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In our own backyard...

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Although climate change is a global phenomenon, with no ecosystem on earth remaining unaffected by rising temperatures this century, research has indicated that the south-western corners of the three continents below the equator, namely the American, African and Australian continents, are likely to be the most affected by climate change.

This has already been evidenced by the impact on Perth, the capital of western Australia, which has received so little rain in the past decade that, after pumping the groundwater from an important subterranean reserve (the Gnangara Mound) almost dry, plans for a desalination plant costing \$350 million dollars have had to be laid, making it one of the largest in the southern hemisphere. Because of its location, the Western Cape is likely to be similarly vulnerable, bringing climate change literally to our own backyard. So, what can we expect?

Although the exact manifestation and scale of change in the region cannot be predicted for certain, it is possible that there will be an increase in the annual average temperature of at least 1°C by 2050. Higher temperatures and increased wind velocity will create conditions conducive to wild fires. There will be a possible increase in the frequency and intensity of extreme events, such as fire, longer dry seasons and more intense flooding. However, overall, the western parts of the Western Cape will experience reduced rainfall with resultant decreased water resources and the level of moisture in soils will be reduced due to the increase in temperature coupled with a decrease in rainfall.

Emerging picture in the Western Cape

With water being the first of the critical resources to be affected by climate change, there will be increased pressure on water resources and possibly even severe water stress, which will affect not only human populations but also natural systems in the region. Ecosystems and biodiversity are likely to come under considerable pressure from increased temperatures and we could lose up to half the extent of the fynbos ecosystem and a significant number of its 8 000-odd endemic species.

Rises in sea level will impact on coastal ecology and exposure to extreme events, which may increase in terms of frequency and intensity, will increase salt-water intrusion, raise groundwater tables and increase coastal erosion. As the Western Cape's 50 estuaries, which are important feeding and nursery grounds for many shellfish, fish and bird species, are particularly vulnerable to climate change, fisheries may also be affected.

In order to strengthen the province's resilience to climate change, as well as its adaptive capacity, the Department of Environmental Affairs and Development Planning, Western Cape, has developed a response strategy and action plan, which identifies significant risk and vulnerability factors, while establishing comprehensive mitigation and adaptation responses. These include strengthening the province's energy security through diversifying its supply base into resources such as natural gas, wind and solar energy that have already been identified as being available to the province.

Anyone unlucky enough to be caught in a lift, snarled up in a traffic jam or left sitting in a cold, dark, unproductive office when the lights went out in 2005 and 2006, had the importance of energy security brought home to them in a very vivid and personal way for, with the blackouts in the Western Cape, the province came to a virtual standstill.

These power outages highlighted the necessity of establishing an energy system that will meet the expected future needs of a growing province because, if current energy consumption patterns remain unchanged, the Western Cape's energy demand is expected to grow from 250 million gigajoules (GJ) in 2004 to 420 million GJ over the next 20 years, and our present energy system is clearly undercapitalised to meet this demand.

Recognising the social, economic and environmental harm that can accrue in terms of lost investment, industry down-time, safety and security issues, service delivery and climate change issues through an energy crisis, the provincial government has committed itself to developing a sustainable energy strategy. This will alleviate pressure on the national electricity grid by diversifying the supply mix and broadening energy generation options to include the various renewable energy conversion technologies that are currently available, making it the first province in South Africa to do so.

With an ambitious target of 15% renewable energy by 2014 for the Western Cape having been declared at the Renewable Energy and Climate Change Summit hosted by the Department of Environmental Affairs and Development Planning in June 2007, there is no time to lose and the process of introducing a renewable energy policy, strategy and action plan has been fast-tracked so that measures to supply bulk renewable energy into the grid can be implemented as quickly as possible.

Up to now, no one low-carbon technology has been developed as the next definitive energy trend to replace coal-generated electricity. A mix of renewable energy technologies is being considered to take the Western Cape sustainably into the 21st century with natural gas, wind energy, waste, biomass, solar power, wave power and hydropower all having varying degrees of potential, attendant sustainability issues and barriers to market transformation.

In the meantime, the first big win is energy efficiency,

which can provide considerable financial and energy savings and carbon emissions reductions.

For example, if the industrial sector, which accounts for 46% of total energy consumption in the Western Cape, producing 48% of the province's carbon emissions, were to become 10% more efficient by 2024, there could be cumulative savings amounting to 278 million GJ of energy and carbon emissions reductions of more than 35 billion kilograms.

Commitments

In terms of feedstock for power generation, South Africa is coal rich, which means that we are relatively secure from a coal-fired power station perspective. However, like many other countries around the world, we are subject to fluctuations in the liquid fuels market, and this affects three to 5% of Eskom's total electricity production capacity.

Eskom's electricity capacity is also largely centralised in the north-eastern parts of South Africa, which means lengthy transmission with regard to energy distribution. Therefore, a best-case energy scenario for Eskom for the Western Cape involves a balance between conventional coal-fired, renewable and nuclear sources of energy, as this offers important diversification of the energy mix with decentralised power spreading the energy supply risk.

The Western Cape is using on average 4 000MW of electricity on a daily basis, with demand peaking in winter, and, as Koeberg's 1 800MW capacity a day is currently meeting less than half the electricity requirements for the province, electricity is being imported from the north-east to make up the shortfall. This picture could be intensified with a five to 6% a year growth rate over the next five to eight years.

To achieve energy security in the province, Eskom is strengthening the transmission grid that brings power from the north-east. Two gas-turbine power stations, with an installed capacity of 1 000 MW, have recently been completed in Atlantis and Mossel Bay. The speed with which they were constructed (18 months) indicates their importance to the province's energy grid.

