

Research and Development Needs for Renewable Energies in Developing Countries

Abstract

The future for renewable energy sources (“renewables”) in the developing world, if properly harnessed, looks bright and the prospects are good. There are vast reserves of and high potential for the use of different renewable energies (RE), be they solar, hydro, wind, wave, hydrogen, waste, etc. However, these remain largely unexploited due to a combination of factors; particularly economics, lack of appropriate research and development and the absence of enabling policy instruments. At the same time, access to modern, commercial energy services is usually too low to facilitate meaningful economic development in developing countries. Sub-Saharan Africa, the world’s most under-developed region, with 17% of the world population and blessed with abundant mineral resources, consumes less than 3% of the world primary energy supply. Most of the developing world’s energy needs could, theoretically, be met by the vast renewable energy potential. However, despite decades of attempts to supply modern renewable energy technologies (RETs), the energy landscape remains largely unchanged. Traditional fuels (biomass in Africa) continue to dominate the energy use patterns. There have been numerous spectacular instances of failed RETs, uncoordinated renewable energy programmes and piecemeal demonstrations or pilot projects. Even in the case of successes, these have largely remained undocumented and lessons learned are therefore lost.

This calls for a paradigm shift in R+D, particularly relating to RET solutions. There is a need for R+D which does not ONLY focus on flooding the developing world with an array of technologies that deliver short term benefits, but an R+D process that addresses the expressed needs of the users in an integrated manner. Such an

approach will provide answers to the key questions: What are the energy needs specific to the users and how do they link to other development needs? How to transform the energy needs to effective demand? What is the best technology mix to meet these needs? The R+D needs of developing countries relate to challenges that address embedded socio-economic needs, identification of appropriate energy technologies that are informed by local conditions, and the need for R+D on sustainable business models to stimulate local renewable industries.

Introduction

There is currently a global optimism regarding the future for RE and its potential role in sustainable development. While there are different justifications for the introduction of RE into the mainstream national energy economies, the potential to sustain economic development, while minimising the adverse effect on the environment, is a common rallying point. There is also a high level commitment globally to accelerate the use of renewables. This commitment is supported by the ready availability of capital from multinational agencies, national governments and the private sector to fund viable RE projects. The World Summit on Sustainable Development (WSSD) in Johannesburg provided a necessary platform to initiate unified and purposeful global efforts, known as Type II activities, towards accelerating actions designed to exploit renewables worldwide. One of the key outputs of the 2004 World Renewables Conference in Bonn is to provide concrete implementation strategies and joint RE projects.



Mongameli Mehlwana¹
 GRA/CSIR (South Africa)
 MMehlwana@csir.co.za

¹ The author acknowledges the technical support provided by Dr. Gert Venter, Thomas Roos, Stefan Szewczuk and Sydney Parsons (all of CSIR). A special thanks to Dr. Pete Ashton for his useful comments and thorough editing. While most issues expressed herein represent the CSIR Energy Trust, the conclusions are those of the author alone.

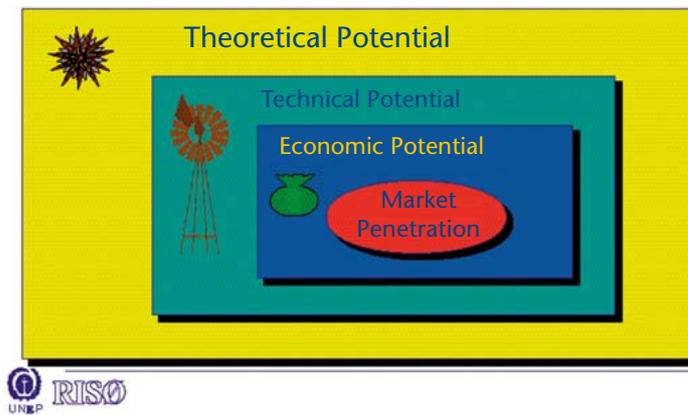


Figure 1
Potential for
Renewables [1]

