Optimal Dispatch of Grid Battery in Distribution System

Fengji Luo, The University of Newcastle; Junhua Zhao, The University of Newcastle; Zhao Yang Dong, The University of Sydney

Project Summary
- Do the dispatch study of the grid battery in a 9-bus distribution system with PV penetration;
- Investigate the impact of the battery on voltage deviation and economic consideration.

Background
- A 9-bus radial system is simulated;
- A 60kW/120kWh battery is simulated;
- Power flow analysis is performed to observe the impact;
- 9 PV sources are simulated on each bus.

Case 1
- Investigate the reduction to the voltage deviation;
- Results (Figs. 1-3) show a small effect on the voltage, namely 0.32V on the LV network.

Case 2
- Investigate the effect of dispatch battery to make profit;
- Results (Fig. 4-5) show that when the peak prices are high, the battery dispatch provides encouraging profit; otherwise, the profit is small.

Conclusions
- The battery dispatch has small effect on voltage deviation;
- Battery can make large profit when there is high peak market prices; however, the cost of the battery’s lifetime depression should be taken into account.