

A sustainable solution to provide 100% electricity to least developed countries: case of Mozambique

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Submission Category:

(A) Technical research proposal to solve concrete problems

SDGs Targets/Indicators:

Primary SDGs: 7 Energy, 13 Climate Action

Secondary SDGs: 2 Zero Hunger

Abstract:

To secure a safe and just space for humanity, today's developing countries must undertake transformative development model. Meeting the target of universal access to electricity in SDG7, e.g. building more power infrastructures, must not jeopardizes the efforts of greenhouse gases (GHGs) emission mitigation in SDG13. A sustainable solution using modern technology therefore is much proposed. Expanding the electricity infrastructure with renewable energy (RE) instead of fossil resources is an effective solution to SDG7 and SDG13. A coupled thermal energy storage (TES) system can overcome the intermittency of RE. In fact, many people still have no access to electricity in least developing countries. This problem must be solved by 2030 in the United Nations' draft resolution [1]. In this study, we investigate a case of Mozambique, a country located in the coastal area in south-eastern Africa. Only 21.2% urban population have accessed to electricity as of 2018 [2]. Using Mozambique, we would like to demonstrate a sustainable solution to increase power plants based on solar photovoltaic (PV) in at a reasonable cost. We will estimate the need of new power plants, and calculate the cost for PV-TES system in comparison to conventional fossil fuel based power plant. It is expected that conventional power plant is economically competitive in urban area with high population density. But PV-TES system will be better in rural area. We will find the borderline that show the advantageous of each power plant system based on cost, and design a roadmap to achieve 100% electricity accessibility. We will evaluate the GHG emission of the roadmap and highlight the environmental benefit of our proposal.