



The rise, fall and rise of Eskom

By Roland Ngam

There are a number of important debates going on right now about energy production in South Africa. The biggest one of course concerns load shedding and the debilitating power outages that have increased over the past years. Then of course there is the just energy transition debate to end South Africa's reliance on dirty fossil fuels, notably coal. ROLAND NGAM ask why are these debates important and which pathways should South Africa follow?

Introduction

South Africa's power utility Eskom is the biggest producer of electrical energy on the African continent. Eskom alone generates 53% of all electricity produced in Africa. Its total installed capacity is about 52,000 megawatts (MW), which is about twice Morocco's nameplate generator capacity, four times Nigeria's total installed capacity, 18 times the Democratic Republic of Congo's installed capacity and about 30 times Zimbabwe's total installed capacity. South Africa has more than the 52,000MW nameplate generation capacity of course, but some of this is owned by private businesses and households.

The major issue with Eskom's energy fleet is that the biggest share of South Africa's energy comes from burning coal, which is dirty and also toxic. Eskom's 81 coal units, which generate 85% of South Africa's electricity, are responsible for up to 20% of all carbon dioxide (CO₂) emissions on the African continent. To put this in perspective, Eskom alone pollutes more than all Southern African Development Community (SADC) countries put together. South Africa emitted 435 million metric tons of CO₂ from fossil fuel combustion and industrial activities in 2021, with most of this coming from Eskom's coal fleet. Mpumalanga – the home of many Eskom generation units – is a global pollution hotspot with extraordinarily high levels of methane emissions.

Why is there such a heavy reliance on coal? South Africa is the eighth biggest producer of coal in the world. Its coal reserves are estimated at 53 billion tonnes and at the present consumption rate there are at least 200 years of coal supply left in the country. The thinking has always been that if we have this massive asset, why not use it to power our economy?



From Escom to Eskom: a brief history

South Africa's first large-scale power station, the Kimberley Diamond Mine power station, was built in 1883 and generated electricity using steam turbines. The first major power station, the Victoria Falls Power Station, began operating in 1905.

In 1923, the South African government established the Electricity Supply Commission (Escom), known in Afrikaans as the Elektrisiteitsvoorsieningskorporasie (Eskom) with a view to ramping up South Africa's power generation capacity. Escom generated the power, and the Victoria Falls Power Company distributed it. This relationship continued until 1948 when the Victoria Falls Power Company was absorbed by Escom. The power utility went on to buy other small utilities around the country in order to create a centralised network and in 1987 the acronyms Escom and Evkom were fused to generate the name Eskom.

Prior to 1994, Eskom had a very narrow mandate. Its mission was to provide electricity to large-scale commercial farms, mines, steel plants, the manufacturing sector and white households. Electricity was offered to the manufacturing sector at rock bottom prices in order to make South Africa a global mining and industrial powerhouse. At this stage, less than 40% of the country had access to power.

After winning the first democratic elections in 1994, the ANC identified access to electrical power as a right to be enjoyed by all citizens. Eskom was mandated to make the dream of quality affordable electricity for all a reality.

The number of black South Africans who had access to electricity increased from around five million in 1994 to over 16 million in 2019 and the electricity penetration rate went up from around 36% in 1994 to more than 85% in 2019. That is a major leap forward; the average white family has had electricity in their homes for over 100 years whereas the average black family has had electricity in their homes for less than 30 years.

But adding that many houses to the grid came at a price. According to Eskom's 1994 Annual Report, the utility had 37,840MW of generation capacity in 1994 with 23,845km of power lines. That year, Eskom committed to reducing the price of electricity by >>



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15% and connecting 1.5 million black households to the grid. Eskom later told the government that with so many new households getting on to the grid, Eskom needed new generation capacity.

The World Bank advised the South African government to leave new build projects to the private sector. In accordance with this recommendation, President Thabo Mbeki commissioned a report and tried to privatise Eskom before eventually reversing course, but he did not act quickly to build more generation capacity. Between 2005 and 2011, Eskom reopened three coal units that had previously been mothballed to generate 3,600MW of electricity. It also commissioned 1,000MW of new own capacity and awarded 1,000MW of generation to Independent Power Producers (IPPs).

The rest is history. There was too much pressure on the grid and load shedding began in 2007. President Thabo Mbeki apologised to South Africa for not accepting Eskom's timely recommendation to build more generation capacity to match the country's demographic growth.

