Properly managed, energy management across the African continent could enjoy an advantage over its more developed neighbours. Its newfound economic growth parallels - the availability of affordable, renewable energy technologies, offer the land the unique ability to leapfrog fossil fuels.

However, missing from the continent is the infrastructure to facilitate its growth, which the United Nations estimates at nearly US$100 billion because, historically, goods moved outward rather than within other African countries.

Africa’s progress will come not just because of its riches in natural resources. One driving force for growth is China. Africa’s trading partner to the east will soon be confronted with the economic repercussions of its one-child policy in which an ageing population will have insufficient youth to sustain growth – and perhaps stability. Similar to India, which has benefitted greatly from Indian diaspora reinvesting in the country from abroad – Africans are now beginning to do the same.

While both solar thermal and solar photovoltaic have bright futures throughout Africa, for this article, Eneref Institute examined the African solar thermal market. Solar thermal primarily uses the sun’s energy to heat water, as opposed to PV, which uses the sun’s energy to generate electricity.

This overview covers Kenya and South Africa and is an excerpt of a more extensive Eneref report scheduled for publication in 2013 covering the African continent as a whole. Even in the United States, where measuring market flux is both a science and an art form, tracking US sales of solar thermal collectors is often inaccurate. Whereas photovoltaic is usually tied to the grid, and therefore measurable, sales of solar thermal systems could be compared to the informal market sectors found throughout Africa - which is not to say the solar thermal market in Africa is undeveloped; indeed, some very sophisticated players have entered the market.

A couple of years ago Pieter Bosch of Ikhwezi Solar, East London SA (manufacturer of high-quality solar thermal collectors) saw the opportunity for renewable energy. Ikhwezi – a well-established manufacturer long before entering the solar market – makes aluminium struts for the rear axles for C and E class Mercedes Benz cars worldwide. Bosch sees his company as renewable technology pioneers.

Kenya

Although today Kenya employs the largest number of solar thermal installers in East Africa, Tanzania and Uganda have the potential to compete. Rwanda is still a small economy with an abundance of hydro and methane. Home to the United Nations Environmental Programme, Nairobi already enjoys a green halo. As fast as the city has grown in the past five years, Nairobi will soon have a modern-day sister city – Tatu City – just 25 kilometres to the north, with 70 000 residents on 1 000 hectares.

Market size

Most of the sales in solar thermal in Kenya are residential, and sold at the retail level, with perhaps 60 active installation companies operating in the country. Solar equipment companies number fewer than a dozen. Two Kenyan companies are manufacturing very basic solar thermal systems locally that compete with Europe and the United States on price. However with mandatory requirements by the Kenyan government for solar thermal on new construction, Kenya has begun to benefit from venture capitalists pursuing the solar markets.

Technology

Evacuated tube systems from China have grown more abundant over the past three years, whereas previously systems from Australia, European Union and the United States had been more common. The United States has an opportunity for sales in Kenya, as a 40 ft container of solar thermal systems from California to the port of Mombasa costs, perhaps, only US$ 500 more than a container shipping from Europe. One notable project in 2011 was the installation of a Heliodyne solar water heating system for the posh Serena Hotel chain. Helios Energy of Kenya sold and managed the project for the Lake Kivu, Kigali, Kampaia and Mombasa hotels.
Because of the large scale of the commercial project, Andrew Njobia, chief executive officer of Helios Energy, contracted with California-based SunWater Solar Company to provide project management services on the initial installation at Lake Kivu Serena hotel. American solar thermal expert Justin Weil, chief executive officer of SunWater, oversaw the project using local East African labour.

**Growth potential**

In 2012, solar water heating became a mandatory requirement for all new housing in Kenya. It is likely that all of East Africa will follow suit. With as many as ten thousand new homes built in Kenya each year, the new bill should grow the solar thermal market.

Today imported solar thermal panels pay no customs import duty tax in Kenya. The city of Nairobi should see the lion’s share of single family flat plate collectors because of the city’s higher income residents. Fortunately, installers of flat-plate collectors are well prepared for growth. However one obstacle to development in Kenya is a lack of well-qualified installers for evacuated tube systems.

**South Africa**

**Power generation**

South Africans are well aware of the problem. The cost of electricity has skyrocketed in just the last three years. Selective blackouts are gone. And the country is very close to utilising the entire grid.

The problem stems from the fact that ninety percent of electricity in SA comes from burning coal, and building new coal-fired power plants are mammoth, expensive projects. The government has set a target to reduce dependence on coal by the year 2050.

**Technology**

Solar could be a near-term solution. South Africa has the most sophisticated and mature solar thermal market in Africa. Metal extruders and glass manufacturers have operated in South Africa for generations. The government is now growing the market further by offering additional rebates for locally made tanks and collectors.

Still, some high-tech items continue to be imported. For example, Ikhwezi Solar imports their selective absorber coating systems from German manufacturer Alanod Solar. Because of Alanod’s high solar-absorption and low emission capability, combined with Ikhwezi’s technology to weld copper to aluminum via laser welding technology – unique in Africa – the solar panels are comparable in efficiency to topline systems in Europe and the United States. The reason - because this welding method ensures mechanical stability and thermal conductivity. However, the majority of systems in South Africa are evacuated tubes manufactured in China, and offered at a very low cost not always ideally suited for the hot African conditions, resulting in overheating at times. While high pressure flat plate collectors naturally cost more, they are also more durable and better equipped for hail. Locally-made flat plate collectors compete with systems coming from Europe, Middle East, Israel, Turkey, the United States and even some coming from China.

In 2008, the South African government launched a plan to install a million solar water heaters by 2013, but the market did not cooperate, despite the incentives. Still, South Africa is approaching 100 000 high pressure systems a year and perhaps twice as many low pressure systems. The market is divided between flat plate collectors installed on upper and middle class residential homes and lower lost evacuated tubes installed on the South African government’s social responsibility programmes or social corporate investment programmes.

While as many as 600 companies are members of SESSA (Sustainable Energy Society of Southern Africa) - only a third of them are focused primarily on solar alone. Less than fifty companies could be considered major solar players in South Africa.

**Market growth**

Like elsewhere in the world, new building regulations will help drive the market; but South Africa has another advantage for its solar thermal businesses: insurance. Water heating systems are insured if they meet the insurance company’s minimum requirements. Naturally, insurance policy standards are strict, and require due diligence to selected better products. Nothing drives sales better than building codes. New building codes are in place requiring 50% of the heating of water in any new building to use non-electric resistance – which includes solar thermal, heat pumps or heat carriage.

James Shirley, general manager of Kayema Energy Solutions and chairman of the Solar Water Heating Division within SESSA, is optimistic about the future of solar thermal in South Africa. Kayema is an integrator of solar and wind energy systems.

**Conclusion**

Why not be optimistic? With the nation’s coal energy supply not keeping pace with demand, with selective blackouts, with people investing in generators and with rapid price increases, these market forces should bring about change quickly. Especially for companies whose business model banks on large amounts of abundant, low-cost energy, today’s energy situation in South Africa will throw that model to the curb. Neighbouring countries that also look promising for solar thermal include Namibia, Botswana and Zimbabwe. Ironically, the extraction of natural gas in Mozambique will bring an influx of growth, which in turn should spur solar growth in that country as well.

As elsewhere on the continent, the Chinese seem prepared to stay for the duration in South Africa – but Mandarin is not the only language arriving in the country. The potential for solar – PV and thermal – in South Africa is bringing investors from all over the world.

This article is part of a larger report to be published in 2013 by Eneref Institute on the solar market throughout Africa.

**About the author**

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