ESCOM's sixth decade

1973 - 1983

Growing international pressure towards South Africa's apartheid government seemed only to harden its resolve. In spite of growing isolation, there was still strong global demand as well as for South Africa's gold, minerals, iron ore, steel, and coal. What South Africa lacked were oil and gas. Thus it was that ESCOM relied so heavily on coal and, particularly, low-grade coal (or "black-painted" rock as some power station operators called it).

So the 1970s saw ever bigger coal-fired power stations popping up in the Mpumalanga valley. Arnot had begun commercial service in 1971, and it was becoming apparent that its 350 MW sets (massive for the time) would be too small for future stations.

With an annual growth in power demand of 9%, ESCOM would need to double capacity every eight years, which translated to a further 10 000 MW by 1980.

Kriel was the first of the "six packs" (so-called because of their size and very prominent, boiler houses and) and featured news "once through" technology, where steam passed through the turbine while the boiler was warmed up or when the turbine is shut down.

From the start, there were challenges in getting the most out of Kriel, which was ESCOM's biggest power station. The boilers were not susceptible to slagging, and new mill foundations had to be built when the heavy milling machinery created dangerous vibrations. On completion in 1979, Kriel consisted of six sets of 500 MW each and was one of the largest coal-fired power stations in the southern hemisphere (and well as for South Africa). The South African power stations, especially those in the Southern Cape, had a high incidence of coal soot in the air.

Meanwhile, Duva, like Kriel, was a "six-pack" power station, with separate housing for its turbine generators. Unlike Kriel, the boilers were of a conventional design and used natural circulation and were not one-through. Kriel began commercial operation in 1979 and, on completion (in 1983), boasted six sets of 500 MW each. It was distinctive for its boiler house structure – constructed from concrete, it was designed to reduce time and capital costs amid a world shortage of steel.

Duva Power Station was the third and final "six-pack" and was built near Widbin in Mpumalanga. It, too, used a "once-through" boiler technology, but instead of six 500 MW sets, it consisted of six 600 MW sets.

The boilers proved more reliable than Kriel's, but there were still challenges, particularly of an environmental nature. The precipitators on Duva's first three units did not reduce emissions to acceptable levels, and the pollution problem was only solved in 1984 when the precipitators were replaced with pulse jet fabric filter plants – a world first.

Another first for Duva came in the lobby, where the name of Elob Matya – ESCOM's first black power station manager.

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In the 1970s, ESCOM's environmental challenges paled into insignificance compared to the crisis that it faced in 5 December 1979. An interconnected transmission system, while preferable, had its risks, and faults could spread to the entire country. What happened on that particular day, when a relay malfunctioned at the Hydros substations near De Aar. Much of the country went without power for 24 hours, and ESCOM had to rethink its transmission system. In 1976, ESCOM addressed the problem by building two gas turbine stations, one near Cape Town and the other near East London. The year 1976 saw the completion of Hendrina power station and Gariep (then Hendrik Verwoerd) hydro power station (Arnot had been completed the previous year).

ESCOM itself was not a capitalist enterprise, and in the 1970s, many South Africans began to see it as inefficient, especially when the price of electricity started to rise. The problem was that ESCOM had to finance most of its own growth. At the same time, ESCOM feared that, without it, South Africa would have faced not only an oil shortage crisis, but an electricity shortage crisis. In 1979, Jan H Smith, ESCOM's General Manager at the time, lambasted the Board of Trade and Industry for its use of the word "profit". Then, as now, the term is a potentially misleading one, given that ESCOM's profits do not enrich private investors, but are used to expand South Africa's electricity system.

In 1980, the chairman of ESCOM, Reinhardt Strasszack, retired. It was the same Jan H Smith who had been the boor. His successor was raised tortoises as pets because he admired their tenacity, was known for being "a man in a hurry". He was nicknamed "Mr Kilowatt hour", a reference to his ability to reduce complex planning issues to the effect they would have on the cost of a kilowatt hour of electricity.

Unfortunately for ESCOM, although Smith was famous for being a top-class planner, he overestimated South Africa's future electricity needs. He was not helped by the fact that there were delays in the building of Koeburg, and the power from Catlora (then called Cabora Bassa) was so unreliable as to be arguably worse than no supply at all. With sanctions starting to bite, it was feared that ESCOM would be unable to complete Koeburg at all, and all planning remained plans of thought discounted nuclear power from the equation. The upbeat was that ESCOM urgently began building more power stations in anticipation of continued high growth in demand. The early 1980s saw construction begin on Lethabo, Matimba, and Kendal power stations. This would add almost 12 000 MW to the system and create a problem that seemed almost unthinkable at the time: what to do with masses of excess electricity.