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Transitioning the Grid

A Quick Read

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Transitioning the Grid

One of the objections raised by Eskom to the signing up of additional renewable energy Independent Power Producers (IPPs) is the alleged expense involved in strengthening the grid in those areas where many renewable IPP projects are situated. This objection raises deeper issues around the grid, how it is managed and developed, and what this means for the future development of renewable energy in South Africa. Essentially, transitioning the grid is key to transitioning to an efficient, affordable and healthy electricity system, which benefits all. Delaying this move to advance further coal and nuclear power, would be to the severe detriment of the public.

The current design and layout of the transmission grid is an outcome of Eskom's mostly coal-fired generators. The transmission grid is designed to take power from these generators - situated primarily in Mpumalanga and the Waterberg in Limpopo, where the coal is located - and to transport this power to the main load centres of the country.

For the present, most renewable energy development in South Africa has taken place in designated zones known as Renewable Energy Development Zones (REDZ). These are areas in the country where renewables projects have the best sun and wind resources and will be able to connect to the grid. In a context where no renewable energy before those developed under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has existed, the REDZ provide a sound starting-off point for a renewables programme to get off the ground and to connect to a grid. However, there are limitations to this approach. Essentially, it relegates renewable energy to the margins, confining its future growth to trivial contributions when in fact a recent study[1] shows just how widely distributed South Africa's renewable energy resources are. Still, it is significant that Eskom has been offered ear-marked financing to strengthen its grid to connect existing and future projects within the REDZ on very favourable terms.

The fact of the matter is that if we want to transition to a cleaner, more efficient and sustainable energy system (which we will *have* to do, sooner or later), we will need to build a different type of grid – one that can accommodate a far greater share of renewables. Work on doing just this is well advanced in countries such as Germany. Despite concerns about instability and having to actively manage the dispatch of standby generators, the German grid has proven to be extremely reliable, as processes of dispatch are largely automated and it does not require much active intervention. Model simulations show that a renewables-friendly ("smart") grid, designed to accommodate a large number of decentralised renewable generators, is more reliable than a centralised baseload-orientated one.

A smart grid would include more direct current (DC) high voltage transmission lines to efficiently transmit from places where surplus electricity is generated to those with a deficit. The opportunity to push for a smart grid is now, as our current grid is in need of significant upgrading. Perpetual delays in upgrading the

[1] http://www.wasaproject.info/docs/PVWindAggregationstudy.pdf at pages 30 - 34.

transmission grid are a direct consequence of Eskom's massive cost overruns on the Medupi and Kusile coal plants, which are squeezing out the available capital for upgrading the grid.

The point is that our existing grid requires massive investment anyway. Building a smart transmission grid will require no more capital and probably less than the necessary investment ear-marked for the grid already. The current grid infrastructure is costing South Africa money, and the poor state of many distribution grids is the main cause of outages experienced by South Africans.

Smart grids do more than simply transmit electricity. They allow for better management of supply and demand and also serve as a better investment, as they hold their value and allow increased returns to utilities. The performance of listed utilities that have invested in smart grids has seen significant improvements over those that have not.[2]

There is a pressing need to address the threats posed by electricity users defecting from the grid and turning to renewable energy sources such as embedded generation. This is mainly as a result of escalating electricity costs from large centralised coal and nuclear plants, as well as present limitations on the grid. Importantly, electricity sales to high-consumption users cross-subsidise poorer households and have generated and continue to make significant contributions to the budget of local governments, but defection from the grid by high-income users makes this model unsustainable. More renewable energy must not negatively impact the poor.

The push to a smart grid at transmission and distribution level requires new thinking, particularly in regulating electricity utilities and the incentives that are in place. It is clear that our current electricity system needs reworking if South Africa intends to serve the best interests of its people and to ensure that its climate change commitments are met. Renewables will be better enabled to flourish and serve the constitutional objectives of social and environmental justice (as well as climate change mitigation), if the grid is configured to do just that.

[2] http://www.bloomberg.com/news/articles/2016-10-03/lifeline-worth-billions-being-thrown-to-utilities-after-slump.