With respect to the developing world, the accelerated use of renewables in countries' energy mixes has important additional benefits. Access to modern fuels in many developing countries is a cause for concern. In the 'business-as-usual-scenario', more and more households, particularly in rural regions of Africa, will forever rely on dwindling biomass fuels to meet their energy needs. Estimates indicate that the current reliance on biomass (mainly woodfuel) is between 70–80%. Providing conventional energy in the form of electricity is usually uneconomical, and the costs are beyond the reach of many households situated in rural areas. This scenario certainly does not encourage economic growth and development in these areas. Access to affordable, adequate and modern energy services is the engine for a country's development and a cornerstone in alleviating poverty. Effective introduction of renewables in developing economies could facilitate and fast-track development processes, while improving the options and quality of life available to the poor.

Despite this situations, there are many dynamic challenges to be faced in attempting to accelerate the uptake of RE in developing countries. These relate to policy frameworks that favour renewables, availability of appropriate RETs, focussed R+D on appropriate technologies and project implementation strategies, lack of baseline studies, funding, etc. Most of these barriers have largely been removed, though several critical ones still remain. This paper argues that now is the opportunity to devise effective implementation strategies that are informed by past experiences, and based on international best practices. The focus of this would be to

isolate the key needs of developing countries, related to renewables, that can be addressed by innovative R+D, whilst creating and embedding local skills and expertise in the process.

The Future for Renewable Energy in the Developing World

Global Push for Renewables

The positive euphoria regarding the enormous potential of RE should be viewed against the global fear of the consequences of relying too much on fossil fuels for economic growth. A lot has been said about the negative effects of emissions from the production, transmission, distribution and consumption of fossil fuels, particularly oil and coal. Much of the global agenda on renewables (and energy efficiency) is driven by this fear, as well as the need to ensure the long-term – and diversity of – supply of environment-benign energy.

As most developing countries are net exporters of energy, as well as possessing few energy intensive industries, their emission levels are insignificant on a global scale. Therefore, the agenda for renewables in developing countries should be to satisfy the energy needs of two billion people without access to modern and clean energy sources. The question, therefore, has to be 'Can renewable energies meet the needs of developing countries?'

Theoretically, all the global energy needs / demand could be provided by RE [1]. However, currently used technologies cannot tap the current potential. Even the market penetration of RETs is below the economic potential. At the level of a developing country, penetration of RETs is least. Even the number of RETs currently in circulation remains unknown because of lack of reliable data on RE projects. The point, therefore, is that on their own, renewables cannot meet the energy demand of developing countries. At a practical level, renewables in developing countries should be introduced as one of the energy options (including non-renewables) in the context of "Energisation" (see below).

Prerequisites for Sustainable Renewables Takeoff

The global (read “developed” countries’) push for renewables will not attain any sustainable level of success if developing countries are not supportive or receptive. Pro-activity is the keyword for success and developing countries must want renewables. The “want” should be determined by the policy frameworks that favour renewables and contribute to the growth of RET businesses in local economies. Unfortunately, in many instances, the push for RE comes from developed countries since there is a dearth of proactive policies in developing countries. For instance, few countries in Africa have renewables energy policies. Most attention is, understandably so, focussed on coal, gas, oil and large-scale hydropower projects. It is significant to note that the energy desk of NEPAD – a framework for Africa’s economic revival – does not have a renewables mandate. The latter is located within the broader environmental desk. Most regional power pools do not prioritise renewables as they do non-renewable energy. A key prerequisite for sustainable RE takeoff is arguably harmonised regional policies and strategies. The effectiveness of projects funded by multinational agencies and inter-governmental entities will come to be well below desired levels if this prerequisite is not addressed.

However, one of the often cited barriers to formulation of realistic, informed and effective policies, particularly in Africa south of the Sahara, is lack of validated data, which in turn are determined by the absence of R+D institutions to conduct this research [2]. These facts are recognised in the WSSD Plan of Implementation, which advocates the promotion of technology development, transfer and diffusion to Africa, and the further development of technology and knowledge available to African centres of excellence [3].

