



CHANGING THE FACE OF ENERGY IN MALAWI

Solar energy is soon to make up a large portion of the Malawi grid. During severe droughts, Malawi's generating assets only account for approximately 200MW. Once the solar projects in development or construction are completed, JCM's assets will comprise of approximately 25% of all generating assets in the country. This represents a high percentage of intermittent power of the grid infrastructure for countries in Sub-Saharan Africa.

The fundamental challenges with increasing solar penetration are:

1. A reduction in spinning reserve from the hydro units which can respond to contingency events (milliseconds to seconds)
2. Increasing variability in generation output due to cloud cover across the various solar projects (minutes to hours)

Currently, the Project team is planning to integrate a utility-scale Battery Energy Storage System (BESS) to help support this integration. The BESS will reduce the overall energy variability by having more control of the solar output's ramp rate. I.e. When a cloud rolls over the PV plant, the BESS can supplement the energy output to maintain a safe operating change in ramp rate.



CLIMATE CHANGE

After completion of two BESS studies completed by Power Engineers and Aurecon, respectively - there are two battery sizes under consideration:

5MW and 10MW. The main technical benefits that the integration of energy storage will provide include:

1. Trip Mitigation
2. Renewable Ramping
3. Arbitrage

Both solutions have similar technical capabilities, however, with more capacity, more impact can be made. To fund the capex of the 5MW BESS, a grant of \$2.8 million USD from Innovate UK's Department for International Development (DFID) was awarded in December 2019.

The Project team is also in the process of securing an additional grant from the Private Infrastructure Development Group Technical Assistance (PIDG TA), which would fund the expansion of the BESS to the larger 10MW system. This Project will be one of the first of its kind in Sub-Saharan Africa and will help unlock further energy storage projects on the continent.

