

## In Summary

- ❖ Renewable energy independent power generation in South Africa presents a promising business opportunity.
- ❖ The renewable energy resource in South Africa is significant.
- ❖ The South African government has indicated its intention to increase the contribution of renewable energy to national power generation. This will be achieved via a Renewable Energy Independent Power Producer Programme, to be embarked upon in 2004.
- ❖ Support for renewable energy has been expressed in the White Paper on Energy Policy, published by the Department of Minerals and Energy in 1998.
- ❖ Emerging studies on the existence of local green power markets have yielded promising results.
- ❖ Access to finance for Renewable Energy Independent Power Producers is becoming available.
- ❖ The creation of a more sophisticated South African electricity market is currently underway and will allow for more innovative ways to market and trade green power through an extensive, technically proficient national transmission and distribution network.

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The South African Renewable Energy  
Resource Database  
[www.csir.co.za/environmentek/sarerd/  
contact.html](http://www.csir.co.za/environmentek/sarerd/contact.html)

The National Electricity Regulator

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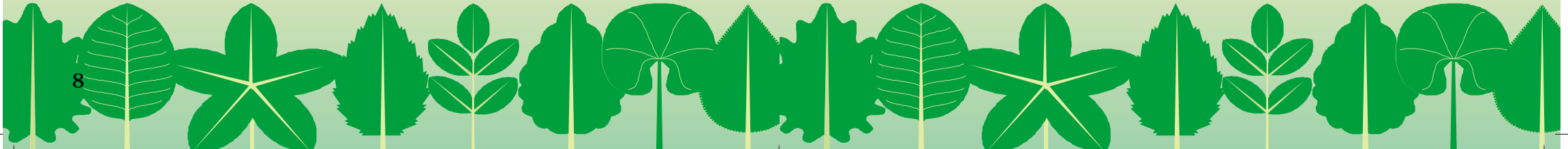


DEPARTMENT OF MINERALS AND ENERGY  
REPUBLIC OF SOUTH AFRICA

# GREEN POWER



**Business Opportunities in  
South Africa for  
Renewable Energy  
Independent Power Producers  
2003**



# GREEN POWER

**The World Summit on Sustainable Development held in Johannesburg in 2002 placed the spotlight on renewable energy.**

**Electricity generated from renewable energy sources is called renewable electricity or 'green' power. Renewable energy resources are naturally occurring, non-depletable sources of energy, such as solar, wind, biomass and hydro. Green power is becoming a readily tradable commodity worldwide. Electricity produced by Renewable Energy Independent Power Producers will be fed into the national electricity grid or to specific users through stand-alone power plants connected to localised or mini-grids.**

**An Independent Power Producer refers to generating systems owned by individuals, companies or agencies other than the entity responsible for distribution of electricity within that distribution area.**

*"Everyone has the right*

- a) *to an environment that is not harmful to their health or well-being; and*
- b) *to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that –*
  - (i) *prevent pollution and ecological degradation;*
  - (ii) *promote conservation; and*
  - (iii) *secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development."*

— The South African Bill of Rights.

## Existing Green Power Production and Potential

Less than 1% of the 200 000 GWh of electricity generated annually in South Africa originates from renewable energy sources. The Government's Renewable Energy Resource Database provides useful information on areas best suited to development by Independent Power Producers. It also indicates that the potential for utilisation of renewable energy is substantial. For more information, please consult: [www.csir.co.za/environmentek/sarerd/contact.html](http://www.csir.co.za/environmentek/sarerd/contact.html).

Existing and potential renewable energy production includes:

### Biomass:

Sugar mills burn bagasse (cane residues and waste), and paper and pulp mills use waste to generate process steam and 210 GWh of electricity per year. Only a small percentage of this power is fed into the national grid. However, there are no regulatory barriers

preventing mills from generating additional electricity which they can then sell into the national grid.

Bagasse offers some of the best potential for Independent Power Producers in South Africa. New technologies using existing feedstock could increase this form of electricity generation to 1 400 GWh a year. This could be supplied to the national grid rather than consumed internally by the industry, given



suitable contracts for compensation for premium green power supply.