Developing World: Different Contexts, Different Needs

While all developing countries share common features or indicators vis-à-vis developed countries, it is important to mention that they are definitely not a homogenous entity (Fig. 2). This distinction is very significant, particularly as far as the energy landscape is concerned. The energy

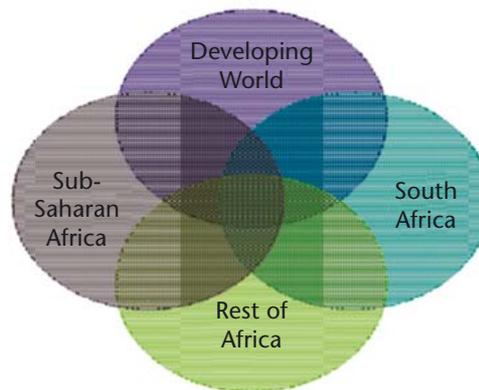


Figure 2
Heterogeneity nature of developing countries

needs of developing countries are influenced by their varying degrees of “development”, or simply the prevalence of widespread poverty. For instance, sub-Saharan Africa (SSA) is considered the least developed region in the world, well below the levels of other developing countries. The IMF projections show economic growth in all developing countries as averaging 6% per year (2003–05) compared with 4% per year in SSA. Therefore if this region has to halve poverty levels by 2015, the GDP growth must more than double from current levels of 3% to 7% per year [4].

In energy terms, this means that the poorer the region, the more different and precarious its energy needs will be, and the more complex the solutions should be. A significant number of the two billion people worldwide who do not have access to modern energy services live in SSA.

Hence, the SSA economic priorities are strongly informed by the need to alleviate poverty. With more than 500 million people currently without access to electricity and with more than 600 million people dependent on traditional biomass for survival, SSA has a dire need for safe, affordable and clean forms of energy to enable productive economic activities to generate much needed income [5]. Tab. 1 underlines the African reliance on traditional fuels, as compared to the more affluent countries in Europe [6].

On the other hand, countries of the SSA need to develop. Owing to its developmental status, exacerbated by emigration of skilled people, Africa lacks the human capacity and technical strength to achieve the necessary progress within a ten to fifteen year time frame as required

Table 1
Energy indicators for 1999 for a selection of african & european countries, 1990 US\$ (Source: International Energy Agency, Paris)

Country	Population (M)	GDP (US\$B)	TPES/ Capita	TPES/ (000\$)	Electr (KWh/ Capita)	Electr Cons (KWh/US\$)
Morocco	28.2	38.4	0.35	0.26	538	0.40
Senegal	9.3	5.5	0.32	0.54	122	0.21
Algeria	30.0	47.0	0.94	0.60	960	0.81
Egypt	62.7	74.6	0.71	0.60	960	0.81
Ethiopia	62.8	7.1	0.29	2.59	24	0.21
Nigeria	123.9	31.0	0.70	2.82	89	0.36
Kenya	29.4	9.9	0.50	1.48	127	0.38
Angola	12.4	6.4	0.61	1.18	92	0.18
Zambia	9.9	3.8	0.63	1.61	568	1.46
Zimbabwe	11.9	8.4	0.85	1.22	940	1.34
Mozambique	17.3	3.4	0.40	2.04	48	0.24
South Africa	42.1	164.4	2.60	0.67	4479	1.15
NOTE: No recent info available for Botswana, Lesotho, Swaziland						
United Kingdom	59.5	1256.0	3.87	0.18	5901	0.28
Germany	82.1	2603.0	4.11	0.13	6480	0.20
France	60.3	1698.0	4.23	0.15	7142	0.25
Sweden	8.9	267.3	5.77	0.19	15450	0.51
TPES: Total Primary energy Supply toe: tonnes of oil equivalent						

in the NEPAD position. It is almost certain that Africa would neither be able or allowed to follow the developmental pathways that brought other countries to their current position in the world. New and innovative systems-dynamic approaches are needed [6].

