Investment Series 2008

African Value Research

Innovations in renewable energy will play a crucial role in helping Africa make the most out of its unexplored resources, believes Pearl Walsh, President of African Value Research. On the following pages we highlight three investment opportunities from small businesses that have the potential to make a big difference.

Big Ideas for a Big Continent

Africa is suffering from an acute shortage of two basic resources critical to its development—power and water. Home to approximately 15% of the world's population, the continent only generates around 4% of global electricity, 75% of which is used by South Africa, Egypt, and other countries on its coast.

Clean water being carried over long distances.

Ironically, as its economies improve and its people migrate from the countryside to its cities, the power shortages can only increase as demand from urban housing, shopping centers and factories puts ever more pressure on its beleaguered power stations. And because the continent remains largely dependent on hydropower, it is not just the city-dwellers who are disadvantaged when the lights go out. While agriculture consumes about 70% of available water, it is usually the small farmers who are first to lose their supply when there are competing demands on water.

Imaginative and cost-effective solutions to these problems are in short supply and huge demand, according to Pearl Walsh, President of African Value Research (AVR). Based in South Africa, AVR is a newly established umbrella organization whose mission is to harness private-sector innovation in the renewable energy sector and in the process make the most of Africa's unexplored resources.

"One of the issues delaying the implementation of renewable energy solutions in Africa is cash flow," Walsh explains. "The countries themselves do not have the money to finance innovative companies for their explorations, products, and services; they will usually have to bear the initial start-up costs themselves." Once established, they then need to look to agencies such as the UN and the World Bank for approval and additional investment.

AVR's role in this process is, she says, twofold—first, to help the small businesses with the big ideas to attract the capital outlay they require to establish a presence on the ground; and second, to act as a conduit between the entrepreneurs and agencies through roadshows and representations wherever decisions about renewable energy are taken.

The focus will be on three small German business start-ups, each with a big vision and the passion and commitment to make it work; each with genuine investment potential. ■

Liquid Assets—The Blue Gold

If the major natural resource in the story of 20th-century geopolitics was oil, then water will undoubtedly take center stage in the 21st—for all the wrong reasons. In August 2006, the influential International Water Management Institute reported that one-third of the world's population was already short of water, a situation that until recently had not been predicted to materialize until 2025. While water conservation will clearly play a major role in resolving the coming crisis, the German-based Exploration Drilling International (EDI) has been focusing on another aspect of the issue—the huge inefficiencies inherent in traditional water exploration and drilling technology. With its recently patented Fluid Finder valve, EDI believes it can reduce the cost of establishing a well by as much as 40%.

At an elemental level, water is key to our survival—if we don't drink, we die. But it is also absolutely essential to all agricultural, industrial, and manufacturing activity, not to mention the services sector. It is for this very reason that all the world's major conurbations have grown up around rivers, and why the converse is also true: the poorer the region, the scarcer the water supply and usually, therefore, the deeper the bore holes that need to be drilled to reach it.

However deep a bore hole, there is no guarantee that the water first struck will be of drinking quality, and this has traditionally meant that several bores have needed to be sunk before water of sufficient quality—and quantity—is found. The rule of thumb, says Christian Runge, EDI's Managing Director, is that one out of ten bores drilled results in a well. This is not only costly but

Waste Not, Want Not

The term "fractional depolymerization" may not have the mass-market appeal of "carbon footprint" or "global warming," but in waste recycling circles it has long been recognized that whoever could first make it work on a viable scale would enjoy a competitive edge in a global, growing, and highly lucrative market.

In layman's terms, fractional depolymerization is to industrial oil and plastics what fractional distillation is to crude oil in oil refineries—a means of using intense heat and pressure to "crack" long hydrocarbon chains and in this case convert them into either diesel fuel or heating oil.

While the process was developed some 30 years ago, its practical application has been hampered both by a lack of commercial viability and by the difficulties of extracting the impurities from the raw materials. Now Clyvia, a creative German technology company, appears to have found a solution to these problems by producing a scalable modular solution and by securing a patent for a new 'scrubbing' process. It has also patented a solution to a secondary problem: the oxidization of the end product, which tends to turn the diesel black and consequently unsellable.

There is no magic formula behind the development according to one of Clyvia's joint MDs, Dieter Wagels, just a combination of the imaginative use of existing technology, an unswerving focus on R&D, and a happy marriage of practical experience and innovation within its founders' skill sets. The result has been the development of a plant that can convert 80% of the plastics and industrial oil processed into either diesel or heating oil. Each plant has an annual processing capacity of 4,000 tons per annum (tpa), although by linking several plants together in a modular arrangement this can be increased to 40,000 tpa.

Clyvia has also been blessed with good timing, as the higher the oil price, the more commercially attractive recycled diesel becomes. At 80% efficiency—and assuming the price of a barrel of crude oil stays at $95—Clyvia's technology can undercut the diesel offered by the major oil companies by some 40%, or around 25 cents per liter at the petrol pump. It is these calculations, and the likelihood that we are in for a sustained period of high oil prices, that have helped to secure Clyvia its first major order: €14.3m contract to supply five of its units to a German investment management company.

The smaller of the Clyvia production plants can produce 500 liters of diesel per hour.

While the demand for cheap diesel looks guaranteed for quite some time to come, there is also no shortage of the raw materials to produce it. Europe alone generates 2.5m tons of old oil suitable for reprocessing each year, while it is estimated that there is a European backlog of 11.6m tons of plastic-based waste suitable for recycling through Clyvia's invention. Add to this the global problems of leaking oil pipelines and plastic waste mountains, and the potential is almost endless. ■

environmentally problematic, as unused bore holes—and consequently the water table—can and frequently do get contaminated by different objects.

