The Eskom nuclear debate is irrelevant

South African consumers have over the past few years learnt just how dependent we are on energy, and more specifically electricity, to maintain our quality of life and life styles. The impact of regular load shedding is firmly imprinted in our collective minds. At the same time, we have experienced rapidly rising electricity cost – again threatening our quality of life and life style, as this cost seems to be spiralling upwards out of control. So, as ordinary citizens and consumers we are facing quite a dilemma. On the one hand, we fully support the notion that Eskom must expand and renew its generating capacity – failure to do so may quickly lead to renewed supply disruptions. On the other hand, there are obvious concerns around the cost of this expansion and renewal programme. This is especially true of the proposed Eskom nuclear build. We read on a daily basis the forecasts of commentators and experts of the dire effect that this proposed programme will have on the consumer (due to the high cost of electricity) and the country (due to the debt incurred). Just read the article by Max du Preez, published on News24 this morning for an update in this regard. It seems that we as the ordinary citizens and consumers are the innocent bystanders and the proverbial "lambs to the slaughter" in this process. But, what would you say if I tell you that there is some good news around all of this? And that we, as ordinary citizens, can insulate ourselves against stupid decisions made by Eskom and our government? In fact, what would you say if I tell you that this whole debate around nuclear energy has become irrelevant?

My statement that this debate around the nuclear build has become irrelevant is based on an international process that has started a few years ago and that is rapidly unfolding across the world. Its impact will be so dramatic that it will change the world as we know it and as it operates today. This process is the development of (photovoltaic based) solar electricity systems. I have previously labelled this process: the Cheap Electricity Revolution. Allow me to outline this process so that everyone can follow my train of thinking.

During the past decade, the price of solar panels have declined dramatically. The result of this is that solar electricity now costs a fraction of what we can buy electricity for (from Eskom or any municipality) in this country. The majority of ordinary consumers cannot yet take full advantage of this fact, as there is a slight problem with photovoltaic electricity: it is only available when the sun shines. To really be of use to us ordinary consumers, a solar electricity system needs batteries to store sufficient electricity for those periods when the sun is not shining. The only

problem with this solution, is that batteries are exceedingly expensive which renders the solution unaffordable to most of us. Until recently that is….

About three years ago, Elon Musk, the CEO of Tesla Motors announced the construction of a giant battery factory in Nevada, USA. The explicit aim of this giant factory (quickly dubbed the Giga factory by the market) was to disrupt the current market for batteries and to drive prices down. Few market commentators, outside of the battery industry, took any notice. The conventional wisdom was that batteries from this Giga factory will be dedicated to the electrical vehicles produced by Tesla Motors. Then in April 2015, Elon Musk, shocked the world by announcing the launch of the Tesla Power Wall. Contrary to expectations, the Tesla Power Wall would be manufactured in the Giga factory, but was aimed directly at the home electricity storage market. Most importantly, the Tesla Power Wall would bring battery storage, using Lithium Ion technology (the same battery technology used in cell phones and tablets) to the homeowner at about half the price of competitive products using the same technology. Although some commentators doubted the ability of Elon Musk to deliver, this time round the market started to take notice.

Just over 18 months later, it is clear that Elon Musk has delivered and has indeed disrupted the market. During this period, competitors were forced to react: announcing their own plans to significantly upscale production and reducing prices. But just last week, Elon Musk has hit the market with a new bombshell: the announcement of the Power Wall 2 that will go on sale in early 2017. Power Wall 2 will double the storage available from its predecessor. It also comes with the inverter (the device that converts battery power to 230 V AC which is used in our homes) built into the battery. This makes the assembly of a system much simpler and reduces losses. But most important is the price: Power Wall 2 effectively halves the cost of battery storage. This means that within 3 years, Elon Musk has driven the cost of battery storage down to 25% of where it was. And still that is not all! He has also announced plans to construct a second Giga factory in Europe. By now everyone should be able to see where this is going.

In a series of articles during May and June of 2015, I dubbed this process the Cheap Electricity Revolution in anticipation of how solar electricity will rapidly change our world if projections of how the cost of electricity storage will decline proved true. Last week, it was with interest that I read an article penned in Australia and which heralded the launch of Power Wall2 as: Electricity Independence Day. The gist of this article was that consumers in Australia are now able to produce and store their own electricity at a fraction of the cost of utility power – thus the consumer has been

liberated from years of poor service and spiralling costs! Sounds familiar doesn't it? The same sentiment has been expressed in numerous articles across the USA. The striking thing about all of this is that even proponents of solar electricity (like myself) have been caught out by the pace at which storage costs are declining. But from now on you ignore this process at your own peril. Within 12 to 18 months from now we will probably have the launch of Power Wall 3 – halving costs again and expanding capacity. The pressure on other manufacturers to keep pace with Tesla Motors will be relentless. Commentators that are still talking about solar electricity dominating supply from 2030 onwards are simply out of touch with reality. Anyone that is still strategising around national grid supply systems will be left in the wake of a rapidly changing electricity (and energy) industry.