Therefore, the ideas and analysis presented in this paper apply to varying degrees to different regions and countries that are, by definition, considered to be “developing”. However, most of the arguments presented concern the under-developed regions within the developing world. The bias is intentional because these are the regions that most need innovative renewable energy solutions, and these are regions that have acute energy needs. The term ‘developing’ is used in this sense throughout the paper.

Renewable Energy Trends in Developing Countries

The Social and Economic Dimensions of Renewables

Energy is an essential consideration in development, and choices taken in the near future will have far-reaching consequences on development, impacts on global change and the sustainable use of ecosystems and non-renewable resources.

The need for access to energy is pervasive.

Fig. 3 indicates how every facet of an economy requires access to energy services in one form or another for sustainable development [6].

It stands to reason that the most important aspect of the energy debate is the type and quality of service that energy provides to the users. Decisions as to what is the best energy source for specific needs, are determined by how an energy service comes about. With respect to developing contexts, the decision to use certain types of energy sources will be influenced by considerations such as accessibility of the fuel resource; efficacy to perform specific tasks; and the speed and reliability of service. More importantly, however, such decisions will be based on costs and affordability vis-à-vis available options. Therefore, for renewables to gain social acceptance, they need to fulfil specific criteria. The needs of developing communities are simple: they need clean water; warm houses; cooked food; to engage in agriculture and other income generating activities; easy access to health and school facilities; and so on. The energy infrastructure provided should assist in meeting these broad social and economic needs. Sadly, in many instances, renewable energy options have been introduced with scant regard to the community needs they seek to address. For example, solar PV projects have been imple-

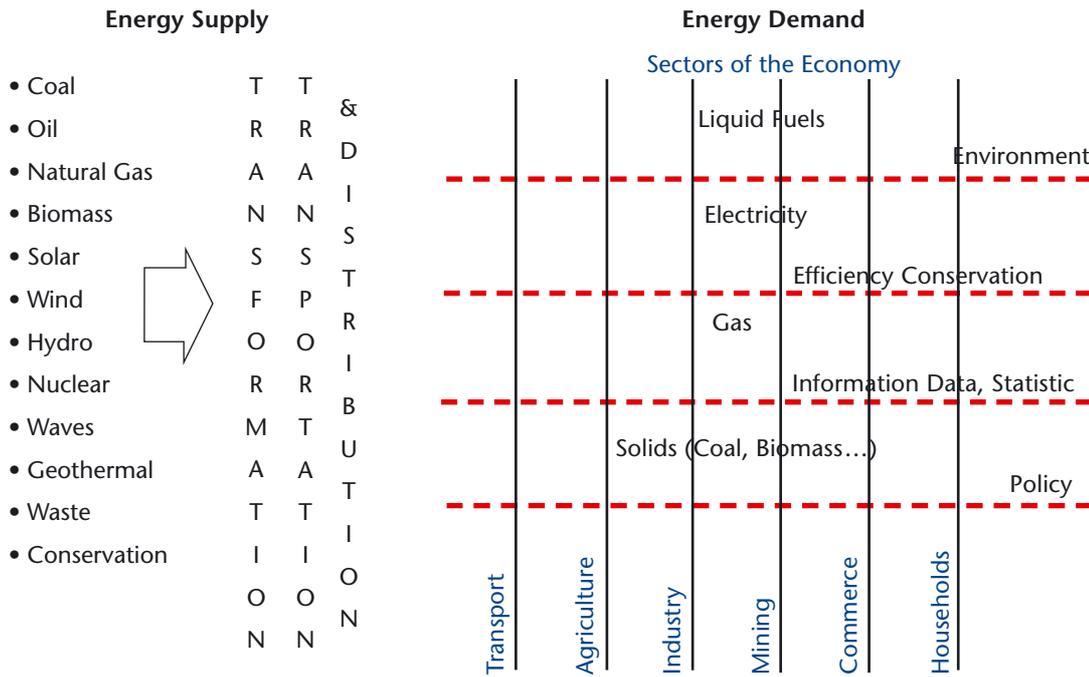


Figure 3
Energy in the economy
[6]

mented in areas where the priorities of targeted communities were clearly thermal (cooking and heating).