Mbeki commissioned two new coal power stations, Medupi in Lephalele in Limpopo province and Kusile near Witbank in Mpumalanga, to generate 9,500MW of electricity. However, many coal generation units were approaching the end of their lifespan and Mbeki's successor, President Jacob Zuma, should have commissioned a significant new build project of his own. Instead he opted for nuclear capacity of about 9,600MW, but whistle-blowers outed the deal that he was negotiating with Russia and he abandoned the project. Eskom then focused on running its coal fleet but it had neglected to address the need for sustainability over time, providing little down time for maintenance, and that has led us to where we are now.

Load shedding has worsened as the coal fleet got older and more unreliable. Due to design flaws at Medupi and Kusile the country is yet to get a combined 9,000MW from them at any given moment. There were 36 days of load shedding in 2019, 52 days in 2020, 48 days in 2021, 200 days in 2022 and in 2023 there has been load shedding almost every day. This is having a devastating impact on the South African economy. Business output has dropped and Gross Domestic Product (GDP) forecasts are being repeatedly revised downwards.

Black South Africans still bear a disproportionate burden of load shedding. In today's digital age, access to information is essential for participation in society and the global economy. Without electricity, many low-income households are cut off from important sources of information, limiting their ability to participate in the global community.

Children in townships and rural areas are unable to study after dark or access computers or other electronic resources, limiting their ability to learn and develop the skills they need to succeed in the modern world.

Those who rely on traditional sources of lighting and cooking, such as kerosene lamps and wood stoves, breathe in toxic fumes every day, which causes respiratory



illnesses and other health issues such as asthma. Basic activities such as cooking, cleaning and maintaining personal hygiene become more difficult and time-consuming, reducing the overall quality of life for individuals and families. Small businesses cannot operate effectively, limiting economic opportunities and hindering development.

So, how do we fix Eskom?

President Cyril Ramaphosa has adopted a number of unprecedented decisions to end load shedding in South Africa. In 2021, he amended schedule two of the *Electricity Regulation Act*, raising the threshold for embedded generation from 1MW to 100 MW without the need for a licence.¹ In 2022, he lifted the 100MW threshold completely and indefinitely. The Department of Mineral Resources and Energy has approved more than 100 IPP contracts with generation capacity of more than 10,000MW.

The provinces are also stepping up to the plate. Construction work has commenced on the Gauteng government's 800MW solar farm in Merafong on land donated by the Sibanye mining company. The Western Cape has announced plans to build as much as 750MW of clean generation capacity by 2025 under the Western Cape Energy Resilience Programme and to increase this to over 6,000MW by 2035. Obviously, such ambitious plans must be coordinated properly with Eskom because the flurry of new build projects has created some capacity problems with electricity that cannot be fed into the grid due to insufficient specifications or a lack of power lines.

In Kwazulu-Natal, the city of Durban has announced a R324 billion plan to build solar and natural gas power stations. The Northern Cape has announced plans to train skilled workers and negotiate new partnerships with renewable energy companies.

In March 2023, President Ramaphosa appointed an electricity "czar" to coordinate all the efforts to end load shedding. Electricity minister Kgosientsho Ramokgopa has announced that his immediate priority is improving the energy availability factor (EAF) of Eskom's 81 coal units. Eskom is purchasing replacement parts for some coal units and has called on the government to waive the requirement for flue gas desulfurisation² systems in some units to bring them back online quickly. This is a controversial move. Although many desperate South Africans just want a reliable, uninterrupted electricity supply, removing flue gas desulfurisation systems means dumping more CO₂ and methane into the atmosphere. It goes without saying that people are going to die from this, especially those who live in close proximity to some power plants.

Koeberg, Africa's lone nuclear power plant that supplies 5% of South Africa's power, has always had a reputation for reliability. It has a total nameplate capacity of 1,940MW and is vital to keeping the lights on. However, on 15 April 2023, Koeberg Unit 2 tripped, sending South Africa into Stage 6 load shedding. Koeberg will certainly add to Minister Ramokgopa's sleepless nights.

The international Just Energy Transition Partnership

The world is warming rapidly and to avoid the adverse effects of climate change spiralling out of control, we need to significantly scale down our emissions. According to the Intergovernmental Panel on Climate Change, limiting global heating to 1.5° or ➤



2° relative to preindustrial levels involves rapid, deep and in some cases, immediate greenhouse gas emission reductions.

At COP26 South Africa signed a Just Energy Transition Partnership (JETP) with Germany, France, the United Kingdom, the United States and the European Union to support South Africa's phase-out of coal. This was one of the most notable outcomes of COP26. Through the JETP, South Africa will be able to access US\$8.5 billion to accelerate its just energy transition plans.