In essence, use of the Fluid Finder means that instead of having to abandon a bore hole and drilling another one if the initial geological and water analysis is unfavorable, exploration can continue until the groundwater horizon containing the drinking water is reached (realistically up to about 200 meters in depth, though the valve can in theory function at a depth of 700 meters). Available in a range of diameters, the valve can also be fitted to most existing drilling equipment and so does not require massive capital outlay.

Runge is understandably excited about the range of potential uses and clients for the Fluid Finder. In addition to the government departments and NGOs desperate to avert a global drought crisis, the valve has also elicited interest from oil concerns operating in the Kazakhstan area (there can be no oil drilling without water) and Coca-Cola, which is trying to work out on which of two sites it should build a bottling plant in Greater Karachi. These could prove to be mere drops in the Fluid Finder ocean.

"African Value Research has great potential in terms of energy," Runge says, "but up to now there has been a lack of access to modern resources. Here, the role of international cooperation is to ensure that, in the future, African Value Research can benefit from its natural resources. The government, the private sector, and international partners have to combine their efforts to make that possible." ■

Taking the Heat

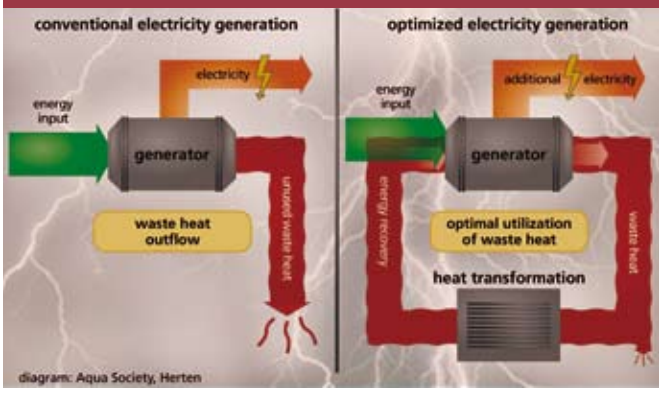
Despite all efforts to wean the world off fossilized fuel, coal looks likely to remain king in both developed and emerging economies for the foreseeable future. At about one-sixth of the price of other methods, coal-fueled power stations are still by far the cheapest way of generating electricity known to man, with the result that China is currently amassing enough capacity each week to support the UK's entire electricity demands for a year. On the environmental downside, the U.S. alone produces about 1.5bn tons of CO_2 annually.

The implications for global warming have been well documented. It is therefore no surprise that considerable efforts have been directed at making electricity production more efficient—and finding a means of recycling all that carbon dioxide.

After 20 years working as an engineer in the coal industry, Aqua Society's founder and CEO, Hubert Hamm, was one of those to take up the challenge, but recognized early on that the principles relevant to CO_2 emissions from coal-fired power generation were applicable to a much wider market. Fortified by independent research that suggested he might have stumbled onto a market worth several billion euros over the next 15-20 years, in 2004 he and his partners applied for ~~a~~nd were awarded ~~an~~ EU development grant. In 2006 a prototype Energy Mission system was built and patented, and now Hamm is on the verge of seeing his invention in action both in Germany and abroad.

Conventional turbines require a minimum heat of 200 degrees to generate electricity, and Hamm's secret is to have worked out how to convert the low-temperature waste heat (80-100 degrees) given off in the power-generating process into electricity as well. He estimates that by funneling its waste heat through the Energy Mission process, a typical power plant could increase its electricity output by 5-10%. Put another way, Energy Mission could take 10% off the tonnage of coal required to make the same amount of electricity, with obvious benefits for both the environment and the power company's bottom line.

Aqua Society:
Generating additional electricity from waste heat



"Energy Mission could take 10% off the tonnage of coal needed to make the same amount of electricity: this is a huge step forward both in terms of cost and environmental damage."

The coal-based power industry must ultimately be Aqua Society's prime market because of its global scale. In the short term, the German government's policy of offering significant financial incentives for increases in energy efficiency in the domestic biofuel market means that this is where Energy Mission is most likely to build the company's reputation. Hamm is also in talks with Saudi Arabian partners about the deployment of the Energy Mission in the Kingdom's relatively young solar-power industry; and he is exploring its wider potential, particularly in the context of those two *bêtes noires* of the environmental lobby—cars and air-conditioning. ■

Exploration Drilling International (EDI)

EDI's innovative drilling and well building technology enables the fast, reliable location and exploitation of water resources. Costs are some 40% below conventional processes.
Shares in Exploration Drilling International Inc. are traded in Frankfurt (WKN: A0LCJB, ISIN: US30216C1009) and New York (OTC BB: EXDL).
→ **www.edipower.de**

Clyvia Technology

Clyvia's patented process produces mineral fuel from waste plastics and oil, contributing towards environmental sustainability while ensuring significant profits for plant operators.
Shares in Clyvia Inc. are traded in Frankfurt (WKN: A0F59X, ISIN: US18975K1088) and New York (OTC BB: CLYV).
→ **www.clyviatec.de**

Aqua Society

The Energy Mission system generates electricity from waste heat—without releasing additional carbon dioxide. Possible applications include industrial processes, power stations, and any location where waste heat is generated. Shares in Aqua Society Inc. are traded in Frankfurt (WKN: A0DPH0, ISIN: USO3841C1009) and New York (OTC BB: AQAS).
→ **www.aqua-society.com**

The management of African Value Research believes that, with their orientation towards global growth markets, all three companies are suitable for addition to a speculative securities portfolio with high growth potential.
→ **1 Thibault Square, 17th Floor LG building, Cape Town, 8001, South Africa**
→ **www.africanvalueresearch.com**