

### Project Description:

The Jamaica Public Service Company (JPSCO) is currently striving to reduce the cost of delivery of electricity to its customers by investing in power plant efficiency and fuel diversity, including renewables, as well as through initiatives such as the Net Billing program. The current electricity prices are the lowest in 10 years at \$0.20 per kWh for residential customers and \$0.14 per kWh for industrial customers. These rates are mainly due to system losses which are on the order of 26% of electricity produced with 9% being technical losses and 17% being electricity theft.

The existing Jamaican energy policy calls for 20% of renewables by 2030 with the potential for increase to 30%. There is a proposed 78 MW of renewable generation to be installed in 2016 bringing the total capacity to 148 MW.

### Need:

With the increased penetration of renewables, up to 30%, system reliability issues may become more apparent due to the variability of the resources

- Perform detailed studies to determine mitigation options for added renewable penetration to minimize outages and load shed, i.e. transmission upgrades, synchronous condenser, etc.
- Evaluate how energy storage may help minimize outages as well as create local micro-grids for distribution systems
- Determine net effect of operation and dispatch of renewables vs. conventional generation



### Results:

- Critical contingencies lead to some thermal and voltage stability impacts due to the integration of renewables
- System instabilities can be alleviated by adding new generation or transmission, or re-dispatching existing generation
- Variability of wind for typical wind profiles for the island had little to no effect on the stability of the system for the amount of wind being currently proposed
- The sudden loss of all renewable projects in an area resulted in the system to initiate its load shed scheme
- Load shed due to sudden loss of all renewables can be alleviated by installing fast frequency response or virtual inertial generators, energy storage