Sawmills and pulp mills have an additional estimated capacity to generate 7 600 and 4 500 GWh of electricity a year respectively.

### Wind:

Wind farms being planned in some parts of South Africa will become Independent Power Producers. The theoretical potential for wind energy harvesting in South Africa is approximately 26 000 GWh annually.



### Solar:

Southern Africa receives some of the world's best sunshine, and South Africa experiences some of the highest levels of solar radiation in the world, implying considerable potential for both solar photovoltaic and solar thermal power generation. Average daily solar radiation in South Africa varies between 4,5 and 6,5 kWh/m<sup>2</sup>.



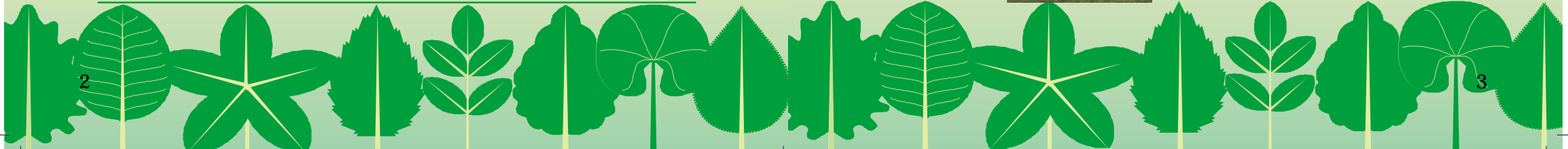
*A solar Dish/Stirling generation plant.*

Installed solar photovoltaic electricity generation in South Africa amounts to approximately 12 MW. This includes off-grid telecommunications, water pumping, schools, clinics and solar home system applications.

There is approximately 150 kW of installed grid-connected photovoltaic capacity.

### Small-scale hydro:

There are eight licensed hydro facilities below 50 MW capacity with a combined capacity of 68 MW. Three of these are owned by muni-

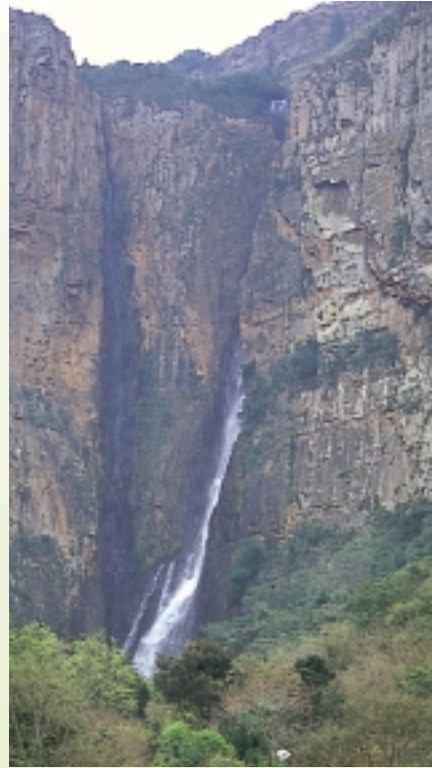


icipalities with a total capacity of 4MW and one is privately owned with a capacity of 3MW. In addition there is an estimated 0,4 MW of installed mini-hydro capacity. This consists primarily of isolated mini-grid systems. There are 3 500 to 5 000 potential sites for micro hydro power generation concentrated in areas along the eastern escarpment.

Realisable small scale hydro generation potential is approximately 9 900 GWh per annum.

**Waste:**

South Africa disposes of almost all of its refuse in landfill sites. The energy content of the total domestic and industrial refuse disposed of amounts to about 11 000 GWh per annum. Options for electricity production from municipal solid waste in landfills include biogas and methane gas generation. Additionally, the net realisable electricity available from sewage-derived methane in South Africa is in the order of 800 GWh per annum. ■

