

Setting the record straight: the cost of renewable versus coal-fired energy

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The long awaited Integrated Resource Plan published in October 2019, affirms the increasingly important contribution of renewables to South Africa's energy mix. By 2030, the government intends to procure almost 25% of the country's electricity from power plants driven by our abundant sun and wind resources.

However, questions regularly asked are:

- How much do renewables cost relative to coal-fired power?
- And what has the impact of renewables been on Eskom's deepening financial crisis?

A misleading narrative peddled by uninformed commentators is that the costs relating to Eskom's current fleet of coal-fired plants built in the 1960s and 70s (which are fast approaching the end of their intended operational life spans) should determine the cost benchmark for renewables. This is like comparing apples with pears, and the correct answer requires a far wider perspective on the matter.

How can we compare apples with apples?

It is more appropriate to compare the costs of constructing new power plants for each technology, in today's monetary terms. The following aspects need to be considered, when comparing the all-in cost of producing a unit of electricity from a renewable source to that from coal:

- a. the fuel supply,
- b. the ongoing repairs and maintenance,
- c. the impact on the environment, and
- d. lastly, and most critically, the party who will bear the above costs.

Stark contrast

It is instructive that, over the past 10 years, both forms of energy have been developed in South Africa. Medupi and Kusile are Eskom's two new flagship coal-fired plants, whilst some 92 Independent Power Producers (IPPs) have signed contractual agreements to build renewable energy projects and supply electricity to Eskom under the Renewable Energy Independent Power Producer Programme (REIPPP).

Eskom's centrally planned and massively concentrated investment in two mega-scaled energy generators is in stark contrast to the successful completion of many individual power projects that use a diversified mix of renewable energy technologies, and are geographically spread across the country. And so, the shortcomings of the historical state-owned utility structure, which has dominated the entire electricity value chain, have been shown up by a distributed and outsourced energy-supply model introduced by REIPPP, that is significantly more efficient.

The following key differences between the coal and renewable developments are clear:

1. Construction cost versus budget

Medupi and Kusile are still in construction, and although some units are supplying power to the grid, full commercial operation is at least four years overdue. Consequently, their cost to date of just over R400 billion, excluding the interest incurred on the debt used to build the plants, has ballooned to more than double the original estimates.

In contrast, most renewable energy projects have been built on time, and within budget, and – critically - the delivery risk has been carried entirely by the IPPs, **not** by Eskom. Moreover, the IPPs in operation are generating more energy than Medupi and Kusile combined, due to the latter's frequent operational break-downs. This, despite the IPP's construction cost being less than 50% of the new coal-fired plants - and with no hint of corruption, theft or malfeasance to boot.

2. Responsibility for maintenance and repairs

Most of the risk of design and construction of Medupi and Kusile has been assumed by Eskom. There have already been equipment breakdowns and full commissioning of the plants is still years away. This has resulted in added strain to the country's energy reserves, and Eskom's finances, and has suppressed the growth of our economy.

In the case of renewables, the IPPs are responsible for the maintenance and repairs of the projects over their contracted 20-year operational life span. The financial risk to Eskom of covering these costs, plus increases in other overhead expenses, is completely outsourced to the IPPs.

3. Cost of energy produced

As Medupi and Kusile are owned by Eskom, the actual cost of each unit of electricity produced should include the fuel required to operate these plants. Together with the construction cost over-runs, massive increases in the price of coal supply contracts have made Medupi and Kusile the most expensive coal-fired plants in the world. This is before the cost of their harmful carbon emissions is taken into account.

