

# CHAPTER 5: CONCLUSION AND RECOMMENDATIONS



## 5 Conclusion and recommendations

### 5.1 Closure

In this dissertation it has been elucidated that Eskom has successfully introduced the DSM initiative, which focuses on reducing the electrical energy demand during the peak periods of the day. All the organisations associated with an intervention of this nature such as the client, ESCO and M&V have been reviewed and the reader was informed of the benefits associated with a project of this nature.

There is a need for more DSM projects and the Usutu-Vaal national water pumping system located near Standerton, South Africa was presented to the reader. The Usutu-Vaal pump station consists of five pumping stations named Grootdraai, Tutuka, Grootfontein, Rietfontein and Naauwpoort. A detailed investigation was concluded on all of these pumping stations and the possibility of a DSM intervention determined. These pumping stations showed positive results except for the Naauwpoort pump station which had relatively low power consumption throughout the year. Naauwpoort pump station was therefore not included in the intervention.

For this intervention to be successfully implemented and sustained, certain infrastructure and communication systems had to be installed in the pumping stations. It was decided that the REMS-Pumping software be used to optimise and control the system. REMS uses real-time information received from the PLCs and calculates the most cost effective procedure for the system to operate.

With the REMS system successfully implemented, the project went into the evaluation phase of the intervention. During this time period the system eased the strain on the national electricity grid, by shifting a combined load of 12.6 MW for the two hours between 18H00 and 20H00, out of the weekday evening peak period, into the cheaper TOU periods of the day. This calculated to a financial saving of R562 000.00 with an expected annual saving of R4 765 000.00.

By taking into consideration that most of the pumping stations operate their pumps constantly throughout a 24hour day, a conclusion can thus be made. DSM interventions on national water pumping systems could be very beneficial, both for Eskom, as it reduces the strain on the national electricity grid, as well for the water distribution scheme which benefits financially.

## 5.2 Recommendations

National water pumping systems are found throughout the country. Some of these are the Usutu-, Scheiding-, Vaalkop-, Bloemwater- and the Nottingham pumping stations. It is advisable that a DSM intervention of this nature be rolled out to include these pumping stations.

By inspecting the system constraints of the Usutu water scheme as documented in section 4.4 of this dissertation, a DSM intervention looks probable. However, a more intense study and simulation would have to be carried out on this water scheme as a whole, before any interventions should be implemented. Each project has its own limitations which need to be determined and solved in order for a project of this nature to be successful.

In addition, it is suggested that research are carried out to establish the long term effect of DSM on dam level fluctuations during different seasons of the year. Due to the fact that water demand changes as a result of weather circumstances, it would be advisable to determine the effect of ambient temperature and high rainfall periods on water consumption.

It is also suggested that the investigation be expanded to determine the possibility of a further load shift out of the Eskom morning peak period between 07H00 and 10H00.