The Western Cape has abundant wind, solar and wave resources that can be converted into energy—renewable energy. Renewable energies provide a major opportunity for the province to achieve the multiple goals of energy security, a low carbon economy and employment creation. Up to 50% of the wind energy potential in South Africa is located in the Western Cape, while large sections of the province have excellent solar irradiation. At a global level, renewables are viewed as the “new technological wave”, and a number of countries have set very high targets for replacing coal-fired power with renewable energy. The Western Cape believes that it could become a renewable energy hub for South Africa and the Southern African region.

In August 2011, the national government announced a tender for 1850 MW of wind power, and a further 1430 MW of solar power. We believe that at least 1000 MW of wind and 200 MW of solar PV will be installed in the Western Cape between 2012 and 2014. These power plants will come into operation in the second half of 2014. Wind farms will be located along the West Coast, in the Great Karoo and in the Overberg region, while solar farms will be concentrated in the Karoo region.

Furthermore, the Western Cape is ideally located to serve as a supplier base for the neighbouring Northern Cape, which is estimated to have the best solar irradiation potential in South Africa. The capital investment that will flow into the province over the next decade as a result of renewable energy development amounts to approximately R30 billion.

The strategy of the Provincial Government of the Western Cape (FCNC) with regard to the development of the renewable energy sector starts with the White Paper on Sustainable Energy for the Western Cape Province (2010), which sets targets for energy efficiency and explores ways in which to utilise renewable energy. The White Paper sets a provincial target for energy efficiency improvement of 19% by 2014. This target is expressed in relation to the forecast provincial energy demand at the time, taking into account the national energy demands, and thus allowing for expectations of economic growth. Renewable energy electricity generation in the Western Cape must equal 15% of the baseline energy consumption by 2014. This target is likely to be achieved, as the first utility-scale renewable energy plants are expected to come on-stream by June 2014.

The policy framework gives rise to a number of key programmes that focus on renewable energy as an important economic sector:
- creating an enabling environment for investment in the sector (removing red tape, making industrial manufacturing precincts available and facilitating business-to-business linkages)
- developing the skills supply required for the sector
- promoting research, development & innovation in the sector
- harnessing national incentives for investment and manufacturing in renewable energy.

This strategy is aimed at ensuring that a significant proportion of the renewable energy investment slated in the RFP is located in the Western Cape, and that this investment maximises job creation in the province. The strategy also recognises that there must be a balance between the need to grow the economy and promote job creation, on the one hand, and the protection of natural resources on the other. This balance must be achieved, for example, between ensuring that wind and solar plants are constructed in the province, and ensuring that this activity does not cause the loss of large tracts of valuable agricultural land or significant heritage sites. At the same time, if a farmer can continue with his or her original farming activity while also earning an income from the installation of wind turbines on the farm, the deployment of renewable energy could have a positive outcome for both farmers and wind or solar developers.

In November 2011, the Western Cape Department of Economic Development & Tourism established the GreenCape Initiative, a special purpose vehicle mandated to implement its strategy for the development of the renewable energy sector. The GreenCape Initiative works in conjunction with the Department of Economic Development & Tourism, the Department of Environmental Affairs & Development Planning, the City of Cape Town, the Western Cape Investment and Trade Promotion Agency (Wesgro), and the institutions of higher learning in the province.

The GreenCape Initiative will support renewable energy manufacturing projects through a clustering approach. One of the key steps in this regard has been to secure access to low-cost land to facilitate the co-location of companies in the renewable energy value chain. Land has been identified in Atlantis, located on the outskirts of Cape Town, and the Cape Town City Council has received the first expressions of interest from potential manufacturers. Discussions are also under way with the Small Enterprise Development Corporation and entities such...
as Eskom and Sasol regard to the establishment of a green tech incubation hub in Atlantis. This initiative is aimed at supporting small scale manufacturers in setting up and commercialising concepts and products.

It is further envisaged that the Western Cape will be the home of the South African Wind/Renewable Energy Centre (SAREC), which will take responsibility for the training of technical staff in the wind energy sector (onshore level). This programme recognizes the excellent research capacity of the institutions of higher education in the province, and the training capacity at Technical University and the Further Education and Training College levels. All four of the universities are involved in research within the renewable energy field, each with their own focus.

Current research is engaged with both the refinement of technologies already in application in South Africa as well as with the development of new technologies that may have particular application in Southern Africa. The province wants to build on its academic and training capacity and encourage cooperation with leading regions in the renewable energy field. Western Cape Universities host a number of students from the sub-Saharan region, thereby facilitating capacity development throughout the region, and gaining recognition as an African leader in the field of renewable energy research and development.

SAREC will complement this by hosting additional wind research & development facilities. The research & development facilities will open opportunities for larger-scale wind technology development than what is currently available within the research institutions in the province. Indicators are that the scope of such a Centre will have to be broadened to include training, research & development in other renewable energy technologies.

The municipal waste problem in South Africa represents another key area for renewable energy development. There is a growing awareness of the fact that waste is not simply waste – it is potentially an important resource. In the first place, methane gas can be captured from landfill sites, which reduces the amount of this greenhouse gas being released into the atmosphere. Potentially, this could be a significant source of income for the owners and/or operators of the landfills, and could be a source for trade in carbon credits – credits that can be earned for the reduction in greenhouse gas emissions.

Municipalities are also exploring the possibility of reducing the amount of waste sent to landfill by setting waste for electricity generation. The City of Cape Town has undergone a detailed process of analyzing the waste streams generated in the City, and has embarked on a process to establish waste-to-energy facilities at several of its waste handling sites. Similar municipalities have also made varying progress in this regard. The work already done suggests that the quantity of waste and the composition of the waste streams are important factors in determining which solution a local council chooses.

Biomass generated from other sources such as farm produce waste or agro-processing waste has the potential significantly to increase the energy that can be generated from waste. An article in the March 2011 edition of AgriProbes has already explained biomass as a source of renewable energy – in particular in the agricultural context. It was argued that there are significant challenges in the local context – one of which is the cost of the technology where the financial incentives provided by the state are too low to make waste-to-energy projects feasible at farm level. Another issue is whether South Africa will adopt a smart metering system that allows an independent, small-scale power producer to feed electricity into the grid and to get paid for what is fed into the power network.

The importance of a pilot project such as the biogas digester on the Department of Agriculture’s farm in the George region is that it demonstrates how different combinations of biomass could potentially be used to generate not only biogas for electricity generation, but also potentially a quality of biogas that could be used as cooking or transport fuel. This last possibility will be explored more fully in the coming months, as the potential for other forms of biogas (planting crops for the production of bioethanol) may be utilized.

Renewable energy clearly holds interesting development opportunities for the Western Cape. The future of power dispersion is a mix of utility-scale power plants and decentralised power generation – fully integrated with the grid or completely off-grid. While there will be significant investment in utility-scale power plants, over time, more and more small-scale power producers will enter the sector, including members of the agricultural sector.

Selected bibliography