

TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT

KEY STRATEGIC AREA	Water Use, Wastewater Resources and Sanitation Futures
THRUST	1. Water sensitive and resilient settlements
PROGRAMME	Programme 1: Smart water supply management
TITLE	Scoping study to explore hydro potential in the in the nearby vicinity of Baakens river and the lake.

Objectives

The objective is to evaluate the hydro potential (mega, micro and pico) in the **vicinity of Baakens river and the lake of the jurisdiction of Nelson Mandela Bay Municipality** area to assist in harnessing all available energy resources in complimenting energy requirements to improve long term energy sustainability.

General

Energy is the lifeblood of worldwide economic and social development. When considering the current status of global energy shortages, the emphasis to reduce CO₂ emissions, development of alternative energy generation methods and growing energy consumption, it is clear that there is a need to change the way energy is created and used. The demand for energy increases continuously and those demands need to be met in order to stimulate worldwide development. Fossil fuels contribute a large majority of global energy, but due to the dangers of global environmental impacts, the expansion of fossil fuel as an energy source is in some cases resisted. This forces our current generation of engineers, scientists, and developers to focus on the development of renewable energy sources.

This project need emanated from the identified need to focus on renewable energies opportunities. Hydropower contributes only 3% of global energy consumption which is only a fraction of its potential. Africa is the most underdeveloped continent with regard to hydropower generation with only 6% of the estimated potential exploited. This should not be seen as a burden, but rather as an opportunity.

South Africa is facing an energy crisis which places additional importance on harvesting all available feasible renewable energies. Rolling power cuts that hit the entire country at the start

of 2008 made all citizens aware of the fact that demand for electricity is grossly outstripping supply. Energy experts say South Africa has moderate hydroelectric potential, and that the establishment of small hydroelectric projects around the country could help provide a sustainable future energy supply.

Unconventional hydropower development can take place in both rural and urban areas of South Africa, such as tapping hydropower from irrigation canals, water supply pipelines, deep mining undertakings, etc. It is believed that there are many untapped opportunities to generate electricity using hydropower technologies. Technologies have also improved over the last couple of decades which now allows the development of previously unfeasible sites.

The WRC has been in the forefront of the subject matter and have lead some of the developments in this field. This pioneering work was driven by the need to utilise water infrastructure in a more sustainable way. WRC studies have shown the huge opportunities for energy generation through the supply and management of water and wastewater which has not been exploited by Municipalities. Scoping study offers the platform to demonstrate potential at a local level and help design roll out programmes.

Specific

to identify the hydropower opportunities that could be implemented in the water infrastructure of the **vicinity of Baakens river and the lake.**

The specific objectives are:

- Identifying potential sites for hydropower development eg. reservoirs, PRVs, pipelines, outfalls, stormwater, lake etc.
- Conducting technical and feasibility studies of energy potential of the potential sites.
- Identifying technology types and products for installations .
- Identifying an O&M model and the capacity needs for this technology.

Expected outcomes and impacts

- Research report with a GIS map of all sites identified, with detail on energy potential, technology selection and first order design.
- Evaluation template
- Position paper

Lighthouse

- Water-Energy-Food Nexus
- Climate Change

Impact Areas: Water and the Economy; Water and the Environment; Water and Society
Knowledge Tree: Sustainable Development Solutions
Time Frame: 1 years
Total Funds Available: R350 000.00 inclusive of VAT.