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ADDRESSING RELIABILITY CHALLENGES OF 100% RENEWABLE ENERGY SUPPLY IN KENYA'S NATIONAL GRID

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Energy demand in Kenya is projected to rise by more than three times by 2030. In this regard, the government has formulated the policy called Vision 2030 to meet this demand by investing in power generation through fossil fuel. However, the Kenya national climate change action calls for investment in a low carbon climate resilient pathway to reduce greenhouse gas emissions. To achieve this, the government intends to reduce greenhouse gas emissions by 30% from business as usual levels (143 MTCO$_2$eq) by 2030. Although currently Kenya supplies 67% of its power with renewables, this paper argues that the country has sufficient renewable energy resources to meet 100% of its power demand. The main focus of this paper, therefore, is to show methods of achieving this goal. In assessing the renewable energy reliability, we examined power supply fluctuations as well as daily, seasonal and regional demand variations. We found out that the power connection to the national grid makes it easier to address time and spatial demand variations by interconnecting geographically dispersed resources. Apart from this, to reliably supply 100% power with renewable sources, Kenya may utilize demand-response management and smart grid, use pump storage as well as promote small and medium scale solar PV storage. In addition, micro-grids run by solar PV and a small hydro source is a key in going 100% renewable

Biography

Eliud Kiprop is pursuing his PhD at the Graduate School of Life and Environmental Sciences, the University of Tsukuba, Japan. His research interests include demand side management, smart grid, and the assessment of renewable energy resource potential. He has investigated how countries like Kenya can reliably meet power demand with 100% renewable energy sources. He received a Master of Engineering in 2017 from the Ashikaga Institute of Technology, Japan and Bachelor of Engineering in Chemical and Process in 2011 from MOI University, Kenya. Between 2015 and 2017, he was a Member of the Japan Solar Energy Society (JSES). He has two publications in *Energy Procedia and Science and Education* journals. In addition, he has presented his researches at several international conferences. Prior to joining the PhD program, he was an Intern at the Lami Corporation in Osaka and OPC Corporation in Tokyo.

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