



ENVIRONMENTAL LIFE CYCLE ASSESSMENT OF WATER AND SANITATION SYSTEMS IN eTHEKWINI



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This study (funded by the Water Research Commission) aimed to assess the environmental burdens due to abstracting, treating, distributing, collecting and disposing (including recycling) water in an urban context. The environmental burdens were calculated from the abstraction of water from rivers through to the return of the same water (after it was used) to the sea.

The LCA scores calculated for the treatment of raw water, the distribution of potable water and the collection of and treatment of wastewater are dominated by the electricity requirements due to pumping in the operation stage. Chemicals and infrastructure have a relatively low environmental burden. This is in line with many other LCA studies on water treatment, where the use stage tends to be the most influential due to the continuous use of energy and materials. Electricity was shown to be the input leading to the largest impacts. This directed the investigation into the processes which had the highest electrical demand.

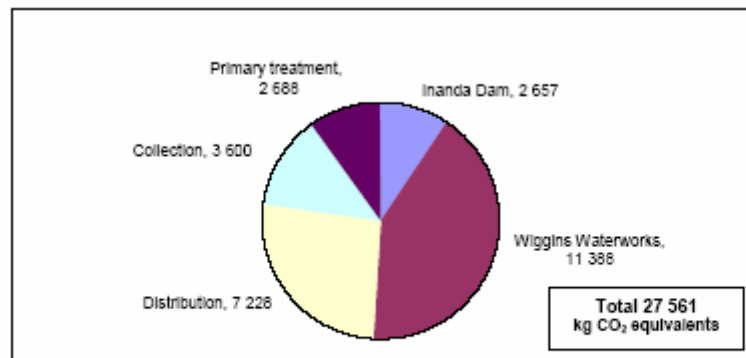


Figure 7.8: Global warming impact (kg CO₂ equivalents) for the base case for the supply of water and sanitation services to an additional 200 000 households per day.

For the provision of potable water to new customers which have not been previously served, two scenarios (200 000 new customers in an urban environment with waterborne sewage and in a peri-urban environment with on-site sanitation) were considered. The benefits of on-site sanitation and the avoidance of the use of electricity were quantified. The recycling of water is followed by maximising the use of existing assets as the most environmentally friendly options. The construction of new infrastructure carries a higher environmental burden and the use of bottled water for drinking (an additional scenario) carries the highest environmental burden.