

RENEWABLE ENERGY technologies are expected to ease southern Africa's power shortages as the region seeks solutions to a decade-long problem that threatens to derail efforts to attain energy self-sufficiency and regional development.

Renewable energy is any energy that is naturally replenished, and includes energy from natural resources such as hydro, methane, sunlight, wind and geothermal heat. Energy produced from the refining of biomass is also classified as renewable.

Coal, oil and natural gas are fossil fuels and are classified as non-renewable energy.

Unlike fossil fuels, the renewable energy sources are generally less polluting to the environment, hence the need for southern Africa to increase the uptake of this type of energy.

The most common renewable energy in SADC is hydropower, which accounts for about 20 percent of SADC's total energy generation, while other renewables do not make any significant contribution to the national or regional grids.

Non-renewable thermal power accounts for the largest proportion of the SADC energy mix, with about 74 percent of all power produced.

This is despite the fact that southern Africa is hugely endowed with renewable energy resources.

In this regard, a rigorous programme to promote the widespread use of renewable energy products and technologies could help the SADC region reduce the burden of power shortages as well as the overreliance on non-renewable fossil fuels.

Renewable products and technologies

The use of renewable energy products and technologies is gradually increasing in southern Africa. The most common renewable energy products in SADC use hydropower.

However, the full potential of hydro as a source of renewable energy is yet to be exploited, and a number of dams are lying idle instead of producing electricity for small towns or remote areas.

The Zambezi River, for example, drains water from eight SADC Member States and has an estimated hydropower generation capacity of about 20,000 megawatts (MW), which is almost enough to meet the region's energy needs if potential sites are exploited.

Only 23 percent of this potential is being harnessed, largely from two main sites at the Kariba Dam between Zambia and Zimbabwe, and the Cahora Bassa Dam in Mozambique.

Hydropower is also in abundance with the Inga project on the Congo River in the Democratic Republic of Congo having the potential to produce about 40,000 MW of electricity.

Outside the national and regional grid, solar technology is commonly used, providing electricity to families



Solar-powered generator



Towards renewable energy Challenges and opportunities technologies

and communities. Solar technologies use panels that attract energy from the sun to generate electricity through the photovoltaic process.

Other products include solar lamps, solar water heaters, solar streetlights, solar phone chargers, solar radios, and solar torches that have many practical uses in both rural and urban areas as they are rechargeable.

There are also solar-powered generators that provide hours of solar energy to keep households powered during electricity outages. However, with the exception of hydropower, there are no sustainable incentives or subsidy schemes to encourage largescale, grid-connected electricity based on renewable energy systems.

According to the African Development Bank (AfDB), Africa could become a "goldmine" for renewable energy due to the abundant hydro, solar and wind resources that are now hugely sought after by international investors in their quest for a new clean-energy frontier.

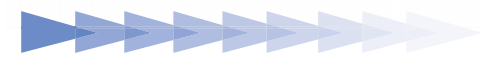
Most African countries receive more than 2,500 hours of sunshine per year, and most of the continent has sunshine all year round.

An assessment by the United Nations Environment Programme (UNEP) and the Global Environment Facility also reveals that there is 4,000 MW of geothermal electricity ready for harvesting along the Rift Valley.

Challenges

With all their advantages, most renewable products and technologies are not cheap to install. For example, a typical home solar system in the region costs anywhere between US\$500 and US\$1,000, according to the AfDB.

A micro hydro system that converts the flow of water into electrical energy, or a wind turbine, is also expensive to install and maintain. As a result, most countries in SADC tend to focus more on fossil fuels because thermal stations are easier and cheaper to construct compared to hydro and wind plants.



s for using new

There are other significant barriers that limit the development of renewable energy unless special policy measures are enacted to encourage development.

These hurdles can be grouped into several categories – commercialization barriers, price distortions, and market barriers such as inadequate information, lack of access to finance, and high transaction costs for making small purchases.

In order to compete against fossil fuel and nuclear technologies, renewable energy solutions must overcome two major barriers to commercialization – undeveloped infrastructure and lack of economies of scale.

Developing new renewable resources will require large initial investments to build infrastructure. These investments increase the cost of providing electricity, especially during early years.

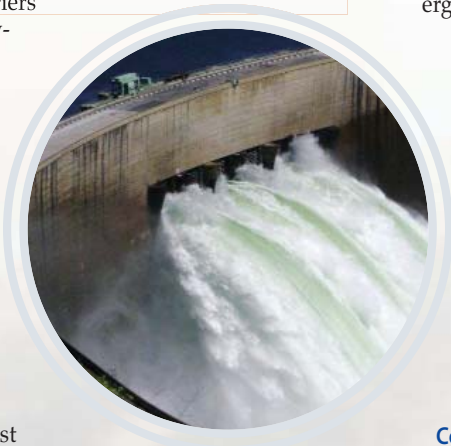
In some cases developers must find publicly acceptable sites with good resources and with access to transmission lines. Potential wind sites can require several years of monitoring to determine whether they are suitable.

There are also costs related to marketing activities that should accompany promotion of renewable energy products. Start-up companies must communicate the benefits of renewables to customers in order to persuade them to switch from traditional sources.

Public education will be a critical part of a fully functioning market if renewables are to succeed.

Opportunities

SADC Member States are slowly turning to renewable energy to boost production and meet the ever-growing demand for electricity



in the region, and knowledge about renewable energy products and technology is extensive throughout the SADC region, although its use is still limited.

The countries that are leading efforts to harness renewable energy include Madagascar, Mozambique, Namibia, South Africa and the United Republic of Tanzania. These countries have stepped up efforts to harness the huge renewable potential that lies untapped in the region.

For example, Mozambique is aiming to boost production at the Mphanda Nkuwa hydropower plant. The Mphanda Nkuwa power plant has the capacity to add about 1500 MW of new electricity on the regional power grid.

The DRC has also stepped up efforts to exploit the Inga Dam potential to generate income and facilitate energy efficiency.

With regard to solar energy, Botswana plans to build a 200 MW solar plant that has capacity to provide a significant portion of the country's energy needs as its national power consumption is about 450 MW.

South Africa has approved largescale wind power projects, with total capacity to generate 562 MW as part of its Renewable Energy Independent Power Producers Programme.

South Africa also plans to commission at least 400 MW of wind power by independent producers within the next few years. Most of the plants will be located along the West Coast that has the potential to generate about 10,000 MW of electricity.

With respect to geothermal energy, Tanzania plans to use smallscale geothermal plants for rural electricity mini-grid systems. In Mozambique, at least 38 thermal springs have been identified, mostly within the Rift Valley just north of Metangula.

In Malawi, 21 major hot springs are reported in the Chitipa-Karonga area down to Chipudze in the southern region.

Conclusion

Development of the renewable energy industry has been made difficult by the lack of financial resources and poor infrastructure to tap the resource.

Madagascar provides a practical example of how southern African countries can benefit from the utilization of the abundant renewable energy resources.

To address some of these pertinent challenges, southern Africa can do it the Madagascan way so people can benefit from solar and wind resources. The island nation, which is the fourth largest island in the world, embarked some years ago on a smallscale exercise to harness its solar potential and provide power to the rural population, who are not connected to the national electricity grid.

Rural clinics and hospitals were equipped with solar technologies such as small solar panels to produce their own electricity and in the process enabling them to cool vital vaccines and other medicines.

Given the cost involved, experts are urging Africa to start with smaller solar projects that are cheaper to ensure that power is available to the majority of its people while bigger projects can be done in partnership with willing investors. □