2019 International Conference on the Domestic Use of Energy (DUE 2019)

Wellington, South Africa 25 – 27 March 2019



IEEE Catalog Number: CFP1950S-POD **ISBN:**

978-1-7281-0921-3

Copyright © 2019, Cape Peninsula University of Technology All Rights Reserved

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP1950S-POD
ISBN (Print-On-Demand):	978-1-7281-0921-3
ISBN (Online):	978-0-6399647-3-7

Additional Copies of This Publication Are Available From:

Curran Associates, Inc		
57 Morehouse Lane		
Red Hook, NY 12571 USA		
Phone:	(845) 758-0400	
Fax:	(845) 758-2633	
E-mail:	curran@proceedings.com	
Web:	www.proceedings.com	



Table of Contents

Surname, Title Initial				
Paper Title	Co-Author			
ENERGY ACCESS				
Cesar, A Aboalez, Dr K; Moh	Cape Peninsula University Of Technology, Bellville			
Overcurrent Directional Protection with PV System Integration2				
Kasangana,Mr K Masekameni,D	University of Witwatersrand, Johanneburg			
Determinants Towards a Clean Energy Technology Alternative Adoption in Low Income Settlements: South African Scenario8				
Kusakana, Prof K	Central University of Technology, Bloemfontien			
Koko,SP ;Mbele, LN Experimental analysis of small conduit pressure hydropower				
systems16				
Luta,Mr D	Cape Peninsula University of Technology, Bellville			
Raji, Dr A Energy manageme l	nt system for a remote renewable fuel cell system20			
	Helione (Conf. Index and Some Telescone de Some			

Mulumba,Mr K University of Johannesburg, Johannesburg Langerman,K; Marnewick,A Determining the optimal energy use mix in a low-income household.....25

Nkan,I Akwa Ibom State University, Nigeria Okoro,O; Awah,C; Akuru,U Investigating the Dynamic Stability of the Nigerian 48- bus Systems for Improved System Performance Using FACTS.....34

Pougoue Tchintchui,Mr BP Cape Peninsula University of Technology, Raji,Dr A Techno-economic analysis of a renewable energy solution for an off-grid residence.....43

Selokela,B

City Power, Johannesburg

Langerman,K

Challenges in electrifying informal settlements: Case study of the 'mixed energy' solution in Thembelihle.....51

Thobejane,Mr JUniversity of the Witwatersrand, Parktown
Masekameni,D; Rathebe,R; Mgwambani,SEffectiveness of solar water heating geysers in South Africa: A
review.....59

ENERGY AFFORDABILITY

Mbonane,Mr T University of Johannesburg, Johannesburg

Rathebe,R

Review of Cardiovascular Disease and Solid Fuel Use: Public Health Implications in Southern Africa.....69

MINI-GRIDS, NANO-GRIDS AND SMART GRIDS

Akindeji, Mr K Durban University of Technology, Durban

Tiako,R;Davidson,I Use of Renewable Energy Sources in University Campus Microgrid – A Review.....76

Arogunjo,EO University Of Ibadan

Olatubosun,A;Markus,E Optimal Design of an Energy-efficient Natural Gas Transmission Mainline.....84

Shirinda,K Central University of Technology

Kusakana,K; Koko,S Techno-economic analysis of a standalone solar PV with groundwater pumped-hydro-storage system.....90

Shokoya,Mr NO Cape Peninsula University of Technology Bellville

Raji,A

Electricity Theft: A Reason to Deploy Smart Grid in South Africa.....96

Sinvula,Mrs R Cape Peninsula University of Technology, Bellville Abo-Al-Ez, Dr K ; Kahn, Prof MTE Total Harmonic Distortion (THD) with PV System Integration in Smart Grids: Case Study.....102

ENERGY EFFICIENCY, AIR CONDITIONING

Overen, Dr OK University of Fort Hare, Alice Meyer,EL Daylighting; a residential energy-efficiency demand-side management initiative.....110

