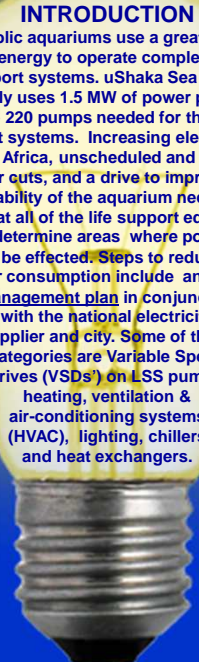


# POWER SAVING IN A PUBLIC AQUARIUM

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## INTRODUCTION

Public aquariums use a great deal of energy to operate complex life support systems. uShaka Sea World, Presently uses 1.5 MW of power per month to run the 220 pumps needed for the aquarium life support systems. Increasing electricity costs in South Africa, unscheduled and scheduled power cuts, and a drive to improve the sustainability of the aquarium necessitated a relook at all of the life support equipment in order to determine areas where power saving could be effected. Steps to reduce total power consumption include an energy management plan in conjunction with the national electricity supplier and city. Some of these categories are Variable Speed Drives (VSDs) on LSS pumps, heating, ventilation & air-conditioning systems (HVAC), lighting, chillers and heat exchangers.



## Energy Management Plan

## LIGHTING

**Planned** - An audit of aquarium exhibit lights.

**Aim** - to convert all the exhibit lighting to energy saving LED lights.

**Done** - The introduction of 20 x 90W LED night lights above uShaka Sea World's seven large exhibits will result in a saving of 6200 Watts of power per hour nightly. The present lights are 400W metal halide lights.



## WATER

**Shower Heads** - Sixty water saving shower heads were installed in staff and public showers. These shower heads result in a 70 % reduction in water usage. This saves 4.2 m3 / 24 hrs and 126 m3 per month.

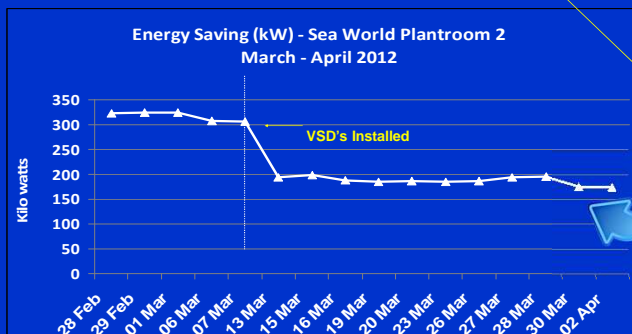
**Urinals** - The introduction of a low water usage system for all staff and toilet urinals has resulted in an approximate saving of 25 000 litres / day.



## WATER HEATING

**Geysers** - Geyser blankets have been installed on the majority of geysers.

**Heat Pumps** - Planned: Four new heat pumps are being re-gassed with environmentally friendly refrigerant gas (R417) and will be installed to replace some existing geysers - this will result in a potential saving of 70% on present electricity consumption by geysers.



## POWER

**Variable Speed Drives (VSD's)** - VSD's have been installed on 69 existing pump motors to reduce speed and power consumption to achieve correct flow rates with the delivery valves fully open. The speed of the motors are reduced to a point where the operational efficiency is not compromised (50kHz to 35kHz). The anticipated savings on the installation of these 69 drives at a reduction of 20-40% is 233kw which equates to 97 0154 kwh's per annum.



## CONCLUSION

uShaka Sea World as a marine conservation organization is committed to ensuring that energy saving initiatives are continually identified and investigated. This process is part of our environmental sustainability strategy that includes reducing our carbon foot print. As one of the leading conservation organizations in Africa, our vision is to pioneer the way forward in sustainable environmental use.

**Ozone Dosing** - Venturi vacuum pumps removed - 125 small protein skimmer pumps consuming 275kw of connected power were permanently removed resulting in a power saving of 198 000kwh per month. This relates to a saving of R85 000 per month.



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