All of this serves as background information to explain my thinking that the Eskom nuclear build debate has become irrelevant. But this is just one of the outcomes of the Cheap Electricity Revolution that is so rapidly gaining momentum. I will briefly discuss a few of them.

For a South African household that consumes around 40 kilowatt-hour per day, the current estimated cost of a solar electricity system that will supply between 60% and 80% of the electricity needs is around R300 000 (this price estimate pre-dates Power Wall). The unit cost of electricity from such a system is estimated around R1.85 per kilowatt-hour compared to municipal rates that are already close to R2.00 per kilowatt-hour. When Power Wall 2 hits our shores sometime towards 2018 this should decline below R200 000, but the unit cost will decline even more due to enhanced battery life etc. Taking inflation into account the unit cost from such a system should be around R1.30 per kilowatt-hour. By the time Power Wall 3 reaches us (2019 to 2020?) the price will drop below R150 000 and the unit cost (adjusted for inflation) to around R1.05 per kilowatt-hour. By this time, Eskom/Municipal power will cost around R2.80 per kilowatt-hourr. Again, the trend is crystal clear: while the cost of Eskom/Municipal power will continue to rise rapidly, the cost for any household to generate its own electricity will rapidly decline (both in terms of capital cost and unit cost). This gap will continue to widen over the next decade and the benefits of own generation will simply become irresistible. So, Electricity Independence Day is not only for the Americans and Australians to celebrate, it is for us as well.

The Cheap Electricity Revolution will not only benefit affluent households that can afford to fork out more than R100 000 for their electricity system. Poorer households that consume substantially less than 40 kilowatt-hour per day, will also benefit.

Within 5 years, I envisage that government, corporates, donor organisations and various NGO's will dish out for free, systems that can supply a few kilowatt-hour per day – enough to provide adequate lighting, power a tv and various domestic appliances and charge cell phones, tablets etc. This will start to transform our society towards alleviating poverty.

Where will this leave Eskom? Current consumption trends reflect a steady decline in demand for electricity as the price continues to rise. This is in line with economic theory and this trend will continue. Already, this trend is placing a question mark over just how much electricity supply we would need in future. If we impose on top of this trend, the added effect of households and businesses reverting to own generation because of the price gap illustrated above, the drop in demand for Eskom/Municipal supply will be even more pronounced. Municipalities are already experiencing cash flow shortages due to the drop in demand and the resultant decrease in their margin earned. Within 5 years, this market of theirs will virtually dry up. If Eskom commits to a massive nuclear build programme on its own balance sheet, my view is that it will head for bankruptcy before the first nuclear power is generated from this programme. The resultant restructuring will see the foreign supplier (Russian or whatever?) take a massive financial knock and probably face bankruptcy itself. Out of the ashes of Eskom there will arise a few power stations operated by privately owned utilities as well as a single transmission system operator. This is something economists have long been pleading for.

This brief scenario of Eskom's future that I sketched above, is in my opinion very realistic. We, as ordinary citizens and consumers, can take reassurance from the fact that we will be able to insulate ourselves against the fall-out from this scenario and will in all likelihood have done so by the time it occurs. The dilemma that we face as stated in the introduction has been broken. To that extent, my statement that the Eskom nuclear debate has become irrelevant is true. But, I agree with Max du Preez that we do have a fight on our hands. It is just that the fight will be fought over other issues.

What are these issues? As has happened in the USA and elsewhere, utility companies are attacking the solar power industry in an attempt to delay their own demise. Thus we have seen in a number of states in America that tax benefits for private solar installations have been discontinued, pricing structures have been changed to render solar electricity less appealing and even new taxes on solar installations have been mooted. Expect to see the same lobbying and arguments from Eskom in the immediate future. I would not be surprised if certain classes of batteries and

electricity storage systems start attracting massive import duties. But the real poison pill that lies waiting for us, is that Eskom and their foreign nuclear supplier will recognise the risk of the scenario that I've sketched above. They will try to mitigate this risk by getting government to either: (i) guarantee the Eskom debt taken on for the nuclear build programme, or (ii) guarantee the purchase of a minimum annual quantum of electricity from the nuclear programme. This minimum annual quantum of electricity will far outstrip the real needs of the country at any future date. Through either of these mechanisms, they will transfer the cost of their folly back onto us, the ordinary citizens. These are the issues that we need to fight tooth and nail. The message to Eskom should be clear: ignore the Cheap Electricity Revolution at your own peril! But we also need to send a clear message to government: don't you even think about tampering with our Electricity Independence!