

# FINDING ENERGY

SOUTH AFRICA IS LOOKING HARDER FOR A SOLUTION TO ITS POWER SHORTAGES, REPORTS LESLEY STONES

There's a site in the Northern Cape that has turned from a sweltering and barren landscape into a hive of energy production. The site, near Upington, is quite literally a hotbed now, with 4 200 panels tracking the sun like electronic sunflowers to beam hot rays onto a massive tank of water, creating steam and generating electricity.

The Khi Solar One power plant will become a much-needed source of renewable energy to boost Eskom's erratic electricity supplies. South Africa desperately needs these alternative energy sources to rekindle the light at the end of the tunnel.

Khi Solar One is being built by Spanish company Abengoa Solar, in partnership with the Industrial Development Corporation and the Khi Community Trust. Its massive array of heliostats, or computer-controlled mirrors, will track the sun to reflect it onto a boiler on a tower 205m tall. The tower is filled with tubes of high-pressure water pumped from the Orange River. When the water reaches boiling point, it turns into steam, which is heated further to 530°C, creating enough pressure to turn a turbine.

Eskom will buy all of the electricity that this first solar tower

plant in Africa produces, reducing the country's dependency on unsustainable oil and natural gas supplies.

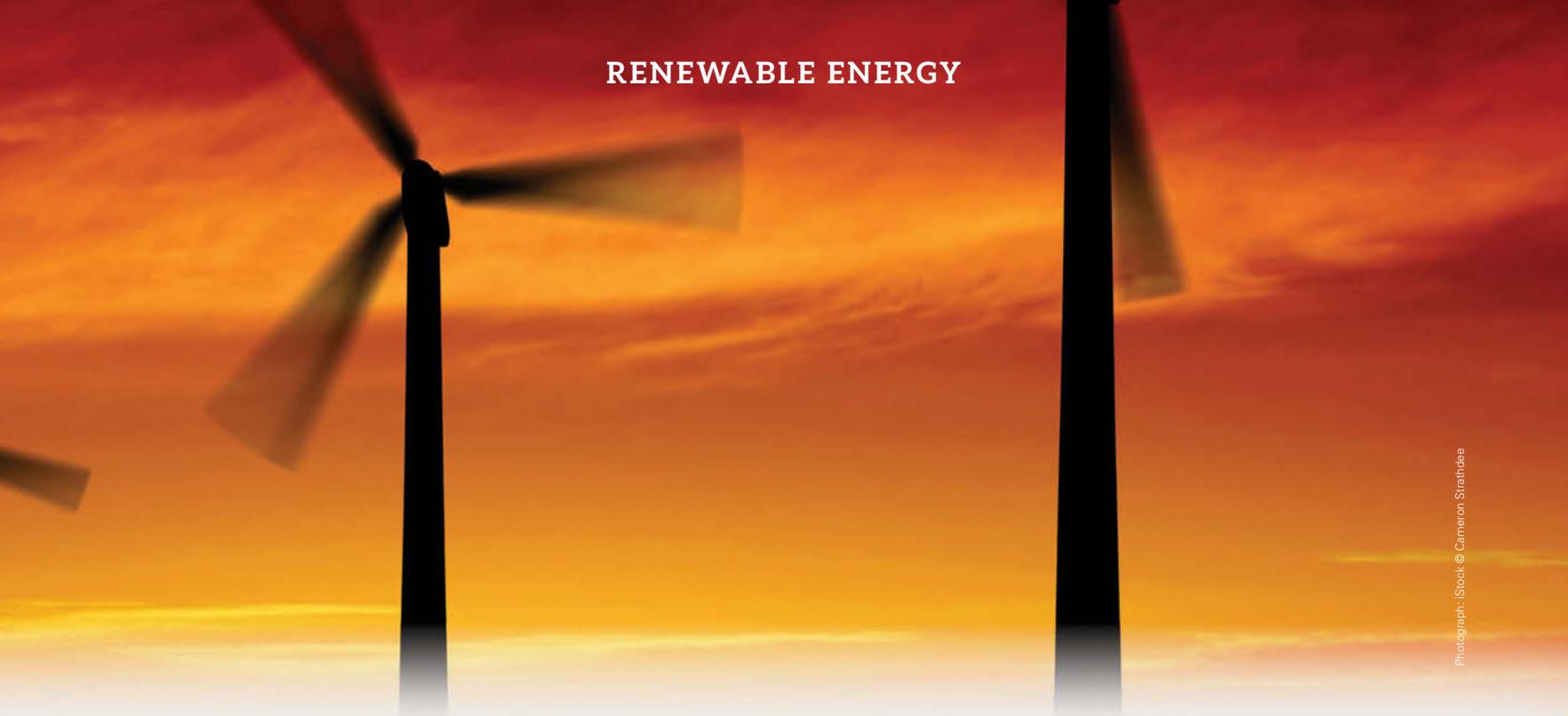
Eskom's woes have been well publicised, with the utility apparently spending R8 billion more than budgeted on diesel to keep its plants running more intensively than expected to meet demand. The inability to rely on Eskom means those businesses that can afford it are investing in generators. But that's a temporary, expensive and environmentally unfriendly fix. The only long-term solution is to fast-track sustainable sources of energy.