Technology Options

Linked to the socio-economic dimensions of energy options is the question of the energy technology choice. While the potential for an array of renewable energy sources is prevalent in developing countries, the technology choices selected are, unfortunately, seldom informed by local conditions. For instance, issues such as community preferences, energy-use behaviour (e.g. cooking inside or outside; time of cooking, etc) and multiple-fuel use are often overlooked when technologies are introduced, particularly renewable energy technologies. In selecting technology options, care should be taken to consider aspects such as community fit, and cultural traits. In some communities, for instance, the use of human excreta to generate biogas goes firmly against the local culture and community etiquette.

It is also important that whatever viable technologies are selected, they should serve broad development needs – more importantly they should provide income-generating opportunities. For example, the majority of RET components are wholly imported to developing countries. This has ramifications as far as social acceptance

is concerned. Where local production is non-existent, communities benefit little apart from selling the technologies. Local production of at least some components of RETs is crucial not only in providing much-needed job opportunities, but in ensuring a sustainable local production industry. Technology transfer should not be defined as indiscriminate distribution of renewables, but as skills and knowledge transfer, particularly in the manufacturing and maintenance of technology components. Most developing countries are considered as the market for ready-made, off-the-shelf RETs. Surely, this attitude needs to change.

Policies on Renewables

It is unfortunate that RE policy instruments are non-existent in many developing countries. This goes against the global pattern which prioritises renewables in countries’ energy policies. How many countries in Africa, for example, have renewable energy policies? Where policies exist, how many countries have RE implementation strategies? The absence of such policy frameworks impedes the introduction of RETs as projects to accelerate renewables are often ad hoc and do not follow a strategic direction. This is a recipe for failure. To be fair to developing countries, national priorities often dictate that the focus should be on pressing and immediate needs, such as combating deadly diseases,

Figure 4 (left)
Village with renewable energy access



Figure 5 (right)
Collection of fuelwood is time-consuming and detains people from income generating productive activities



alleviating malnutrition, providing clean water, etc. Focusing on RE which is perceived (though may not be necessarily so) as small-scale, rural and therefore less important than large-scale capital projects. Also, it appears that the policy vacuum is also caused by a dearth of information that would facilitate the introduction of renewables, such as baseline studies on energy needs. The challenge this poses to RE practitioners is how to explicitly link renewable energy production, distribution and consumption patterns to national priorities.

At regional level, policies or approaches to disseminate RE are seldom harmonised. Regional institutions such as power pools and development communities exist and can be used as platforms to harmonise RE policies, as well as assisting member countries to formulate appropriate policies. All things being equal, the cornerstone to relevant and informed policies is the availability of research centres at national and regional level to provide updated baseline information as well as to develop new technology options. The developing world has fewer centres of excellence to support policy decisions, particularly on renewables. Some of the existing centres lack capacity as the best personnel emigrate to developed regions of the world due to lack of adequate resources (mainly lack of funding and institutional support) to implement appropriate R+D programmes.

A Paradigm Shift to Technology Development: Renewables and Sustainable Development

Whose Development, Whose Problem? Thinking with the People and not for the People

The above discussion suggests that perhaps one of the impediments to uptake of renewables is the manner in which solutions are conceptualised and implemented. In many instances, the energy problems of developing countries are assumed, and there is no proper research done on how such problems are viewed by the people concerned. Even when such problems are properly researched, solutions are often planned far away from the target communities. Surely, if the poor can articulate their problems and needs, solutions should also be discussed with them as well. In many instances, it may not matter so much what type of energy technology is provided, but the service that such technology provides is of crucial importance.

Thus, there is a need for a paradigm shift to development, not only in theory, but also in practice. People in developing countries should not be passive actors in their own development. Granted, they may not be aware of technological innovations, but this does not justify their exclusion in problem-solving strategies. The overriding reason for introducing RETs in developing countries should not only be driven by the need to open up new markets or to serve the concerns of the affluent about environmental issues, but by the expressed desire to complement strategies aimed at reducing poverty. For instance, the primary development problem of the developing world is poverty, not access



to energy. The latter is the symptom of the former. RE dissemination strategies should be informed by this fact, and should be directed at poverty alleviation.