HEAT PUMPS

DeKock, Prof J North-West University

Carter,T Optimization of a residential heat pump system.....120

Sikhonza, Mr M University of Fort Hare

Tangwe,S;Simon,M An efficient design of a data acquisition system to monitor the operating performance of a hybrid solar assisted air source heat pump water heater.....126

RENEWABLE ENERGY AND POWER ELECTRONICS

Abaid, Mr A Cape Peninsula University of Technology

Almaktoof, Dr A; Kahn, Prof MTE Solar Pathway Operating Assessment for Public Park Lighting-II.....134

Alwaer,A Higher Institute of Science and Technology

Gryzagoridis,J Desalination system using evacuated tube heat pipe solar collector with improved insulation of the geyser.....140

Ben Hamad,K Cape Peninsula University of Technology

Almaktoof,Dr A;Kahn,Prof MTE ;Mohamad H Taha,M Modelling and analysis of a grid-connected megawatt fuel cell stack.....147

Dekeda,B

Cape Peninsula University of Technology

Adonis,M

The Case for Integration of Renewables in Rail Freight Yards in South Africa.....156

Surname, Title Init Co-Author Paper Title	ial Firm, City, Country
	Central University of Technology K c feasibility analysis of a grid-connected solar PV system for sidential load163
Peter,Mr J Kanyarusoke,K Design optimisat households16	Cape Peninsula University of Technology ion of pillar-mounted sun tracking solar-water purifiers for large 9
Showers,S Raji,A <i>Frequency Regul</i>	Cape Peninsula University of Technology ation of Grid Connected Solar PV System Using Battery Storage System176
Tsholoba,Mr M Raji,A Impact Assessment o	Cape Peninsula University of Technology f High Penetration of Rooftop PV in Urban Residential Networks183
van Duijsen, P <i>Requirements on</i>	Simulation Research Power Electronics for converting Kitchen Appliances from AC to DC190

ENERGY MANAGEMENT, AMBIENT INTELLIGENCE AND IOT

Michael,Mrs M University of Pretoria Ntsaluba,S

A Comparative Study on Electrical Energy Usage of University Residences in South Africa (2017).....201

Ntsaluba, Mr S University of Johannesburg Mukadi,P Comparative campus energy usage study for a South African University.....206

Ntsaluba,S University of Johannesburg Campus Energy usage modelling for a South African Academic Institution.....213

 Karjalainen,J University of Turku, Finland Futures Research Centre Heinonen,S; Shaw,M
Peer-to-peer and circular economy principles in the fourth industrial revolution (4IR) – new risks and opportunities.....220

GREEN ENERGY

Nteka, Miss N Cape Peninsula University of Technology

Kanyarusoke,K

Concentrated Solar and Photovoltaic Thermal Cooled System for Domestic Use.....232

Surname, Title Initial Co-Author Paper Title	Firm, City, Country		
Mawire,A;Lentswe,K	iversity Of Namibia The Effect Of Supercooling On The Perfomance Of Erythritol As A Phase B		
Shobo,Dr A University Of Namibia Mawire,A;Lentswe,K Thermal Performance Analyses Of Two Different Configurations Of Combined Pebble-Pcm Bed Thermal Storage System244			
Senda,P	Cape Peninsula University of Technology		
Dobson,RT			
Convective Natural Circulation Loop Analysis using Two-Phase Flow Model250			
Ben Hamad,K Mohamad H Taha, Ali Ali	Cape Peninsula University of Technology maktoof, and Mohamed TE Kahn		
Modelling and analysis of a grid-connected Megawatt Fuel Cell stackN/A			

Sikhonza,M University of Fort Hare.

Tangwe,S; Simon,M

An efficient design of a data acquisition system to monitor the operating performance of a hybrid solar assisted air source heat pump water heater.....N/A

ADDITIONAL PAPER

Mazimbo,W Chinhoyi University of Technology, Chinhoyi, Zimbabwe

Ruziwa,W; Mhundwa,R Energy Consumption Modelling and Optimisation of Electric Water Heating Systems.....64