Debating our future electricity supply

The debate around South Africa's future energy and electricity resources is raging ahead full-steam. Amongst the most sensitive issues are shale gas fracking in the Karoo and nuclear electricity. While public debate is a valuable tool to enhance public participation in, and understanding of, the decision making process, the opposite is true if the debate centres around emotive issues rather than facts or substantive issues. Under such circumstances one cannot really speak of any debate – it is just naysaying and trying to elevate fringe issues to the core of the debate. In an environment where there may be concerns around the motives of government to preselect certain options, the debate tends to become even more emotional and counter-productive. How can we avoid this and rather identify, focus on and debate the key issues, specifically around our future electricity supply? Well, I believe one way to achieve this would be if the debate itself was (firstly) around the strategic issues and choices we face rather than implementation issues.

Take the issue of government's proposed nuclear build and its procurement process. To my mind this is a good example of a debate that has degenerated way beyond the point of healthy public debate. It is a debate characterised by claims and counter-claims none of which stand any chance to advance the debate or clear-up any obvious misconceptions – for the simple reason that misconceptions are often deliberately introduced and fuelled as a way to influence opinion. Some examples of claims that are often advanced are listed below. In each case, I include a key question that one can ask to clarify if this is an emotional claim or a substantive claim ~

1. *We do not need any new nuclear electricity generation capacity as we should focus exclusively on renewable energy resources such as wind, solar and biomass*. **Question**: Are you certain that if from today onwards only renewable energy capacity is installed that we will never run out of electricity?
2. *Nuclear energy is too expensive as the capital cost would run into billions or even trillions of US $ (or is it Rands?) and the government can never finance that*. **Question**: What is the (order of magnitude) total cost of the coal to be purchased over the next 40 years to keep our power stations running? How is that being financed?
3. *We can never build these nuclear power stations on time and on budget – just look at projects elsewhere in the world*. **Question:** Would we use exactly the same contracting framework to build our nuclear power stations as used in your examples?

These are just three examples, but I hope the point is well illustrated. Let us return to the strategic issues and start to debate those. What are the strategic issues? Well, there is the Integrated Resource Plan for Electricity ("IRP"), covering 2010 to 2030 as published by the Department of Energy in 2010. The IRP is government's strategy around electricity generation and distribution for the next 20 years. It deals with all the relevant issues such as: how much electricity will we need, how will we generate our electricity, what is the age and replacement profile of our existing generation capacity, what are our carbon emission targets, what will it all cost, where should we generate our electricity and how will we distribute electricity from (generation) source to end-user. As a strategic plan it utilises the fairly standard practice of identifying specific future scenarios and how we as a country should react to each such scenario. If you really want to participate in the electricity debate, this is the one document that you have to study and interrogate (find it here).

If you do so, you will quickly find that it is not so easy to simply shoot holes in it through wild claims or emotive issues. For one, in crafting a strategy like this, one doesn't start with a clean slate. In this country, we do have substantial, existing electricity infrastructure that will play a crucial role in the "mix" over the next 20 years (and beyond). One of the key questions in the IRP is this: to what extent do we invest in new infrastructure (and write-off the older infrastructure) versus investing to prolong the economic life of the old infrastructure? There are many factors and parameters that impact on this question. Following on this and a decision to invest in new infrastructure the next question is obviously: what type of infrastructure (coal, gas, oil, nuclear, solar, wind etc.) should we invest in? A further obvious question is: how do we phase-in renewable energy sources and deal with their limitations? The limitations I refer to stem from the fact that these are typically intermittent electricity sources. A wind turbine for example does not (necessarily) generate electricity when it is needed but rather when the wind blows. Similarly solar panels only generate electricity when the sun shines.

So, in studying the IRP, one quickly gains an understanding of how complex the issues are that it deals with and how complex the trade-offs are in every decision that has to be made. If you thought it would be easy, just go ahead and try to write your own strategy for our future electricity supply. The complexities become even greater if it is considered that decisions need to be made against various unknowns (example: what will the price of oil be in 2028?) and in an environment where things change relatively rapidly (example: the industrial demand for electricity). This point is illustrated through the update of the IRP published in 2013. The update document clearly indicates how various critical parameters have changed in the preceding three

years and how these changes impact on the strategic choices we face. Remember, when one is making decisions that will impact us all for the next 40+ years, then 3 years is a relatively short period of time. If you are not fully appreciative of this complexity think about it this way: *you have just completed a 3-year degree at university and must now choose your career and job, but with the added constraint that once chosen you cannot change for the next 40 years*! Easy decision? No definitely not. I expect that another update of the IRP will be published within the next 12 to 18 months and that this trend of significant changes impacting on the strategic choices will be further emphasised.

But let us return to my previous example of government's proposed nuclear build. What does the IRP say about nuclear electricity? In the original (2010) plan, various scenarios under which existing coal-fired power stations will progressively be replaced with nuclear power stations were identified. It is through these scenarios that the original estimates were made of the nuclear capacity to be built over the next 20 years (in itself the topic of highly emotional public debate). The 2013 update highlights how rapidly things have changed during the preceding 3 years. With the economic downturn for example the demand for electricity in this country has reduced substantially. Is this reduction in demand of a short-term nature or is it longer term? One of the consequences of this reduced demand is that the need for new generating capacity has been scaled-down commensurately. Another reason for scale down of new generating capacity is that a new, preferred scenario was introduced to illustrate the impact of investing capital to extend the life of the existing (coal-fired) generation capacity (Eskom announced on the 25th April that it is launching a pre-feasibility study of this *Renewal Strategy*). Given these changes the 2013 IRP indicates significant reduction in the immediate need for any nuclear build. But, the IRP also highlights that two key unknowns impact the feasibility of this new, preferred scenario: (i) the cost of nuclear build under South African (contracting) conditions and (ii) our long-term carbon emission commitments. Of these two parameters I believe the nuclear-cost-factor is by far the most important and critical.

To come to the correct decision as to the best strategic option for our future electricity supply the uncertainty around the nuclear-cost-factor must be reduced substantially or even eliminated. How can this be done? One can do as many cost comparisons of various international installations or one can get as many (indicative) quotes as you want but this unknown parameter can only be properly quantified and determined for our local conditions through an appropriate, competitive, procurement process. Once such a procurement process is in place government will be able to ~

1. Update the IRP with the relevant cost information to crystallise the appropriate strategic choice(s); and
2. If (and only if) the new IRP highlights the need for any nuclear build, proceed to negotiate with one (or more) preferred bidders identified through this process.

The nuclear procurement process is thus a critical step to help us finalise the strategy and then to proceed implementing the final strategy. I firmly believe that government would not proceed with step 2 above until it has published an updated IRP that clearly reflects the need for a nuclear build given the new data. I also believe there will be ample time for us to study the new IRP and to identify any fatal flaws prior to step 2 above being initiated or finalised.

To me it is thus clear that the nuclear procurement process that government is embarking on is a crucial and critical step to update the IRP – it would be senseless to publish an updated IRP in the next 12 or 18 months if it is not based on information gathered through such a procurement process. Against this background I do not understand the furore that we see in the popular press on a weekly basis around this procurement process. I believe this is simply part of an emotional debate, which is not worth pursuing. If you want to participate in the debate then do your homework and let's focus on the strategic issues.

One final thought. Does this article mean I am happy with all the strategic issues as outlined in the IRP? Definitely not! In the next few weeks I will outline some of my concerns. I will try to stick to strategic issues.