

Renewable Energy



The shift to renewable energy is part of the larger transition to a low carbon economy and also chimes with undertakings given by South Africa's Government as a signatory to the Paris Agreement that would allow for a reduction of greenhouse gas emissions. Nationally, there is a commitment towards 17,800 MW renewable energy generated by 2030, and 13,225 MW renewable energy generated by 2025.¹ Importantly, it is reported that for each kilowatt hour of renewable energy that displaces fossil fuels in the national grid, 1.2 litres of water will be saved, allowing the Province to achieve both greenhouse gas emission and water demand reduction targets.²

Globally, the case for the Green Economy has been made abundantly clear. Renewable energy is the only electricity generation technology whose price has decreased dramatically, with solar PV module prices falling by 80% during the past five years, while wind turbines have become 30% less expensive. South Africa's wind resources are regarded as amongst the top five in the world and could sustain 25% of our grid's capacity. Furthermore, it is estimated that by 2020 the price of wind and solar PV will be at least R0-50/kwh, unlike Eskom's Medupi power station, which - once completed - will charge close to R1-10/kwh.³

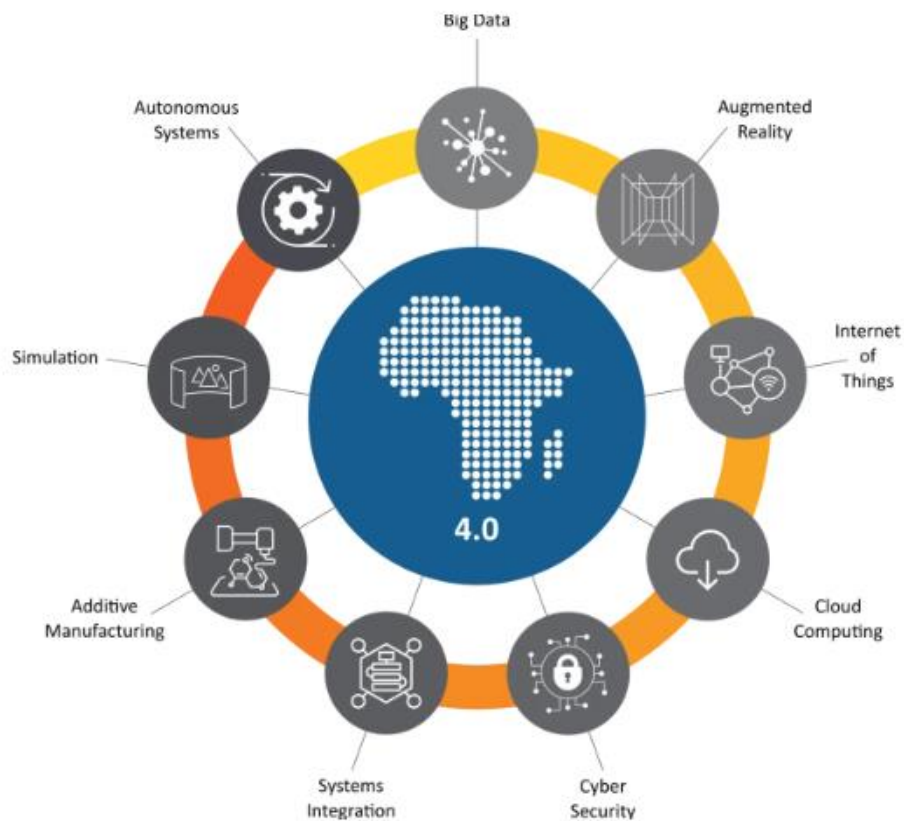
KwaZulu-Natal is an energy-hungry province and consumes in excess of 6 700 MW of electricity and to maintain predicted economic growth rates of between 6% and 7%, the province requires between 400MW and 470MW more electricity every year. As part of the transition towards a low carbon economy, there is a need to consider alternative energy options at the district, provincial and industrial level. The province's renewable energy sector incorporates a host of sustainable solutions and includes the installation and supply of solar water heaters and heat pumps, solar energy, biomass, biogas, bio-fuels, wind, hydro, waste to energy, industrial symbiosis and also the circular economy and energy efficiency measures.

