



ELECTRICAL POWER ENGINEERING

Department of Electrical Power Engineering

Postgraduate Research Template

#	Student Name / Surname	NGONI GWATIDZO	Start Date	July 2017	Supervisor	Prof Innocent E Davidson
	Title of Project	Modelling, testing and evaluation of HVDC equipment - Converters, DC transformers and DC breakers	Completion	Nov 2019	Co-Supervisor(s)	
	Program of Study (M Eng. / D Eng.)		M Eng.			
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	<p>Synopsis of Research Project: (< 300 words)</p> <p>It is the strategic intent or objective of Eskom is to use High Voltage Direct Current Transmission (HVDC) technology extensively at some point in the future, hence HVDC research remains imperative. National and independent electrical power utilities and investors require compelling scientific information to adopt HVDC. The information and evidence of HVDC viability and sustainability plays a major role in the decision-making process for any power utility or investor. Since the first commercial HVDC scheme was built in 1954 on the Island of Gotland, Sweden (100 kV, 20 MW DC link.), HVDC technology has progressed, but experienced some challenges such as: constraints in HVDC circuit breakers, lack of HVDC models to adequately evaluate HVDC systems and components, and limited advancement in insulation materials for equipment that operate at extra high DC voltage. Using experimental tests, components and systems modelling and computer simulations, this study gives an appraisal of the HVDC systems and components with respect to their power losses and efficiency. The cost of power losses and benefits of semiconductor HVDC equipment and components are presented and discussed as well as a financial evaluation. The study focuses on the following key HVDC components: DC circuit breakers, VSC-HVDC converters and converter (DC) transformers.</p>					