

Reducing costs for wind farms

Global trends for cleaner, more sustainable energy sources are demanding a more substantive move towards renewables. In fact, the country's 20-year Integrated Resource Plan (IRP2010) states that about 42% of electricity generated in South Africa should be supplied from renewable resources.



When it comes to wind power, there are already a substantial number of wind farms in the Northern, Eastern and Western Cape, once the delayed power purchase agreements are signed between Eskom and the independent power producers, this sector should be back on track.



Is there something more sinister behind the latest PPA delay?

Nicci Botha 14 Mar 2018



Lowering the costs

When developing a wind farm, it is critical to optimise its layout for maximum efficiency. This process is also called wind farm micro-siting. The aim of such a process would be to maximise the energy production of the wind farm while minimising infrastructural and operating costs. For most projects, the economics are substantially more sensitive to changes in energy production than infrastructure costs. It is therefore appropriate to use energy production as the dominant layout design parameter.

Factors to be considered when micro-siting can include:

- Maximum installed capacity (due to grid connection or power purchase agreement terms)
- Site boundary
- Set back - distances from roads, dwellings, overhead lines, ownership boundaries and so on
- Environmental constraints
- Location of noise-sensitive dwellings, if any, and assessment criteria
- Location of visually-sensitive viewpoints, if any, and assessment criteria
- Location of dwellings that may be affected by 'shadow flicker' (flickering shadows cast by rotating blades) when the

sun is in particular directions, and assessment criteria

- Turbine minimum spacings, as defined by the turbine supplier (these are affected by turbulence, in particular)
- Constraints associated with communications signals, for example, microwave link corridors or radar

These constraints may change as discussions and negotiations with various parties progress, so this is inevitably, an iterative process. The number of variables make micro-siting a challenging process, and one that is an ideal candidate for advanced analytics that can crunch vast amounts of data to arrive at a scientifically optimal solution.

Indeed, some wind energy firms are already using these prescriptive analytics to solve energy production problems that were once thought unsolvable.

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