Fact Sheet 5: Desalination Plant in the South

Proposed 150 Ml per day desalination plant at Illovu River Estuary on the South Coast

The severe drought conditions in eThekwini have had a significant impact on the available water resources on the South Coast. Figure 1 provides an illustration of the water balance for the South Coast.

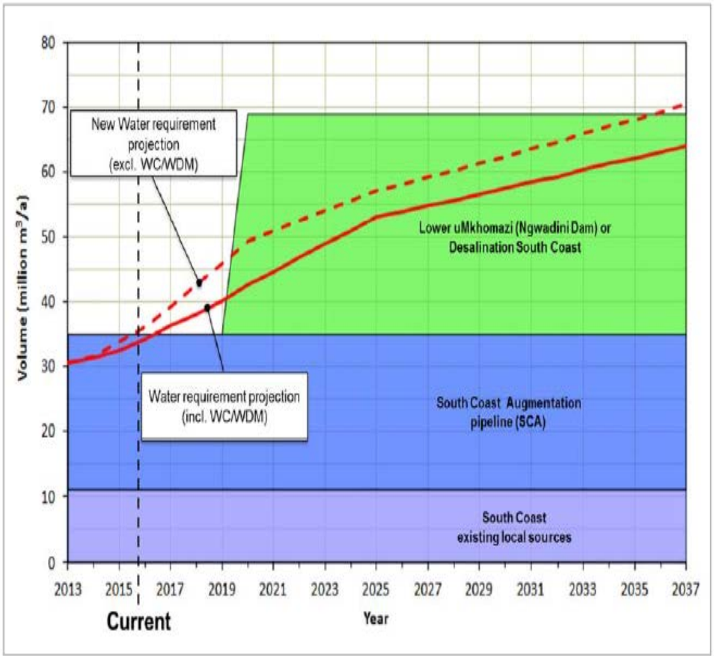

FIG 1: South Coast Water Balance with Support from Mgeni WSS (https://www.dwa.gov.za/Projects/KZN%20Recon/sapp.aspx)

The existing water availability is represented by both the local resources (in light blue) and the support from the Mgeni Water Supply System (in dark blue). The graph also clearly displays the gap between the projected water demand (shown as red lines) and the current supply. In order to decrease the shortfall, the implementation of either the proposed lower uMkhomazi Bulk Water Supply Scheme (Ngwadini Dam) or the proposed desalination plant is necessary.

An investigation by Umgeni Water was initiated by undertaking a desalination pre-feasibility study to determine the viability of constructing a large scale desalination plant. The volumetric flow rate of 150 Ml/d was based on the capacity of existing and proposed bulk water supply infrastructure which would be used to convey the final potable water from the desalination plant to the various distribution plants.

The technology required in desalination are typically energy intensive as it does not only facilitate the removal of salts but also a number of other pollutants in the form of metals, nutrients and organics. In South Africa, the majority of electrical power is generated by coal fired power stations. Unless the availability of sufficient waste heat or low cost fuels is guaranteed, reverse osmosis (RO) will always be the preferred process as opposed to thermal distillation systems in the South African context. As the process of RO removes dissolved salts from saline water by a process similar to filtration, the membranes are susceptible to fouling by colloids, organics, iron and manganese. Accordingly extensive pre-treatment is required in order to reduce membrane fouling and maximise membrane life.

In order to gauge the environmental impact of the desalination treatment process, the use of an environmental management tool is required. Conducting a Life Cycle Assessment (LCA) of the entire process would provide a comprehensive evaluation of the environmental impact for each stage of the product's life cycle.

A LCA is an analytical tool that is used to determine the potential environmental impact of a product or process by characterising and quantifying the inputs and outputs of a specific system. In particular, the procedure provides an evaluation of the product's life cycle from '*cradle to grave*' i.e. from raw material acquisition through production, use, end-of-life treatment, recycling and concluding with final disposal. Thus, an LCA can be utilised to quantify the amount of energy used, the consumption of raw materials, emissions to the atmosphere as well as the amount of waste generated during a product's life cycle. As stated in the ISO 14000 series of documentation, the LCA process is a systematic approach, which consists of four major components namely goal definition and scoping, inventory analysis, impact assessment and interpretation.