Appropriate Technology Options

The paradigm shift mentioned above suggests that education is essential before solutions can be devised. This education must be two-pronged: firstly about assuring that the developed countries understand the real needs of the developing countries and, secondly, the developing countries learning about new technologies to address energy needs. The infusion of this two-pronged education should form the basis for effective partnership in halving the levels of world poverty by 2015, as espoused by the Millennium Development Goals. Indicated above is that some wonderful technologies introduced in developing situations become spectacular flops. This may not be caused by an inferior type of technology. The failure is often due to the fact that such technology does not serve the community's expressed needs, or that the community does not understand the technology. Appropriate technology options are arrived at by understanding the developing world's priorities and the provision of technology options to match such priorities. It is therefore important not only to think of the technology, but also the downstream issues related to the use and maintenance of the technology.

Overcoming Research and Development Barriers: The Challenge for Developing Countries

The above discussion highlights that as far as developing countries are concerned, addressing energy needs is not simply the provision of technologies to meet the needs of society. Energy poverty is simply an indicator of general development challenges, which are defined by levels or degrees of impoverishment. Besides the obvious reason that most RETs that are introduced in poor rural areas are unaffordable to many people, these technologies are not used on a large scale even if they are heavily subsidised, or provided free of charge through grant funding. Does this mean that RE is 'the most expensive energy option for poor people' as it is viewed in some circles? This question can be answered by posing another question. Why, even when RETs are given for free, do they not gain widespread acceptance by people who use inferior fuels? In answering these questions, the R+D capacity in developing countries needs highest consideration. Without adequate capacity, such countries will not have the ability to develop home-grown policy frameworks, innovative technologies and processes of implementation. All things being equal, the development needs of RE can be achieved through three interlinked actions:

- (a) appropriate technology;
- (b) appropriate business models; and
- (c) local production of RETs.

Once all these are achieved RE options would, for all intents and purposes, gain local acceptance. A brief discussion of each action plan is presented below.

R+D Focus 1:

Appropriate Renewable Energy Options

At the end of the day, solutions (i. e. technology choices) have to reflect the needs and preferences of the target community. What is the community preference: do they prioritise thermal needs over lighting or vice versa? Examples abound of solar PV for lighting projects where a community's expressed need is for thermal energy services, for cooking and heating.

*Figure 6
Solarhome system
as example for a
decentralised
distributed electricity
generation*

Figure 7
example for the
utilisation of
wind energy



Secondly, technology solutions mean little if they are not explicitly linked to other development needs. Does the introduction of a technology improve people's lives in terms of facilitating other important services such as the availability of vaccines, clean water, better transport, user-friendly appliances (that meet local preference), warm houses, etc? To what extent are technology sources or renewable energy choice in harmony with regional, country or government development priorities?

Thirdly, communities need to be exposed to an array of technology options available, so that they could make informed decisions as to the best option to meet their needs. Such exposure enables the users to select options that meet a variety of needs. Introducing only a technology that meets a single need may be counterproductive in promoting renewables. For instance, when a solar PV system is introduced for lighting, other solar technologies, such as solar cookers, solar water heaters, passive solar designs, should also be introduced in order to cater for most household and community energy needs.

Fourthly, education and public awareness are crucial for renewable technologies to be accepted by communities. Public perception on the quality and performance of RETs has long been identified as the key barrier to renewables in poor areas. Such perceptions – that renewables

are energy supplies of second choice – are informed by past experience with low quality, fly-by-night technologies which flooded the market in the early days of renewable energy penetration. News travels fast in developing areas, particularly in Africa. Many people who have negative perceptions of the performance of renewables may not necessarily have experienced renewables first hand. These perceptions can only be addressed by a targeted public awareness and education processes that are aimed at both the users and producers of RETs.