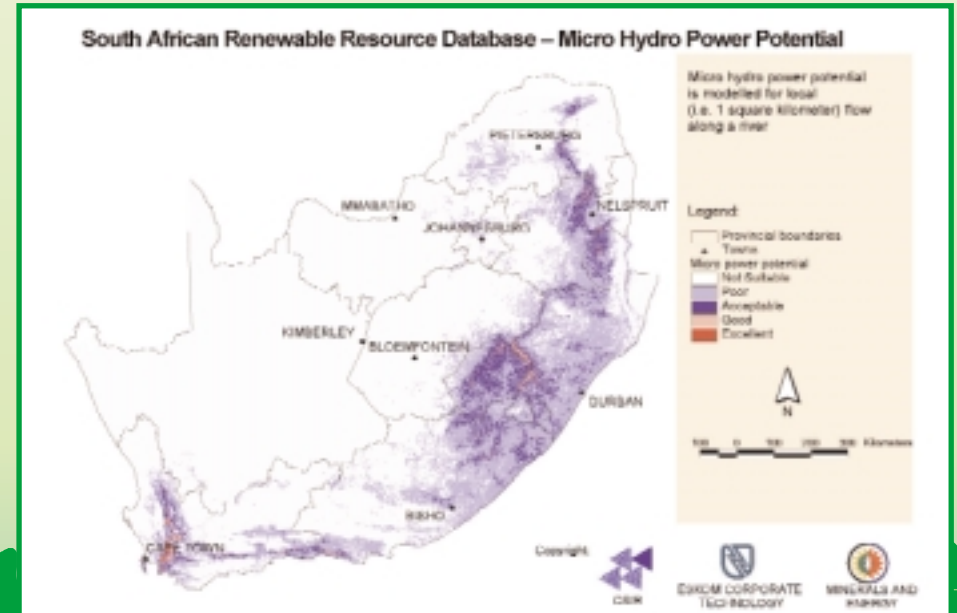
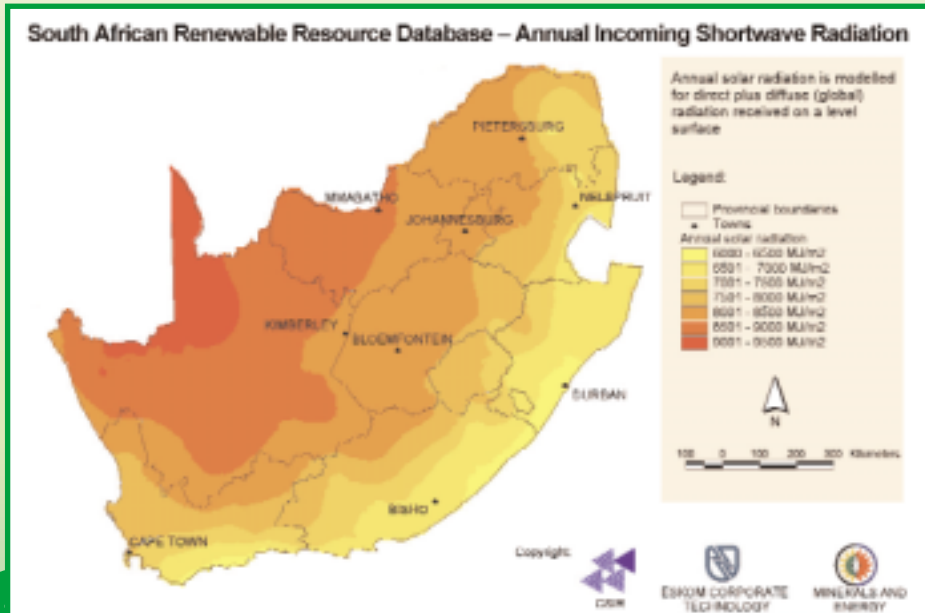


**Breaking The Barriers To Entry**

The South African Government recognises that utilisation of South Africa’s renewable energy sources is not at present cost-competitive in many locations compared to South Africa’s fossil fuel-based energy supply industry. Government is therefore considering a number of measures to support Renewable Energy Independent Power Producers and the use of renewable energy. Measures include:

- ❖ Setting a national target for renewable energy generation.
- ❖ Possible financial incentives.
- ❖ Putting regulations in place to:
  - Create a more sophisticated electricity market. This will enable wholesale bilateral contracts between power suppliers and consumers anywhere on the national transmission and distribution network.

