Automated load shedding with remote feeder control system using GSM for ZETDC Network

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Abstract

Zimbabwe is considered as one of the developing countries in Africa. Analytical statistics show that as the country will be developing, the power demand in that country will also increase. Currently, the amount of the power that is being generated in Zimbabwe is lower than that required for consumption. The power utility company in Zimbabwe, ZESA, prefers load shedding when such a scenario that consumption exceeds generation occurs. Load shedding can be an intentionally engineered electrical power outage where electricity supply is stopped for non-overlapping period over a particular zone. Currently, load shedding is done manually where an electrician will be assigned a task to go to the substations and isolate as well as restore power when the intended period of the shedding is reached. This has never been an effective method since it doesn't allow operations to be done effectively in emergency scenarios which is leading to equipment failure. This has also caused a lot of accidents to the operators since the reclosers are prone to many hazards such as explosions and arcs when being operated. This paper is intended to phase out manual load operations and allow load operations to be performed remotely using low cost GSM module or RTC technology that if the period of shedding is foreknown, the system can be hardcoded so that it will isolate power and restore power when the set period is reached automatically.

Keywords
Zimbabwe Electricity Supply Authority (ZESA), Global System for Mobile communication (GSM), Real Time Clock (RTC)

Biography / Biographies

Takawira Cuthbert Njenda received his Bachelor of Science in Electrical Engineering from the University of Zimbabwe and his Master of Science in Power Systems Engineering from Isfahan University of Technology, Isfahan, Iran and currently a DPhil student. He has published journal and conference papers. His research interests include power systems protection, smart grids and emerging technologies in power systems. His is also a lecturer in the department of Electrical and Electronic Engineering at University of Zimbabwe.

Joseph Mudare holds a Ph.D. in Electric Circuits and Systems from Jilin University, China. He started as a Trainee Engineer at Siemens Pvt Limited in Zimbabwe before it closed its branch in Zimbabwe and relocated to South Africa. He then joined the Harare Polytechnic College in 2003 as a Lecturer in the department of Electrical Engineering. From then Dr Mudare joined the University of Zimbabwe as an Assistant Lecturer and has rose through the ranks to become a Senior Lecturer in the department of Electrical and Electronic Engineering. He also worked as the first substantive Chairman for the newly established Department of Aeronautical Engineering at the University of Zimbabwe. As a

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lecturer, he teaches a wide range of Electrical & Electronic Engineering and Control Engineering courses including Electronic Circuit Design, Analogue & Digital Electronics, Control Systems, Digital Signal Processing and many others. Currently, he is also the department's examination officer and a member of the Faculty Quality Assurance Committee. His fields of interest for research include automation, IOT, and smart systems among others.

Munyaradzi Munochiveyi received the B.S. degree in electrical engineering from University of Cape Town, Cape Town, South Africa, in 2007; the M.S. degree in Electronic Engineering from Tianjin University of Technology and Education, Tianjin, China, in 2012; and the Ph.D. degree in Communication and Information Systems from Jilin University, Changchun, China, in 2017. He is a Senior Lecturer with the Department of Electrical and Electronics Engineering, University of Zimbabwe, Harare, Zimbabwe.

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