

INSTANTANEOUS LOAD REPOSE

Grid Connected Battery Energy Storage System



CLIENT CHALLENGE

Our client in Northern Ontario operates a biomass plant. Such plants do not operate at a flat output, but they do not ramp up fast enough to keep up with load growth in the morning or ramp down fast enough at night to follow the load drop.

The client has been using diesel generators for this function as generators follow load variations quickly. But the fuel costs and the emissions associated does not make it the ideal choice. Instead, battery energy storage is well suited to provide the instantaneous load response required during such operations.

BACKGROUND

TROES is a Canadian company specializing in advanced distributed energy storage technologies, product and solutions. TROES has completed a case study utilizing Battery Energy Storage System (BESS) to replace diesel generators used for instantaneous load response in a Biomass Microgrid System.

By replacing the generators with BESS, there can be significant fuel cost savings during the peak time and some excess generation can be recycled that would otherwise require a heat pump.

RESULTS



US\$1,782,000

Initial Cost



US\$455,910

Annual Savings



~3.7 Years

Payback Period

ABOUT THE SYSTEM

The highest power output/input is in the 3rd period. The power requirement should be higher than 960kW, while the BESS capacity should be more than the highest one-way charge/discharge flow of 2,050kWh.

Based on design experience, a 2,228kWh capacity BESS formed by 320 battery modules in 16S20P structure is ideal. The battery packs are 51.2V 136Ah and will be put in one 40 feet container. A 1MW Power Conversion System is appropriate for this project.

FINANCIALS & BENEFITS

The BESS size for this project is 500kW/2228kWh to replace the existing 500kW diesel generator.

With Generator:

The initial cost of a generator with this capacity is US\$80,000. While it is more cost-effective up front, regular fuel and maintenance is required. With annual fuel costs of US\$361,192 and maintenance cost of US\$94,718, the client will be spending \$455,910 per year after the initial cost.

With BESS:

The initial cost of BESS is US\$1,782,000. The system reduces exhaust fumes and other polluting emissions while instantly ramping up and down according to client needs. Since the previously recurring fuel and maintenance costs are eliminated, the payback period is just under 4 years.

