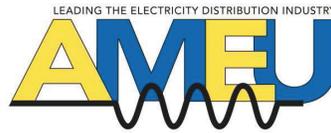


RENEWABLE ENERGY IN SOUTH AFRICA: RESOURCES, RESEARCH AND PROJECTS



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1. Introduction

South Africa is blessed with an abundant variety of renewable energy resources. It is well known that sunshine, solar energy, is in abundance in South Africa, especially in the north western parts where some of the best solar irradiation in the world can be found. The wave energy resource along the south western coast is also indicated on most maps as a resource with sufficient power to drive wave energy convertors. The wind energy resource is limited to the Northern, Eastern and Western Cape Provinces but even in this regard South Africa has the potential to generate a number of giga-Watts using conventional, land base wind turbine technology.

There are some resources where South Africa is more constraint. Due to the fact that most of South Africa is a water-stressed area large scale biomass production for energy will probably never realise as a cost effective agricultural sector although energy from agricultural waste has more potential. Due to the lack of water and only a few, large, perennial rivers the potential for hydro power is limited and mostly restricted to pump storage schemes.

South Africa also has very limited potential to exploit geothermal or ocean thermal energy conversion. The Agulhas ocean current shows some potential but technology to harvest the energy from deep sea currents is currently not economically viable.

2. Resources

A number of projects are currently under way to map the various renewable energy resources. In particular the South African Wind Energy Project is developing a new wind map for South Africa in cooperation with the Riso National Renewable Energy Laboratory of Denmark. This map will be a meso-scale map relying on synoptic weather

data to generate a wind map. It is possible to increase the accuracy of this model by more detail modelling in specific areas.

A geothermal atlas for South Africa is currently under development by a group at the University of South Africa. There is an existing solar map of South Africa and more detailed, satellite derived solar data is available from abroad. A project to verify the solar data with ground measurements is under development.

The wave energy resource around the coast is well understood due to the extensive work on coastal developments that have taken place over the years. This is augmented by wave-rider buoys with data going back 30 years.

3. Projects

The number of renewable energy project in South Africa is still extremely limited given the abundant resources available and the profile that renewable energy as a source of clean energy is receiving worldwide. The main reason for this is that as a developing country South Africa has been focussed on cheap energy from fossil fuels, in particular electricity from coal-fired power stations.

Some of the larger projects that are under development or came online recently are the Darling wind farm and the Bethlehem hydro scheme. These projects will deliver 5,2 MW and 7 MW of clean energy respectively.

Other projects such as landfill to gas and existing hydro-electric power stations are already making a contribution.

It is envisioned that the new REFITs will stimulate the sector and enable the various project developers to implement the projects currently being planned.

4. Research

There are various groups in South Africa engaged with research on renewable energy, from small one-man operations to larger, reasonably well funded groups at universities and other research organisations such as the CSIR. SANERI identified three spokes of research, solar thermal energy, solar photovoltaic research and wind energy research. The universities involved include Stellenbosch, Cape Town, Pretoria, NMMU and Fort Hare. There are however some activity in renewable energy research at most universities and universities of technology in South Africa.

Currently the SA Government has two processes underway to increase the investment in renewable energy research. SANERI is investigating the establishment of a RECORD, Renewable Energy Centre of Research and Development, with sub-centres in solar, ocean, photovoltaic and transport energy. At the same time the Department of Science and Technology contracted the CSIR to develop a road map and business plan for solar energy research programme that will focus on solar thermal energy

4. Conclusion

One of the biggest stumbling blocks that inhibited the roll-out of large renewable energy projects was, and still is, the low price of electricity from coal-fired power stations. This is however changing fast as Eskom is running out of capacity and the new power stations, coal-fired and nuclear, are becoming much more expensive than anticipated. This will result in a significant increase in the price of electricity over the next few years making electricity from renewable energy sources more cost-competitive.

At the same time the effect of greenhouse gasses from burning fossil fuels is manifesting more and more and the world is contemplating how to deal with this global threat. There are already incentives in place to make us of renewable energy resources

and this may increase after the next round of discussions in Copenhagen at the end of the year. What is unclear is what new mechanisms will be put in place and how South Africa, with a very carbon intensive energy sector, will be affected by the new arrangements.

What is clear is that South Africa is well positioned to harness renewable energy and to build a completely new industrial base to service this sector. The sector is very attractive as South Africa can easily enter this market with our existing industrial complex and technology base, and the country is even well positioned to make a contribution towards developing new technology in this area.