Fifthly and related to the above, there is a widespread perception that renewables are second grade sources of energy. Such perception can be illustrated as thus:

Renewables = solar PVs = energy of 2nd choice
= rural applications = poor people

This equation often results from the way in which renewables are promoted in developing countries. Renewables projects often promote a single technology (which is often solar PV or solar cookers) and promoted by people who themselves have never used this technology choice in their households. Again, the tendency is to concentrate on rural applications when grid electricity is not financially viable. Urban centres, where substantial economic activities are situated are often served with conventional energy sources. Sadly, this leads to the conclusion that renewables and its technologies are reserved only for the poor. As a starting point, it is important to ground the use of renewables firmly in developing countries. The best way to start is to focus more on urban centres where economic activities are centred and on urban households most of which could afford to pay for the new technology options. This requires (including capacity building as illustrated above) an innovative marketing strategy.

Lastly, it must be recalled that current renewable technologies may not address all the energy needs of developing countries. Therefore, RE should be promoted as one of the energy options that can perform certain tasks well. RE options can work better if introduced in a basket with other energy options, such as gas, i. e. energisation.

R+D Focus 2: Effective Business Models to Promote Renewables

When renewables are viewed as energy options for the rural poor, the tendency is to provide these at little cost to the users. This 'developmentalist' approach was preferred especially by multilateral organisations and by other international institutions. The rural 'markets' were flooded with technology, wholly imported from the north, with little consideration to their long-term sustainability. The track record of donor programmes is poor in creating and sustaining rural enterprises for RE delivery, and has, in fact, contributed to the negative perceptions outlined above. There is a realisation now that donations (of renewables) without cost recovery actually destroy the market. Still, some donors continue to provide capital cost subsidies in order to boost the renewable energy market. There is a growing consensus that commercialising renewables could work positively for the dissemination of these energy sources in a sustainable manner. However, proper research and development on effective business models is in its infancy. Various models are being piloted across the developing world, ranging from vendor-supplied credit, micro credit, equipment rentals, etc. The bottom line is that new business models are needed with the focus on entrepreneurship and innovative finance schemes. However, the danger here could be that purely market-driven approaches may leave the very poor behind.

With respect to developing countries, there is a need for an R+D process that has the following components:

- (a) as a clearing house of innovative business plans;
- (b) international best practices and amplification of success stories;
- (c) innovative finance which does not only provide start-up finance, but also provides for business development training; and
- (d) as a source of skills to select technologies.

It should also be remembered that business models become effective if there is a market and a demand for the services provided. Unfortunately, this aspect resides outside the realm of renewables, to the broader development of the

society as a whole. The market is defined here as the demand for the services and the ability of consumers to pay for them. This is different to the need for energy services. One of the downsides of renewable energy dissemination strategies is the virtual absence of viable markets. Therefore, RE strategies, including new business models can only succeed in so far as the community is developed enough to demand and afford such services. This calls for the integration of RE to other development needs, such as employment creation, increased household income, education, etc. It is often said that sustainable solutions to energy problems rely mostly on non energy interventions.

R+D Focus 3: Local Manufacture of RETs Components

Most RETs currently in the developing markets are fully imported. Even in fairly advanced countries in the developing world, more than 50 % of renewable energy components are imported from the north. This asymmetrical situation needs to be changed if the renewables industry is to be sustainable in developing countries. There should be a long-term strategy in place for knowledge transfer. Granted, some technologies cannot be fully manufactured in developing countries and may need to be imported. However, if the rationale is to increase the share of renewables in the national energy economies, significant investments have to be made in local production of RE components. This area requires immediate intervention as it could have positive spin-offs: increased technical capacity and innovation in science and technology in developing countries, more jobs created due to the labour-intensive nature of renewable energy production, etc. Local production of RETs may be a long-term source of revenue for municipalities, and can, as well, be integrated in other municipal issues such as landfills, sewage treatment and waster disposals). [1]

Concluding Remarks

The R+D needs in developing country on renewables clearly go beyond technology solutions to encompass social and economic considerations,

i.e. the so-called “downstream” issues of technology. The above discussion highlights these broad development issues associated with technology options. Having identified these issues and needs, what is then the way forward as far as renewable energies are concerned in the developing world context? Before proposing some recommendations, it should be emphasised that energy poverty in developing countries cannot be addressed using purely market approaches, nor can they be resolved by a strictly developmentalist approach. The solutions lie somewhere in the middle. Below are value propositions on the way forward.