A more technologically advanced, coal-fired power station, the Medupi Power Station, which uses dry-cooling fans rather than water-cooled ones, making it more climate change and environment friendly, has been approved for location in the Waterberg, which is situated in the north of the country.

In terms of renewable power, three demonstration wind turbines are operational at Klipheuwel as a fore-runner to an Eskom-built wind farm that will supply 100 MW of electricity by 2010.

With Eskom considering Thyspunt, which is 6km from Oyster Bay near Cape St Frances as an alternative site for its pressurised water reactor, with the current Koeberg site as another possibility, nuclear power is set to continue contributing to the national power grid. This is despite the fact that it is so controversial in terms of the transportation of radioactive materials, the disposal of radioactive waste, health impacts for communities living near nuclear plants, the prohibitive cost of decommissioning plants and the possibility of nuclear weapons proliferation.

As in most things, challenges also create opportunities

and, by moving quickly towards a sustainable energy future in the Western Cape, it is hoped that the way forward will provide many benefits.

Some of the benefits of diversifying the energy supply mix in the province could be investment stimulation, job creation, emissions reductions, technology advances, market opportunities for transportation, power generation, hot water and space heating, green project development and a share in the carbon market that is developing internationally, while in the process addressing the health, social and environmental problems that have become associated with an energy system that has relied heavily on coal-produced electricity and petrochemicals.

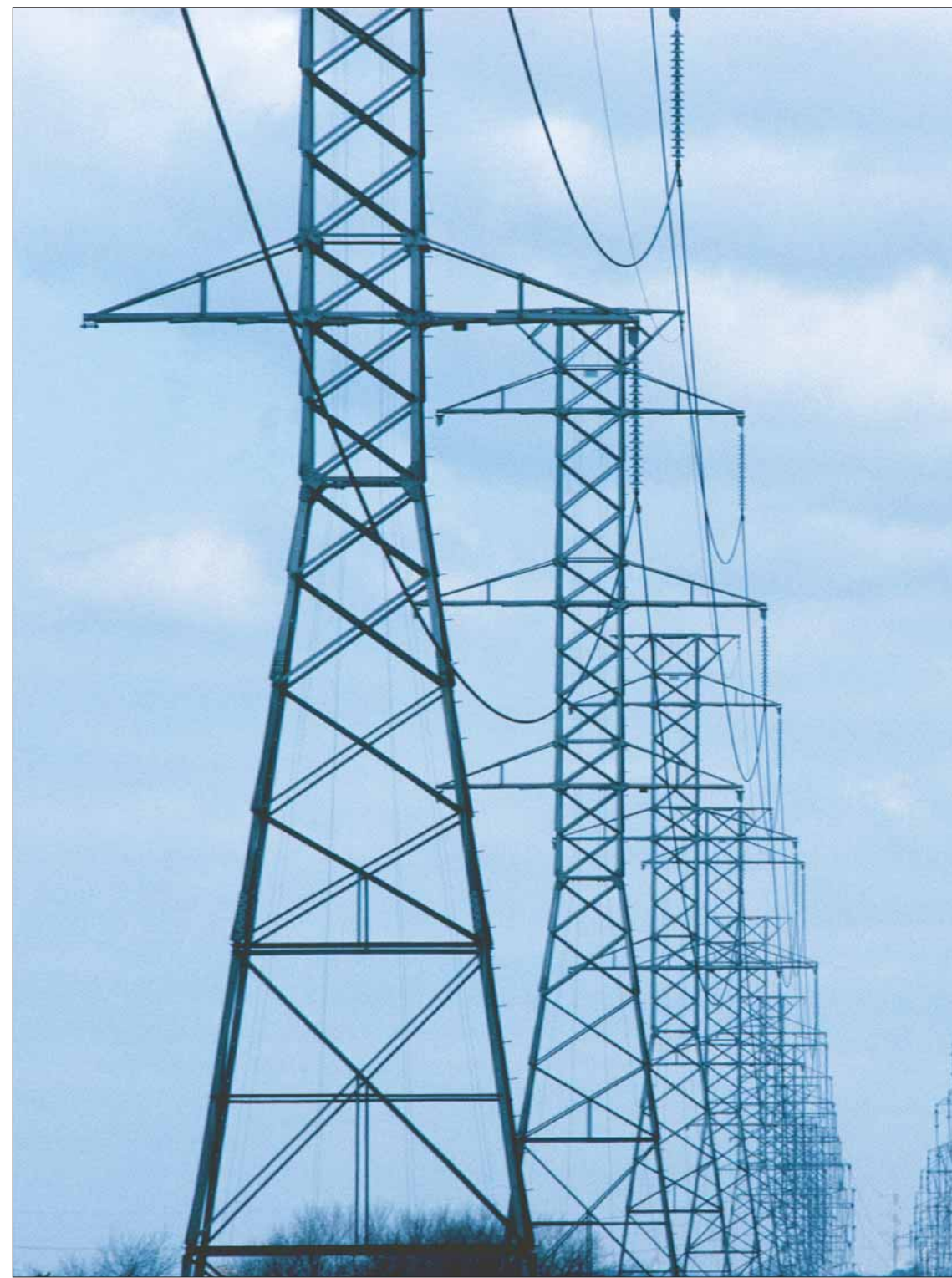
Worldwide, the monumental transition from a "Hydrocarbon Age" to the "Age of Renewables" has begun. The Western Cape is undeniably a part of this historic global process, which means that you and I are becoming a part of history in the making, influencing not only our energy future, but also the environmental and cultural changes that are part and parcel of this momentous transition. These are sure to be interesting times!

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