

DSM STRATEGY FOR NATIONAL WATER PUMPING SYSTEMS

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ABSTRACT

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The continual increase in electrical energy demand in South Africa has resulted in a precariously low reserve margin in supply from the primary utility, Eskom. This resulted in extensive load shedding throughout the country. Far-reaching measures had to be introduced in order to ensure a reliable supply of electricity.

DSM interventions were shown to be very successful short term solutions for the mining industry, reducing the strain on the national grid. This resulted in an increasing number of investigations to broaden the base of DSM projects to other industries.

One such intervention was the Usutu-Vaal water distribution scheme, situated near Standerton, South Africa. This scheme includes the Grootdraai, Tutuka, Grootfontein, Rietfontein and Naauwpoort pumping stations. With a combined installed capacity of 36.5MW and the extremely large water storage capacities, these pump stations have been identified as prime candidates for DSM interventions.

This dissertation discusses the method followed for a DSM project intervention and the results of the implementation. The national grid was relieved by an average of 12.3 MW during the Eskom weekday peak period, by shifting the pumping load into the off-peak periods. Simulations have shown that an annual financial saving of approximately R4.7million may be expected.

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ABBREVIATIONS

°C	Degrees Centigrade
DSM	Demand Side Management
DWA	Department of Water Affairs
ESCo	Energy Service Company
HMI	Human-Machine Interface
HVACI	Heating, Ventilation and Air Conditioning International
kV	Kilovolt
kVA	Kilovolt-ampere
kWh	Kilowatt-hour
M&V	Measurement and Verification
MD	Maximum Demand
ML	Mega Litre
MVA	Megavolt-ampere
MW	Megawatt
NERSA	National Energy Regulator of South Africa
NMD	Notified Maximum Demand
PLC	Programmable Logic Controller
POD	Point of Delivery
REMS	Real-time Energy Management System
RTU	Remote telemetry unit
R/c	Rand/cent
SCADA	Supervisory Control and Data Acquisition
TOU	Time of Use
UPS	Uninterrupted Power Supply

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