With government bungling largely to blame for Eskom's death of future-proofing investments, the private sector must take the lead and generate alternative supplies. Thankfully, there are efforts to encourage independent suppliers to fill the darkness.

The Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is granting the most economical suppliers a 20-year Power Purchase Agreement to supply Eskom. The rollout of the REIPPPP has been dubbed "unpredictable", but it is also crucial, and is achieving some good results.

The Khi Solar One power plant near Upington, Northern Cape.





Photograph: iStock © Cameron Strathdee

Through it, the Public Investment Corporation (PIC) is paying R4.4 billion for a 20% stake in each of two solar power projects, Xina Solar One and Ilanga I in the Northern Cape. The PIC will also provide debt funding for both of R600 million. Companies involved in their development include Abengoa, Cobra and Emvelo.

## OUR SUSTAINABLE OPTIONS

South Africa's sunshine also gives us the potential to install millions of domestic solar water heaters at very affordable rates. They would use solar photovoltaic (PV) cells that don't need direct sunlight, and can still generate some electricity on a cloudy day. They also have the potential to store power in batteries, to feed back into the grid during peak hours.

Sun isn't the only resource we have in abundance, yet renewable energy is still scarce, despite strong winds and a lengthy coastline that could provide wave-power.

The Council for Scientific and Industrial Research (CSIR) says the cost per kilowatt-hour (kWh) of renewable energy is falling significantly as technologies evolve, and by 2020 solar power should be considerably cheaper than electricity from coal-fired power stations.

## BANKING ON GREENER FUEL

### Several renewable energy projects have been made possible through funding by Standard Bank's Sustainability Team

Standard Bank senior manager Tanis Brown says renewable energy forms a significant part of its project finance portfolio, and spans wind, photovoltaic, hydro and geothermal power stations.

In the first and second phase of the government's REIPPPP Programme, the bank underwrote R14.8 billion for 16 solar and wind projects with a combined capacity of 865MWh. Some are still under construction, while 13 are already supplying electricity to the grid.

In the third phase of the programme, which is yet to close, it has committed R2.1 billion for two solar projects.

The bank has also signed a R20 billion deal to fund renewable energy projects backed by the Industrial and Commercial Bank of China (ICBC) in South Africa.

Further north, it is co-financing a 300MWh Lake Turkana wind project in northern Kenya, designed to be the largest wind farm on the continent. It has also provided a R500 million facility to the Zimbabwe Power Corporation to fund a 300MWh extension of the Kariba South Hydro Power Plant.

## DO TRY THIS AT HOME

**Eskom must be one of the few companies in the world that urges customers to use less of its products. Most people would happily do that, if they knew how**

Eskom itself is testing solar water heating at a block of 100 flats, a school for the disabled and an industrial client, to evaluate the savings. But why wait? Hot water uses about 30% of the country's energy consumption, so if everyone installed solar roof panels for their swimming pool and domestic water, the savings would be enormous.

At the moment solar power is really the only option for producing green energy at home. There are numerous other methods for reducing your demand, of course, such as energy-efficient lightbulbs and slow-cooking products such as the Wonderbag.

Buying a generator is rather extreme for households, but increasingly essential for business premises. Nedbank, for example, has stockpiled enough fuel to last about 10 days, to protect its operations against any blackouts, and CEO Mike Brown says the bank has solar-powered generators as well as the diesel variety.