¹ http://www.energy.gov.za/files/renewables_frame.html

² <http://www.energy.org.za/news/246-reaping-rewards-sa-reippp>

³ <https://www.egsa.org.za/general-news/coal-or-renewables-the-answer-is-in-the-numbers/>

The Fourth Industrial Revolution



Over the past decade the world has undergone a process of by rapid innovation that has irrevocably altered the face of business, our social behaviour and even the way entire industrial sectors are organised. In turning traditional growth models upside down, this process has also changed the way we perceive innovation, technology and business generally. The Fourth Industrial Revolution, concerns the convergence of the physical and digital worlds, and is characterised by the speed of technological change and the emergence of new trends and sectors such as the Internet of Things, robotics, artificial intelligence and 3D printing. These technologies allow for digital communication between machines, and entire factories, while the use of smart technology which has combined to revolutionise industries in some parts of the world, has also destabilised industries elsewhere. Evidence of the extent to which the world had changed irrevocably is that ten years ago the five largest companies on the globe were oil or oil-related, while today, they have been replaced by information-based giants. This has ensured that data has become the new global commodity, the “new oil”. By 2020, the number of connected devices in the world will almost triple from more than nine billion today to 25.6 billion. Of these, 10.5 billion will connect using mobile technology, with a dedicated SIM and a connection to a mobile network.⁴ This convergence of the digital, physical and biological worlds has resulted in the rapid

⁴ https://www.gsma.com/iot/wp-content/uploads/2014/08/cl_iot_wp_07_14.pdf

growth of 4IR-related businesses in South Africa and KwaZulu-Natal. Consequently, government departments has realigned their priorities to leverage some of the opportunities that will arise in the hope that 4IR benefits will accrue to large swathes of the population, both rural and urban.

Water



Water is now regarded as the highest global risk in terms of devastation, ahead of nuclear war or a global health pandemic. South Africa, the 30th driest country in the world, not only experiences extreme climate and rainfall fluctuations, but has an average annual rainfall which is half the global average. This rainfall is unevenly distributed across a country which currently has access to surface water (77% of total use), groundwater (9% of total use) and re-cycled water (14% of total use).⁵

Water is not only a crucial component for food production, but is also integral to the country's industrial, mining and power generation sectors, which uses 10% of its freshwater, while contributing close to 40% to the country's total GDP. Agriculture, on the other hand, accounts for 15% of GDP and uses 60% of the available water supply. The industrial sector, which contributes 29% towards GDP, uses 11% of the country's water. ⁶ It is predicted that during the next five years, there will be significant growth in the water infrastructure, waste-water treatment, desalination and water recycling sectors. This will become particularly prevalent as the debilitating effects of climate change become more pronounced resulting in widespread changes to the global water industry. While a country-wide increase in rainwater and grey water harvesting is predicted, another area of possible investment will be in waste-water treatment plants which are in every municipality across the province and which may be retrofitted to produce energy. In effect, following global best practice, they will become energy factories. The Province, through various

⁵ <https://www.gov.za/about-sa/water-affairs#:~:text=By%20mid%2D2019%2C%202.5%25,population%20of%20over%2060%20million.>

⁶ <http://12.000.scripts.mit.edu/mission2017/case-studies/water-access-in-south-africa/>

initiatives and programs, has attempted to ensure a reliable supply of water to its citizens. In 2014 and 2015 were the province experienced two consecutive years of very low rainfall (less than 600mm) while above average rainfall has only been experienced in both 2017 and 2018. In excess of R1.1 billion has been spent by Departments in KZN in order to mitigate the effects of the drought since 2015. Studies undertaken recently for KZN in the respect of waste water recycling reveal that the poor state of waste water treatment works in KZN do not support the installation of waste water recycling units, as these waste water treatment works first require refurbishment and upgrade.⁷

The Department of Water and Sanitation in the Province have several key capital water projects that will ensure a relative supply of water in the Province. Of particular significance are the uMkhomazi Water Project and Lower uMkhomazi Water Project. A R270mill desalination plant delivering 10ML/day was constructed and commissioned for the City of uMhlatuze in 2017. However, other preliminary studies on desalination for other WSAs of KZN have revealed that the costs would be far higher and consequently would not be the most feasible option in terms of capital and operating expenditure. In an attempt at curbing the spread of COVID-19, The Department of Water and Sanitation in KwaZulu-Natal has increased the supply of water and hygiene products to communities and roughly 4 200 water storage tanks and 532 water tankers have been distributed to various district and local municipalities. Umzinyathi District Municipality has the highest number of water tanks delivered at 450, followed by Harry Gwala and eThekweni District Municipalities with 350 and 300, respectively.⁸

⁷ <http://www.kznppc.gov.za/images/downloads/PGDP%202019%20v4%20Final.pdf>

⁸ <https://www.sanews.gov.za/south-africa/kzn-boosts-water-supply>