

Executive Summary

Supplementary to the full Case Study

Energy efficiency and energy management

April 2023

Prepared by the Vuthela iLembe LED Support Programme which aims to improve the economic future of iLembe district residents through sustainable economic growth of the local economy and the creation of higher, better and more inclusive employment and income-generating opportunities.

The Sundumbili WTW is located on the northern bank of the lower uThukela River within the Mandeni Local Municipality. The WTW is owned and operated by the iLembe District Municipality. The WTW abstracts water from the river, treats the water and pumps it to remote bulk storage reservoirs.

The Vuthela Programme conducted an energy efficiency assessment and a feasibility study to explore the use of renewable energy at the WTW.

The feasibility study investigated the various options available for the WTW to utilise renewable energy, reduce carbon dioxide emissions associated with the plant and reduce the plant's overall energy costs. The study concluded that the plant can improve its energy management and efficiency by pursuing several opportunities.

This case study is based on a project commissioned by the Vuthela Programme which investigated:

1. Energy efficiencies and energy management at the Sundumbili Water Treatment Works (WTW); *and*
2. A feasibility study and concept design for renewable energy at the Sundumbili WTW.

The Vuthela Programme conducted an energy efficiency assessment and a feasibility study to explore the use of renewable energy at the WTW.

On energy efficiency and energy management, it was found that steps to reduce the WTW's operational costs and ensure optimal operation in the long-term include refurbishing old electric motors and control equipment, installing digital meters to monitor the WTW's power consumption accurately and request for a change in billing tariff type from Eskom.

Four solar power options with various configurations of rooftop and ground-mounted panels with various battery energy storage systems were analysed for

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their Solar Photo Voltaic (PV) output, capital costs, operating costs, the number of years of payback and the reduction in the emission of carbon dioxide.

The selected scenario results in the highest cost savings compared to investment requirements and consists of Eskom grid energy supplemented by a ground-mounted tracking PV system with bifacial modules and a roof-mounted PV system.


Should iLembe District Municipality agree to the implementation of the solar power system option and the required funding is sourced, the steps would be to conduct a structural assessment to confirm the suitability of the WTW's roof for the installation of the solar system.

The institutional modality involving ownership, operation and maintenance also still needs to be determined. This is an important step that will indicate implementation appetite and feasibility.

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A detailed investigation and design of the solar facilities will need to be conducted before the necessary equipment is procured based on the sizing and quantities of the detailed design.

The installation of a solar power system at the Sundumbili WTW will be a great opportunity for the iLembe District Municipality and its family of local municipalities to become familiar with solar systems.

It will also create opportunities to train people from local communities to install, operate and maintain solar systems. 

Energy saving measures include reducing nominated maximum demand by about 12%, saving R37 000 a year, installing new electricity meters to improve energy management, and changing to a less costly Eskom tariff structure.

The proposed solar power facility would supplement approximately 8-9% of the WTW's electricity requirements at a cost estimate of R6 million, with a payback period of between 9-10 years. Cumulative savings over the first 25 years were estimated at R12.6 million.