South Africa has revised its 2030 mitigation target range downwards from 398-614 Mt CO₂-eq to a range of 350-420 Mt CO₂-eq. This ambitious target cannot be achieved without decarbonising Eskom. South Africa has earmarked Komati's old coal station as the key locus of this project.

In addition to 200MW of solar power, the JETP funds are to be used to set up a reskilling centre for energy sector workers as well as to boost small business initiatives that have emerged around coalmines.

Electricity minister Ramokgopa caused an uproar when he announced his decision to refurbish old coal power plants, import 15-year-old second-hand generators from the Netherlands and apply for a waiver on flue gas desulfurisation systems as a way to end the energy crisis immediately. This will cause and lock in massive CO₂ dumps in the atmosphere. Nevertheless, at the same time the following factors must also be considered:

- Some trade unions are fully behind Energy Minister Gwede Mantashe's push to hold on to the core of South Africa's coal fleet for the next three decades and possibly longer given the possible threat of significant job losses in the sector;
- Businesses in towns where there are coal-fired power plants are not keen on the JETP either as they may lose their sources of income;
- Both the National Union of Metalworkers of South Africa (Numsa) spokesperson Phakamile Hlubi-Majola and the president of the Association of Mineworkers and Construction Union (AMCU) Joseph Mathunjwa, the main trade union in the platinum belt, have pushed conspiracy theories suggesting that the JETP partners, which are also some of the highly industrialised countries that are responsible for most of the CO₂ emissions in the atmosphere today, are bullying South Africa into shifting to unreliable green energy sources. They say that South Africa must listen only to Mantashe who wants to lock South Africa into using more coal, gas and diesel for the foreseeable future.

The coal and allied sectors employ up to 120,000 people. The energy, auto and metals sector employs a further one million people. That is a formidable political bloc. Pushing them too hard and too quickly into adopting green energy could backfire and alienate many working families. Remember that the "just" in *just transition* requires the decarbonisation process to be fair, just and patient. The just transition really has to be *just!* We need to speak our truth loudly and clearly but also, and this is very important, *patiently*.

Green energy sources are getting cheaper every day and South Africa's international partners are adopting tough measures to switch their economies to low-carbon or



carbon-neutral paradigms in the medium term. Others, such as China, continue to install a record number of coal-fired generation plants (China has installed over 200GW of new coal capacity since 2019), which is why people like Mantashe are right to call out those who are fixated on South Africa while massive polluters are left to do their thing the way they like.

Perhaps it is also important to say that the load shedding crisis has inadvertently accelerated the adoption of solar- and wind-generated power in South Africa. Prior to 2021, many people were not interested in discussing solar and wind as serious alternatives to coal but that has all changed with uninterrupted load shedding. Now thousands of South Africans who can afford it have installed rooftop solar energy-based photovoltaic (PV) systems at unprecedented rates.

South African households have installed at least 1,000MW of rooftop PV and wind capacity since 2020. From less than 3,000MW of renewable energy generation capacity five years ago, South Africa more than doubled that to 6,200MW by 2023. When the construction of the more than 100 IPP projects in the risk mitigation and renewable energy independent power producer procurement programmes are completed over the next years, South Africa will have at least 16,000MW of renewable energy capacity. That is a remarkable transformation. Inch by inch, South Africa is getting closer to where it needs to be, regardless of what the fossil fuel lobby is doing or saying.

Conclusion

Electricity has a developmental purpose. Regardless of how dirty they are, Eskom's 81 coal units play a critical role in South Africa's development. Workers rely on them for jobs as well as to take care of their families. Load shedding has had a devastating impact on the South African economy with the poor bearing the brunt of the power outages and disruptions. However, the power challenges have also helped to accelerate South Africa's renewable energy push. It is all hands on deck as many different stakeholders rush to build new green power generation capacity and that is something we must recognise and quietly celebrate.

On a broader, multilateral level, the countries that are genuinely concerned about South Africa's CO₂ emissions and would like to help decarbonise the economy should help transfer the skills, technology and money that South Africa needs right now to keep the lights on. During a recent visit to South Africa US Treasury Secretary Janet Yellen called on philanthropists to help the country get a cleaner power fleet. But asking philanthropists is taking the easy way out. What the Global South needs is for the countries that have played the biggest role in creating the dangerous levels of CO₂ that are trapped in the atmosphere right now to invest in adaptation and mitigation projects.

ENDNOTES

1. Embedded generation (also known as distributed generation) refers to smaller scale electricity generation or storage plants connected to a local distribution network rather than the overall transmission network.
2. Gas desulfurisation is a process to reduce the sulphur dioxide from exhaust gases from fossil fuel power plants. **NA**