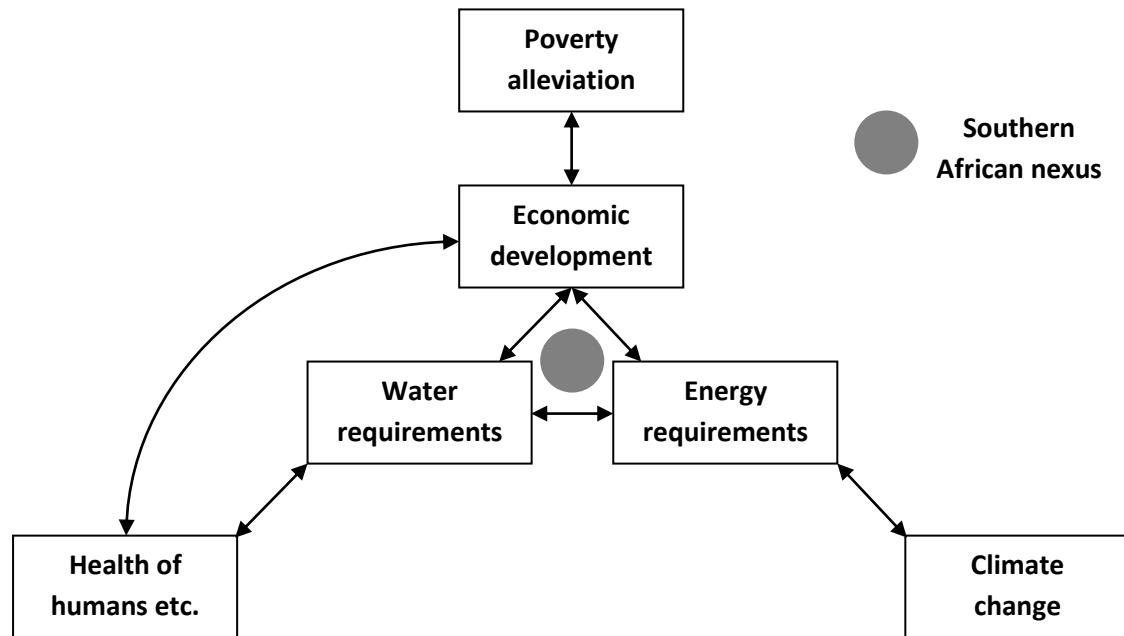


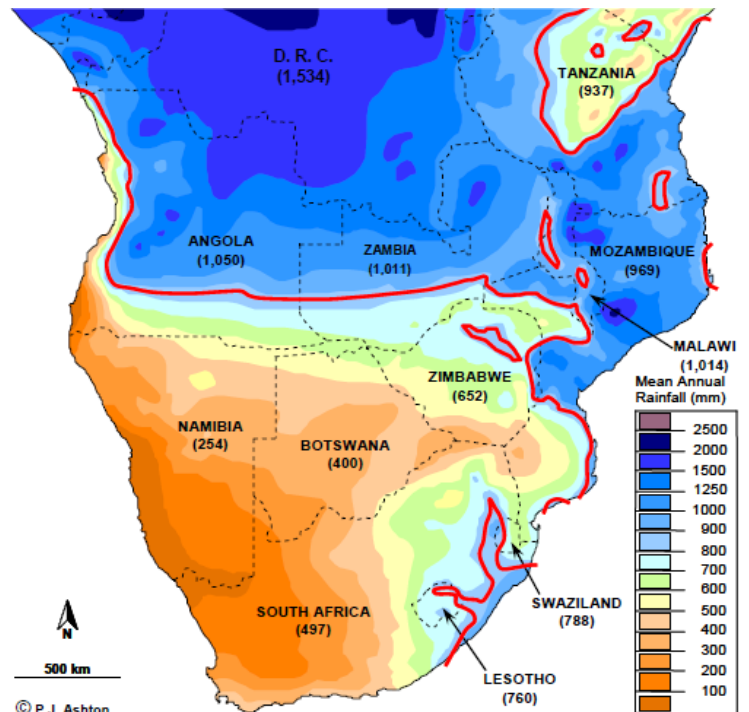
Overview: Renewable and sustainable energy needs for the Southern African industry

Prof Alan Brent, Centre for Renewable and Sustainable Energy Studies, School of Public Management and Planning, Stellenbosch University, South Africa; acb@sun.ac.za.

