technological absorptive capacity that is needed for adaptation and use of available RETs; iv) promoting domestic resource mobilisation for RETs in national contexts; and finally, v) exploring newer means of improving innovation capacity in RETs, including South-South collaboration. The proposal is definitely a colossal example of best practice globally.

To conclude in Chapter six, the authors opined that all countries including the developing ones have potential to develop renewable sources of energy to alleviate energy poverty. The renewable sources of energy could complement conventional energy supplies and would support their efforts to leapfrog into higher stages of economic development.

It was proposed that developing countries consider focusing on adapting existing RETs to their domestic contexts and markets. By using conventional sources of energy for off-grid applications, it could lower their costs and improve their operational performance. China, India and Brazil are good examples, although the size of the markets in these countries provides inherent advantages.

The report is definitely useful not only to governments and policy makers, but also to the private sector, NGOs and individuals, because everyone can play a role in renewable energy technologies. In the just concluded Rio+20 conference it is heartening to note that governments, private sectors and multilateral agencies have pledged US\$5,130 billion toward projects targeted at

reducing usage of fossil fuel, improving renewable energy sources, conserving water and alleviation of energy poverty.

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