- Ensure fair access to the national electrical network and prevent anti-competitive behaviour by incumbent network owners and operators regarding connection to the national network.
- ❖ The development of standards, guidelines and codes of practice for the use of renewable energy technologies.
- ❖ Establishing the office of the Designated National Authority required by the Clean Development Mechanism for approval of projects trading in carbon credits. This is the only requirement for countries hosting Clean Development Mechanism projects.
- ❖ Promotion of research, development and local manufacturing to strengthen renewable energy technologies.
- ❖ Promotion of public awareness of the benefits of, and opportunities to use, renewable energy.
- ❖ Investing through the Central Energy Fund in renewable energy projects to help kick-start their market. ■



## How To Start A Green Power Business

Renewable Energy Independent Power Producers will need to find viable sources of energy and appropriate technologies to harness these. They will also need to:

- ❖ Identify a suitable site that matches resource availability and proximity to the national grid. This could include the possibility of building stand-alone systems in the short term for eventual connection to the national grid.
- ❖ Find a market for the power and undertake preliminary negotiations for a power purchase agreement with potential buyers.
- ❖ Produce a business plan and secure financial backing; and
- ❖ Comply with licensing and environmental impact assessment requirements.

### Finding Markets

In South Africa, research on potential markets

for renewable energy use has begun and indicates the existence of noteworthy markets, namely:

#### Industry:

The substantial potential for co-generation from biomass and waste resources presents an attractive opportunity for South African industries to reduce electricity price risk and has not yet been fully developed. In addition, growing numbers of South African industries and exporters, like counterparts elsewhere in the world, need to align themselves with green practices in order to make their products and services more acceptable in many international markets.

This trend is likely to accelerate, providing Renewable Energy Power Producers with opportunities to supply green power.

#### Industry and Households:

A local survey facilitated by the Department of Minerals and Energy, the Global Environmental Facility and the City of Cape Town has established that a significant num-

ber of industrial companies and households in the Cape Town area are prepared to pay a premium to support the generation of electricity from renewable energy sources. The Department of Minerals and Energy is now planning to facilitate the commissioning of a national survey to assess potential in urban areas country-wide.

### Finance

Funding possibilities from South African and international agencies and institutions at this stage include:

#### South Africa:

- ❖ Various development and investment incentives from the Department of Minerals and Energy.
- ❖ The Development Bank of Southern Africa is supportive of developments in renewable energy generation. The Industrial Development Corporation invests in energy projects including renewable energy generation.
- ❖ The Central Energy Fund is a potential co-investor.
- ❖ Department of Trade and Industry investment support.

#### International:

- ❖ The Global Environmental Fund provides grant funding to help developing countries, including South Africa, to fund projects that protect the global environment.
- ❖ The Prototype Carbon Fund, established by the World Bank, supports that reduce carbon emissions.
- ❖ The World Bank's Community Development Carbon Fund links small-scale projects in developing countries seeking finance with companies, governments,

foundations and non-government organisations.

- ❖ The Clean Development Mechanism established in terms of the Kyoto Protocol adopted under the United Nations Framework Convention on Climate Change. This provides for developed countries to invest in renewable energy projects in developing countries.

The Clean Development Mechanism Guidebook provides a list of potential Clean Development Mechanism investors.

For further information, please consult: [www.edrc.uct.ac.za/research.html](http://www.edrc.uct.ac.za/research.html)

- ❖ Foreign renewable energy investors who might want to expand into South Africa in partnership with local developers.
- ❖ Investors seeking long-term, viable, environmentally sound investment opportunities with recognised local agencies. ■

### Regulatory Compliance

- ❖ Under the Electricity Act, generation licences are not required by generators smaller than 500kW, generators selling less than 5GWh of electricity annually, departments of state, and local authorities in their areas of jurisdiction. These regulations will be updated in the forthcoming Electricity Supply Industry Regulatory Act.

The National Electricity Regulator licenses all other generators. Application forms can be obtained from and submitted directly to the National Electricity Generator. ([www.ner.org.za](http://www.ner.org.za))

The quality of electricity supplied to the national grid is governed by the National Standard NRS 048.

- ❖ An environmental impact assessment must be undertaken before any power project can proceed. ■

