

## Energy Storage in the Future of Ethiopia Renewable Electricity Grid System

**Authors :** Dawit Abay Tesfamariam

**Abstract :** Ethiopia's Climate- Resilient Green Economy strategy focuses mainly on generating and utilization of Renewable Energy (RE). The data collected in 2016 by Ethiopian Electric Power (EEP) indicates that the intermittent RE sources on the grid from solar and wind energy were only 8 % of the total energy produced. On the other hand, the EEP electricity generation plan in 2030 indicates that 36 % of the energy generation share will be covered by solar and wind sources. Thus, a case study was initiated to model and compute the balance and consumption of electricity in three different scenarios: 2016, 2025, and 2030 using the Energy PLAN Model (EPM). Initially, the model was validated using the 2016 annual power-generated data to conduct the EPM analysis for two predictive scenarios. The EPM simulation analysis using EPM for 2016 showed that there was no significant excess power generated. Hence, the model's results are in line with the actual 2016 output. Thus, the EPM was applied to analyze the role of energy storage in RE in Ethiopian grid systems. The results of the EPM simulation analysis showed there will be excess production of 402 /7963 MW average and maximum, respectively, in 2025. The excess power was dominant in all months except in the three rainy months of the year (June, July, and August). Consequently, based on the validated outcomes of EPM indicates, there is a good reason to think about other alternatives for the utilization of excess energy and storage of RE. Thus, from the scenarios and model results obtained, it is realistic to infer that; if the excess power is utilized with a storage mechanism that can stabilize the grid system; as a result, the extra RE generated can be exported to support the economy. Therefore, researchers must continue to upgrade the current and upcoming energy storage system to synchronize with RE potentials that can be generated from RE.

**Keywords :** renewable energy, storage, wind, energyplan

**Conference Title :** ICAESES 2023 : International Conference on Alternative Energy Sources and Energy Storage

**Conference Location :** New York, United States

**Conference Dates :** June 05-06, 2023