

## Dissertation link: #29

### The potential of renewable energy for rural groundwater supply in the Elundini Municipality

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#### **Abstract:**

The Elundini municipality, situated in the interior Eastern Cape of South Africa, as with many other municipalities with a large portion of rural inhabitants, is beset with the challenge of needing to provide clean drinking water to these far lying people in an efficient and cost effective manner. Due to the large distances between villages as well as from any town or major infrastructure, supplying water via traditional pipe networks is not feasible. Historically, groundwater has been the water source of choice and abstracted via the use of diesel powered borehole pumps. These pumps are however noisy, require constant maintenance and are associated with high running costs associated with the ever increasing price of fuel. Not only is the fuel expensive in itself, but it is also required to be transported long distance to the boreholes on a regular basis. This study then investigated how solar and wind powered borehole pumps compared with diesel powered options. This was done by assessing the natural resource potential of the region (wind and solar power) as well as the groundwater abstraction potential of a sample of villages. Notional solar, wind and diesel powered systems were then designed for each of the villages with each of their unique water supply requirements and then compared against one another with a life cycle cost analysis for each system being performed. The study found that, not unlike other similar studies in other regions of the world, that over their lifetime, wind and solar powered borehole pumps were cheaper than their diesel counterparts. This was especially true for solar powered options as the solar resource for the region is superior to that of wind. Although traditionally shunned due to high capital costs, solar powered pumps have been commercialized in recent years and are now only marginally more expensive than diesel options. Wind pump capital costs are still prohibitively high, although running and maintenance costs are low. For the Elundini municipality however, and its relatively poor wind resources, this would not be a recommended technology. Includes bibliographical references.

**Reference:** Kernick, G. 2014. The potential of renewable energy for rural groundwater supply in the Elundini Municipality. University of Cape Town.

**Full text link:** [thesis\\_ebe\\_2014\\_kernick\\_g.pdf](#)



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