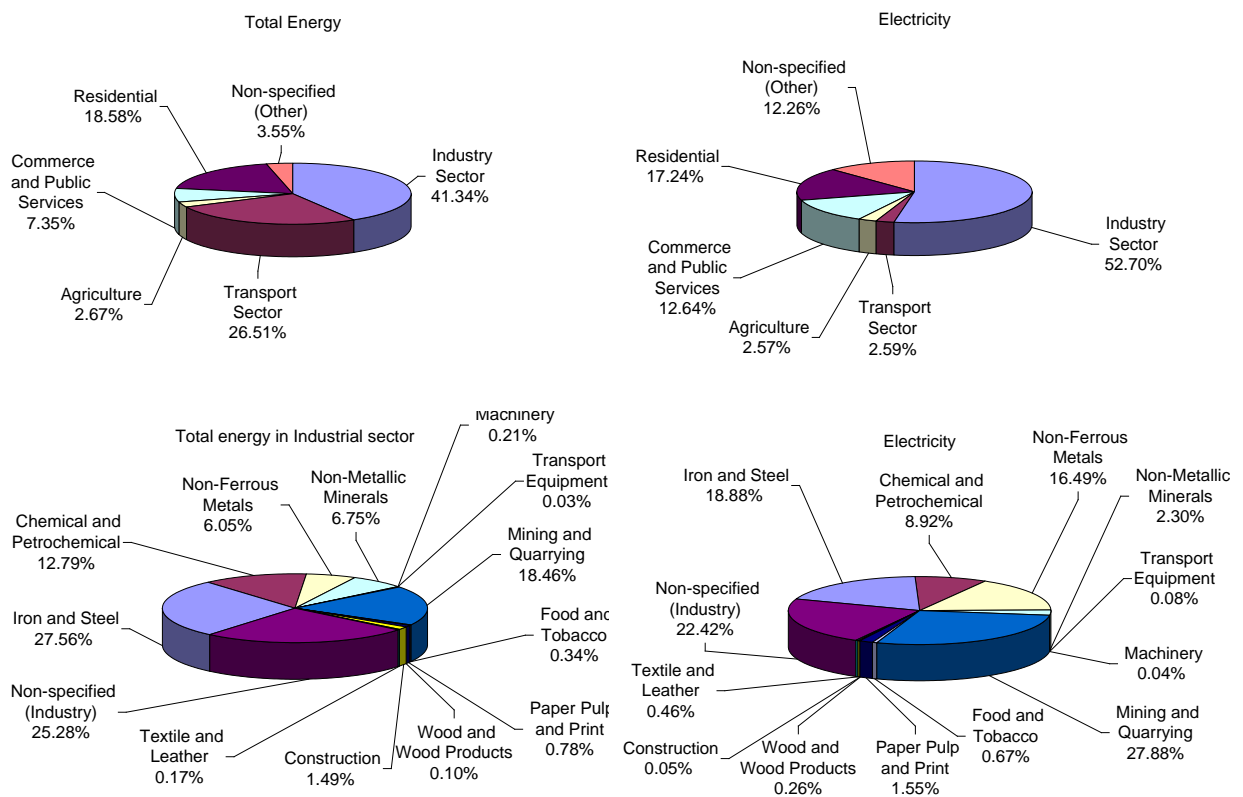


South Africa finds itself in a polycrisis in terms of dealing with economic development, to alleviate poverty, within water and energy constraints. This holds true for its neighbours of Namibia and Botswana.

Due to its scarcity (see Figure to the right), much of the water has been allocated and the region has lost its dilution capacity, so all pollutants and effluent streams will increasingly need to be treated to ever higher standards before being discharged into communal waters or deposited in landfills. The spatial development pattern of the region is also unique in that all of the major centres of economic development, and thus cities and urban conurbations, are located on watershed divides. It now means that effluent return flow out of these major industrial and urban conurbations is a major threat to future economic development, simply because the quality of the water is so degraded that it becomes unfit for human, ecosystem and industrial consumption. All these (water) issues are exacerbated by historic legacy that remains to this day; service delivery to treat water and waste, and supply suitable water is now a recognised problem in the public sector with a propensity to become more complex over time.



At present, the region relies heavily on coal as feedstock; the carbon intensity of energy supply, and therefore of the related products from the region, is high. The reliance on coal also has dire consequences for water resources in the region in terms of water use and impacts on water quality. In South Africa the industrial sector currently comprises 41% of the total energy use and 53% of the total electricity demand of the country (see Figures below). Within the industrial sector mining, iron and steel, non-ferrous metals and non-metallic minerals together constitute 59% of energy and 66% of electricity consumed in the industrial sector, with smaller-scale industries collectively accounting another 25% and 22% respectively. It is here that renewable energy systems can make a direct contribution to address the government imperatives of stimulating economic growth coupled with industry development and (labour-intensive) employment creation, improving energy security and access, and addressing climate change. For example, solar industrial process heat could be provided through a range of technologies for chilling purposes (mining, agriculture, and others) or to generate steam (paper and pulp, textiles, and others). The potential to manufacture and install solar collectors is an industry in its own right, thereby comprising the expansion of the industrial sector. Similarly, a variety of bioenergy value chains, with local production and processing, are currently considered to meet some of the industrial demand.



The drive to meet industrial energy demand with renewable systems is also seen as a potential catalyst to address some of the other societal problems. For example, desalination with solar systems is now considered, not only of sea water to meet coastal water demands, but also of polluted inland water, which could lead to more carbon-neutral locally-supplied water. Also, a combination of concentrated solar systems and biogas from sewage treatment is now considered for sustainable local electricity supply. All of these investigations come as local governments move to become more independent from national-level utilities. However, it is especially here that problems of knowledge and technology transfer are apparent; the Southern African region still has the characteristics of a technology colony.

The two key questions that need to be answered from the perspectives of green solution, clean technology and development, are:

- What are the key factors to ensure the sustainability of green solutions, such as renewable energy technologies, for the purposes of development in Southern Africa?
- How should (African) systems of innovations be transformed to integrate better with global communities to commercialise appropriate technology to solve local problems?

The underlying aspect is fostering international partnerships across governments, the science community, and society (including the private sector), through a triologue model:

