

The Case for Non-nuclear Power Options



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Intelligent persons, such as liberals supporting the Helen Suzman Foundation, often hold a range of views on complex issues, especially where more than one criterion is involved, and where some criteria may not be easily quantified.

Newspaper editorials have criticized the Government's abuse of secrecy – what democracy classifies its future electricity plans as secret? – as it proceeds with its programme to build six to nine extra atomic power reactors totalling 9600 MW of electricity. The reason for secrecy is defensive: these plans cannot stand up to scrutiny for economic rationality. This is one requirement for the constitutionality of state decisions and choices.

Joseph Schumpeter's famous phrase about capitalism and entrepreneurship acting as "perennial gales of creative destruction" reminds us that the cost-effective blend of power generation varies during each decade. From the 1990s, imported hydropower would have been South Africa's cheapest electricity source. From the 2000s, imported gas could vie with imported hydropower. During the 2010s, solar power, both photovoltaic and concentrated solar power with storage, could start to be added to the cost-optimal mix.

The tell-tale give-away of economic irrationality in the Government's grim determination to rebuild PW Botha's atomic industry is that it is utterly price inelastic: 9600 MW regardless of the supply-side revolution noted above.

Gaps and Silences

Public debate on security of electricity shows extraordinary gaps and silences.

First, the Government and President Zuma deserve praise for having signed a treaty in 2013 - ratified by Parliament - to import 2500 MW of hydropower, progressively rising by 2030 to 10 000 MW, from the Grand Inga project. This made no headlines in the newspapers

Energy security will be enhanced by adding to the existing "eastern power corridor", through which we already import 110 MW from the Democratic Republic of the Congo, a "western power corridor" running through Angola and Namibia to Cape Town and Gauteng. South Africa took the lead in founding the Southern African Power Pool in 1995 to facilitate greater international trading in electricity. Currently our biggest example is importing an average 1200 MW from Cahora Bassa in Mozambique, through different transmission cables.

There are also discussions about importing further hydropower from other Angola and Mozambique sites. The Energy Intensive Users' Group of South Africa will have noted that electricity from the Grand Inga project is costed at one-quarter of the same quantity of electricity from atomic power stations. Doubtless, the real costs of any government



Cahora Bassa Dam, Mozambique

mega-project must realistically be anticipated at double the promised costs, but atomic power shows the same escalation - or worse.

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The second silence in the electricity debate – in this case a near silence – concerns the unpredicted finds of vast gas reserves in Mozambique, Tanzania, and Kenya. This is gas that costs far less to tap than shale gas.

The Eskom-Shanduka contract proved that gas-fired power stations are the fastest to build and plug into our national grid – eighteen months. If speed is the criterion, then the rational advocacy is for combined-cycle gas-fired turbines. Atomic power stations take longer to build than almost any other alternative.

Eskom accountants and quantity surveyors can advise between the options of bringing Mozambique gas into South Africa through building pipelines, or of building gas power stations on top of the gas fields, and erecting transmission cables into South Africa.

Third, another supply-side revolution is that over the past decade the cost of photovoltaic electricity has dropped to parity with current grid retail prices. Simultaneously, the cost of Concentrated Solar Power with storage for the evening peak usage has dropped to below the cost of power from the diesel-guzzling Ankerlig and Gourikwa peaking stations.

The Energy Department proposed in 2010 that we generate 5000 MW from a solar park in the Northern Cape. There is no reason why this should not be upped to 9600

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or 15 000 MW. Instead, the Energy Minister announced (Cape Times 6 October) that the solar park will be for 1 500 MW – slashed by more than two-thirds after five years in which the prices of solar electricity dropped more than from any other alternative source. Distributing the solar power stations between Springbok to Hotazel and Mahikeng will ensure that rare desert rains in any one locality will not significantly lower the distributed power output as a whole.

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The fourth silence is over demand-side management. Even in democracies, not every policy can be popular – such as tax. Eskom bills municipalities with time-of-use charges, as mobile phone companies use. But municipalities charge their customers prices below cost during the sunset peak usage hours, and far above cost for the rest of time.

It is overdue to upgrade all retail meters to permit both time-of-use billing, and also reverse metering for those who install rooftop photovoltaics. This can be done within three years. Similarly, somewhere before WW2, municipalities fell into the bad habit of misusing electricity billing to cross-subsidize rates. They need to incrementally raise rates, with continuing exemptions for pensioners and other low-income households, to stand on their own. Electricity, like water, is an essential, to be priced to cover only its own capital, current, and reticulation costs.

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Many governments decide on actions and policies which do not make economic sense, but are undertaken for political or diplomatic goals. For example, no one expects economic benefits in return for the costs of a decade-long deployment of South African peacekeeping soldiers and police in the Darfur province of the Sudan. Our actions as part of the AU force are justified by their humanitarian benefits.

The Nuclear Option

But no political benefits are obvious in choosing the atomic alternative. Politicians talk of nuclear as a strategic asset in a way they do not perceive solar, gas, or hydropower, but can never explain why it should be considered any more strategic. South Africa has a historic over-investment in atomic technologies, from the bomb to the Pebble-Bed Modular Reactor, (PBMR) with the opportunity costs hurting other sciences and technologies.

Questions asked in parliament by DA MP Lance Greyling exposed that state investment has privileged atomic research & development with four hundred times the grants and funding given to all renewable electricity options combined.

The opportunity costs of the Government's obsessions with extra nuclear power have been significant.

The R8 billion of wasteful and fruitless taxpayers' funds poured into the PBMR left them with no Energy funds to back the West Power Corridor Company, Westkor, between 2003-2008, which led to the DRC Kabila Administration pulling out of the Inga scheme for a decade because it assumed that the South African Government was not serious in its commitment. By the time new treaties were signed in 2013



The Sasol gas pipeline in Temane, Mozambique

and ratified by Parliament in 2014, seven years had been wasted in which the construction of the hydropower station and transmission pylons could have almost been completed.

The physicist Schleffer presented a paper back in 1995 proving that the sunlight per square metre in our Kalahari districts equals the highest in the world. This makes the Northern Cape and North-West Provinces the most economically viable globally to erect PV and CSP plants. Two decades were wasted before substantial solar power plants were constructed there.

The Mozambique gas pipeline to SASOL at Secunda was opened in 2004. Had this been replicated at the time, to flow to new gas power stations, there would have been no power failures and rationing in the past few years, angering voters and hurting our economy.

The claims that the Government's nuclear plans will not cost more than R400 billion neglect to consider several facts:

- First, the Government's atomic ambitions extend far beyond extra power stations. The Nuclear Policy White Paper in 2008 published its policy reversal: to rebuild PW Botha's entire end-to-end atomic industry, with the sole exception of atomic bombs. The electricity-guzzling uranium enrichment factories, the zirconium cladding factories for fuel elements, are all again on the state priority list. There is currently talk of also building a nuclear fuels processing plant. The atomic wish-list also includes another research reactor for Pelindaba.
- Second, atomic industry supporters never explain that their quoted costs of R400-800 billion are merely one component of the costs, termed "overnight costs". That is what the cost would be only if Eskom could pay upfront a lump sum of R400 billion. In the real world, Eskom will have to borrow this sum at compound interest – and these finance charges, adding between one-third to 40% onto the sum are excluded.

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- Third, the global atomic industry advises its corporate members to avoid fixed costs contracts, so that as inflation bites during the seven to ten years needed to build a new nuclear reactor, the contractor cheerfully adds this on the taxpayers' bills, raising costs by at least another third.
- Fourth, the prices claimed by nuclear power station vendors have the charming habit of excluding what they call "owners' costs". Their quoted prices exclude the costs of building the breakwaters or pipelines that pump in and out the huge volumes of cooling sea water needed. Their prices exclude the seismic raft – the massive concrete foundation and steel coils built beneath a nuclear reactor to ensure it is safe against earthquakes. They apply the same exclusion to the cost of building the administration buildings and security perimeter. No architect would dare give a client a written quotation that excluded the cost of the foundations, the outside plumbing connections, and the garden walls for a new house, but that is the practice of nuclear vendors.
- Fifth, the decommissioning of the oldest atomic power stations built in the 1950s and 1960s has only started in recent years. It is becoming evident that the total costs of the dismantling of an atomic power station, including long-term storage of its radio-active parts, can cost up to one-quarter of the original price of building it.
- Sixth, HSF supporters – indeed all defenders of the Rule of Law – will be concerned at the authoritarian mindset of some supporters of atomic power. For example, the atomic engineer Kelvin Kemm writes in THE NEW AGE (21 October) "It is time that the South African Government started ... jailing some of the Greenpeace activists - and banning Greenpeace ... from receiving any foreign funds."

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Our Bill of Rights ensures that critics of nuclear power stations have the same rights as, for example, the atomic conglomerate Areva has, to donate foreign funds to host 24 months of events in South Africa as soft-sell for its bid.

Conclusion

The Government's nuclear ambitions (power stations, enrichment plant, and others) will cost considerably more than the arms deal. This means that the corporate incentive to bribe will be considerably higher than it

was for arms dealers. As will the corporate war chest be used. The current corporate terminology used to camouflage bribes includes: initiation fees, facilitation fees, consultancies, success fees, and, the most outrageous of all, signature bonus fees. That is, a bureaucrat or politician is paid millions for signing documents which is part of his or her job.

The Government's static policy - determination to build 9600 MW of atomic power stations regardless of varying cheaper options - proves that this policy is only political in motivation, and is not economically rational. Otherwise, the proposed quantity of power to be generated by atomic power stations would fluctuate, depending on the price of other options in the mix.

To succeed in compelling the Government to reverse its determination to expand atomic power will require a multi-pronged campaign of the same magnitude as the one which forced the Government to reverse its policy of treating HIV-AIDs with beetroot instead of medicines.