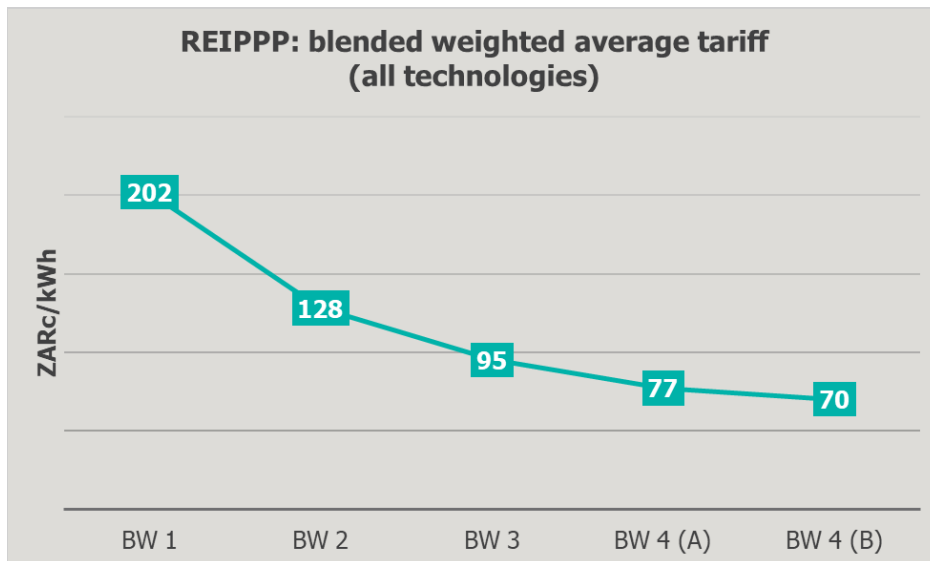
Conversely, the IPPs are paid only for the environmentally clean electricity they produce, at an inflationary linked tariff that was set at the inception of their contracts.

Significant decline in tariffs in each successive REIPPPP round

Many people forget that almost 10 years ago, renewable energy technology was not well known in South Africa. The costs of the technology (i.e. the solar PV panels and the wind turbines) were much higher than current levels, and the investment case for introducing billions of Rands into new projects was unproven. The tariffs bid by early investors reflected this elevated risk, and the commensurate rates of return were obtained in an open market that was transparently and competitively run by the government's IPP office. This paved the way for future projects to be bid, and the establishment of one of the most successful renewable investment programmes in the world.

The widely acclaimed success and growth of investor confidence in the REIPPP, together with the downward trend of international prices for renewable technology, has resulted in a competitor driven decline in the tariffs bid in each consecutive bid window. The weighted average tariff across all technologies awarded in the latest bid window of the REIPPP was R0.70 per kWh, a reduction of almost 66% on the weighted average tariff of R2.02 per kWh that was awarded in the first bid window in 2012.

Compared to the most competitively priced new coal plant construction today, a renewable energy plant is at least 30% cheaper to build, when translated to a cost per unit of electricity produced by each technology.



Source: Antone Eberhard and Rain Naude

The customer bears the brunt

Despite the higher weighted average unit cost of electricity paid by Eskom to the initial IPPs, it is still cheaper than the electricity produced by Medupi and Kusile, in view of the massive increase in the construction costs, the delays in completing the plants, the environmental cost and the costs of the massive debt incurred by Eskom in implementing these two projects.

A fact often overlooked is the full pass-through to Eskom's customers of the cost of electricity supplied by the IPPs. The National Energy Regulator of South Africa has approved annual electricity price increases so that Eskom achieves full recovery of tariffs paid to the IPPs, as well as the costs of Eskom's own generated electricity. In the context of IPPs, Eskom plays the role of a cash collector, thus ensuring the cost neutrality of its operations.

Impact on investor confidence

Perhaps the biggest difference between renewables and coal-fired energy is the positive impact the former has had on investor confidence in South Africa since 2012. More than R200 billion of fixed investment under the REIPPP has been made by the public and private sector, which has in turn contributed directly to GDP growth. It is revealing that the slump in GDP since 2016 has coincided with government's stalling of the REIPPP and has undermined future investments in the country's renewable energy sector.

Renewables are the cheapest form of new energy generation available today. They are also quicker to construct and, given the shortage of electricity experienced recently, are an obvious answer to ensure new generation capacity is brought on line in the shortest possible time frame. Relative to the direct costs incurred by Eskom for Medupi and Kusile, the environmental costs of this “dirty” technology, and the indirect cost to the economy from load-shedding as a result of the dire state of Eskom’s coal fleet, renewable energy has to be the pre-eminent solution to South Africa’s new energy requirements in future.

No brainer

South Africa has the opportunity to lead the global pursuit of decarbonisation by virtue of our country’s unrivalled solar, wind and land resources. We have the competitive advantage of being able to produce naturally clean, cheap electricity from sources that are inexhaustible. Why would we not do this?

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