

# **CUSTOMER-ORIENTATED HOT WATER LOAD MANAGEMENT**

by

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Submitted in partial fulfilment of the requirements for the degree

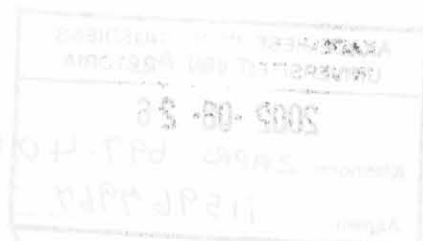
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ABSTRACT

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**“FOR THE LORD GIVES WISDOM,  
AND FROM HIS MOUTH COMES  
KNOWLEDGE AND  
UNDERSTANDING.”**

**- Proverbs 2:6 -**

Keywords: Hot water load control, load-pickup, hot water cylinder temperature, effects of human behaviour, savings distribution

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## ABSTRACT

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The reader will be introduced to the South African electrification crisis and the benchmarks set by Eskom to contain this problem. Various load management options will be discussed but the work done throughout this dissertation is to direct the attention towards the possibility of implementing a customer orientated hot water load control system. Various authors have studied ways to solve the problems found in the South African hot water load control scenario, but their “optimum” control strategy hardly included the needs of the end user.

Research areas include:

- Hot water load control seen from a national perspective,
- A customer-orientated hot water load management methodology designed to satisfy the mutual needs of the utility, municipality and residential consumer,
- Hot water load control system dynamics,
- Average cylinder temperature prediction and
- Savings calculation and distribution.

It is inevitable that some emotions would be stirred when the paradigms starts to shift towards consumer-orientated control, but something has to be done to change the current situation.

**Keywords:** Hot water load control, cold-load pickup, hot water cylinder temperature, effects of human behaviour, savings distribution.

**Streekwoorde:** Warm-water-las-beheer, warm-water-silinder-temperatuur, menslike gedrag, besparings verspreiding.

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## OPSOMMING

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Die leser sal bekend gestel word aan die Suid-Afrikaanse-elektrifiserings-krisis en die doelstellings wat deur Eskom daar gestel is om die probleem te oorbrug. Die bespreking word ingelei deur 'n verskeidenheid lasbeheer opsies te bespreek wat dan uitloop in die implimentering van 'n kliënt-gebaseerde-warm-water-lasbeheer-metodiek. Verskeie studies is oor die jare geloots om die Suid-Afrikaanse warm-water-lasbeheer situasie op te los, maar geen optimale oplossing het die behoeftes van die residensiële kliënt ook in ag geneem nie.

Navorsing sluit onder andere die volgende areas in:

- Nasionale perspektief oor warm-water-lasbeheer,
- Kliënt-gebaseerde-warm-water-lasbeheer-metodiek wat ontwerp is om die behoeftes van die elektrisiteitsvoorsiener, munisipaliteit en residensiële kliënt gemeenskaplik te bevredig,
- Dinamika agter warm-water-lasbeheer,
- Gemidelde warm-water-silinder-temperatuur en
- Die bepaling van besparings asook die verspreiding daarvan.

Die feit dat sommige partye geafronteer gaan voel as gevolg van nuwe warm-water-lasbeheer-paradigmas wat daargestel gaan word, is onontbeerbaar. Die residensiële kliënt het vir jare lank aan die korste ent getrek en dit is nou tyd dat iets aan die situasie gedoen moet word.

**Sleutelwoorde:** Warm-water-lasbeheer, warm-water-silinder-temperatuur, menslike gedrag, besparings verspreiding.

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Figure 1.1: National demand profile - Actual values of 1996 compared with estimated simulation profiles for 2015 [1].