Photograph: iStock © FernandoAH



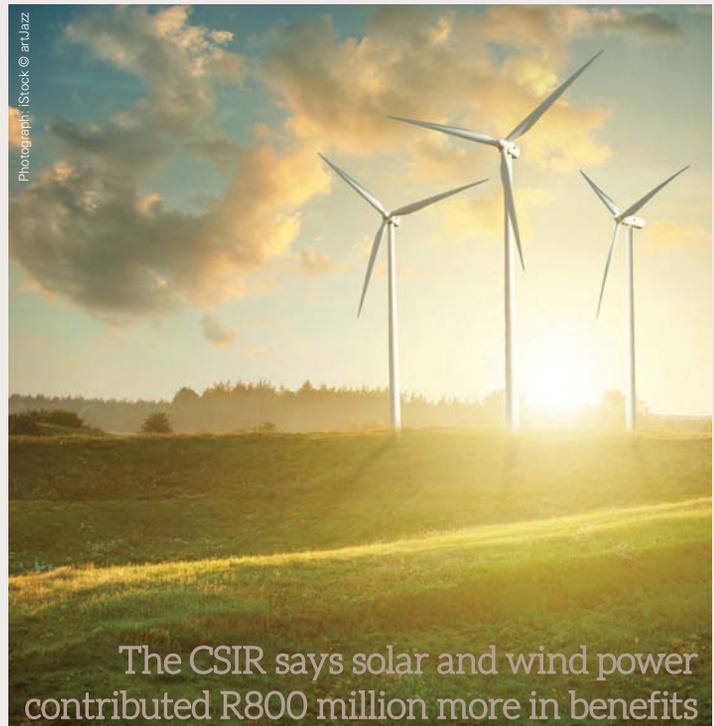
Photograph: Kih Solar One power plant: <http://www.abergoa.com/web/en/novidades/atacama-1/acera/maganes>

But the benefits are obvious already. The CSIR says solar and wind power contributed R800 million more in benefits than they cost to operate in 2014, so they already make a vital difference.

Water power is not used abundantly, although the Department of Energy's website says South Africa has some small hydroelectricity stations. Electricity is used to pump water in off-peak periods, and when electricity is needed in peak hours, the water is released through a turbine to drive a generator. However, hydroelectricity has an environmental downside, since large areas of land may be flooded when dams are built, disrupting wildlife. Water released into rivers from a dam may have little air dissolved in it, and deoxygenated air can kill fish unless its release is managed carefully.

Hybrid energy systems are a combination of two or more renewable sources, such as the plants mixing wind and solar techniques at Hluleka Nature Reserve on the Wild Coast and the neighbouring Lucingweni community. The Lucingweni system provides power for house lights, radio, television, cellphone chargers, street lights and water pumping to the community.

Fifteen wind projects have been commissioned through the REIPPPP, mostly along the Western and Eastern Cape coastlines. Jeffreys Bay Wind Farm was one of the first and is another REIPPPP beneficiary. The farm has 60 wind turbines and supplies Eskom with 460 000MWh per year – enough energy to power 100 000 households.



Photograph: iStock © artLJazz

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## SASOL AIMS TO GO GREENER

### FUEL COMPANY SASOL INVESTS ABOUT R2 BILLION A YEAR IN PROJECTS SUPPORTING SIGNIFICANT ENVIRONMENTAL IMPROVEMENTS.

The company says it is acutely aware of its responsibility as a large industrialist, and has committed to sustainability policies in several areas.

One is to develop inherently safer and cleaner technologies, and another is to reduce water consumption. It also takes air quality seriously. "As a historically carbon-intensive company, we recognise that we have a responsibility and an opportunity to contribute to finding appropriate solutions that balance economic development, job creation and energy security with lower-carbon technologies," it says.

It has set greenhouse gas reduction targets for existing plants and for future facilities to limit the impact of its operations on ambient air quality.

Sasol was required to comply with Minimum Emission Standards (MES) by April this year and to meet stricter new plant standards by 2020. But there are certain activities where it will be unable to comply with the timeframes or emission limits, it says, so it is seeking to review some provisions within the MES.

Placed in the right area, a wind farm can provide energy about 90% of the time, and the scale and maturity of the wind energy industry make it cost-competitive compared to other renewable technologies and many fuel-based technologies.

Johan van den Berg, CEO of the South African Wind Energy Association (SAWEA), says the wind sector alone can supply 62% of the country's current energy needs. He believes the REIPPPP is an extraordinary success, channelling tens of billions of rands of private investment into renewable energy, and promising abundant electricity at very competitive rates. "We know the private sector is willing and able to assist, and we know there are benefits for the country," he says.

SAWEA will hold its Windaba 2015 conference in Cape Town in November, and will emphasise the industry's conviction that wind energy can fill South Africa's energy gap with low-cost, clean electricity that can be brought on to the grid relatively quickly.

"The REIPPPP has stimulated investment and created a thriving market for wind energy. Now we are in the position where we can rise to the challenge of helping to keep the lights on," says Van den Berg. 🌱