Regional Cooperation in Research and Development

Energy development knows no boundaries. In fact new strategies work better when they are implemented across a region, rather than only in a country-specific context. Global partnerships are a testimony to this development. Partnership is not simply about brotherhood, but a conscious strategy to mobilise scant resources and share experience across more than one country. Research and development of a technology, process of implementation or financing strategy stand more chances of success if the focus is cast wider than a single country. There is cooperation at the regional levels in many developing countries. The mandate of regional cooperation should be expanded to include research and development.

Database of Renewable Energy Technologies

It is very difficult to formulate effective policies based on insufficient and often invalid data sets. Many experts agree that lack of information on energy demand and consumption makes it near impossible to devise effective implementation and planning strategies. It is not even known how many renewable energy technologies are currently in use in developing countries. In addressing the question of data gaps, national and regional databases need to be created and periodically updated. R+D centres of excellence, such as the Global Research Alliance partners can be utilised to maintain these databases.

Innovation in Rolling Out Renewables

There is a glimmer of hope as far as innovative strategies to disseminate renewables across the

developing world. In Africa, the UNEP funded programme, AREED (African Rural Energy and Enterprise Development) in partnership with E+Co is implementing an entrepreneurial approach in energy service provision. This programme is still very small-scale and also promotes other cleaner fuels such as bottled gas. In South Africa, a concession model, public-private partnership provides a fee-for-service mechanism to provide poor households with a basket of energy options including renewables. This model is, however, heavily subsidised by the national government. Across the continent and in South Asia, various ESCOs models are being piloted. These attempts provide a shift from a conventional developmentalist approach to more sustainable, profit-driven implementation strategies. Be that as it may, the impacts of these new models remain largely untested, and experiences have not been properly documented. In addition, recent experience shows that these innovative strategies do not reach the poorest sectors of the developing world.

Harmonisation for Energy Policies

Linked to the above points, an enabling environment has to be created for renewables. All developing countries have to have policy instruments to regulate renewables imports, production, dissemination and use. Moreover, as stated above, technology knows no boundaries. Therefore, policies should be harmonised so that a sustainable market for RE would be created. Prevailing policy instruments can be used and/or adopted to perform this task. Regional cooperative trade agreements between countries can be utilised to assist in the harmonisation of the renewable energy policies and assist countries that are without policy frameworks.

The discussion in this paper points to the fact that the developing world is willing and ready to take a centre stage in accelerating the use of renewables. It also argues that the best way to go about this is a formation of an effective partnership between North and South, as well as South and South. The former ensures skills and knowledge transfer and the latter ensures that best lessons are learned. The time is now!

Literature

- [1] Norbert Wohlgemuth 2003. Innovative financing mechanisms for renewable energy in developing countries. UNEP Collaborating Centre, Denmark
- [2] Patrick Manders 2004. Energy technologies for Africa sustainable development. Position Paper, CSIR.
- [3] Patrick Manders 2003. Energy for sustainable development in Africa: a concept note. CSIR, Pretoria.
- [4] Financial Mail 2004 (April 30).
- [5] Stefan Szewczuk 2004. Hybrid mini-grid energy systems: its contribution to sustainable energy and economic development in South Africa. Paper to be presented to the World Energy Council, Sydney September 2004.
- [6] Gert Venter and Patrick Manders 2004. Effective energy supply and use in development context. Industrial and Commercial Use of Energy Conference, Cape Town May 2004

Pictures are courtesy of CSIR, AfricaNet, RISOE UNEP and Renewable Energy World.