

Energy Storage System DDG-51 Single Generator Operations

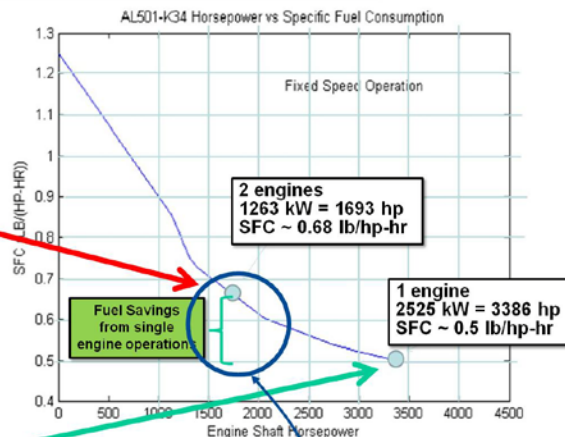
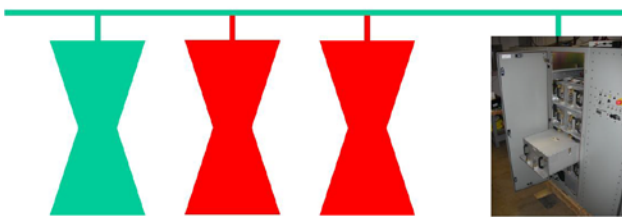
RCT Systems has designed, manufactured and tested a modular Energy Storage Module designed for use on the DDG-51 class of ships for fuel savings. Use of the system is estimated to save \$3-5 million dollars per ship per year, based on the fully burdened cost of fuel. The fuel savings is accomplished by allowing the ship to operate, under normal conditions, with only a single ship service generator operating. The Energy Storage system can serve as a backup to that generator and supply a full 3 MW of power to the ship for up to 10 minutes in the event of an overload or casualty. This is in contrast to the situation where two ship service generators are operating continuously to provide the same redundancy. In the latter case, the generators are more lightly loaded, and operating at significantly lower efficiency than a single generator with the same load.

DDG-51 Single Generator Operations

Normal Cruise – 2 Gensets



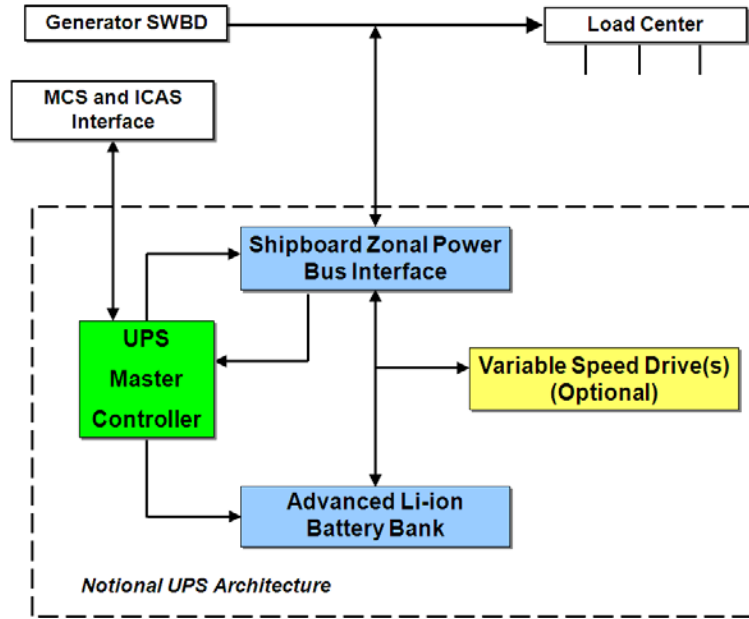
Single Genset with ESM



Significant Fuel Savings (projected)

- 25-30% electric Plant Fuel savings
- ~ 8,000 BBL/ship/year
- ~ \$1 M/Ship/year at Mar 2010 DESC Rates (\$118/BBL)
- ~\$3-5M Fully Burdened Fuel Cost (FBFC)
- ~2-3 year ROI based on FBFC

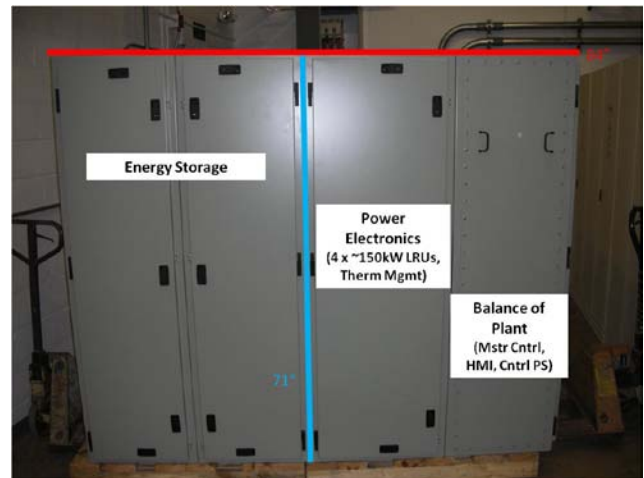
Motivation Behind the Energy Storage Module Implementation



Energy Storage Module Block Diagram



Energy Storage Module Showing Parallel Inverter Modules



Energy Storage Module Cabinet