

## Electrochemical Capacitors are very Competitive for some Electric Utility Applications

The following charts show the total capitalized cost of using electrochemical capacitors for three different utility applications of energy storage. Note that electrochemical capacitors are very competitive with lead acid batteries and cost less than other energy storage options. Also note that electrochemical capacitors have the lowest annual cost that includes maintenance and losses.

These charts are based on the information available in the **EPRI-DOE Handbook of Energy Storage for Transmission and Distribution Applications** issued in December 2003 [[EPRI Product No. 1001834](#)]. The Handbook may be obtained from EPRI for \$250 by calling 1-800-313-3774 and requesting the product number.

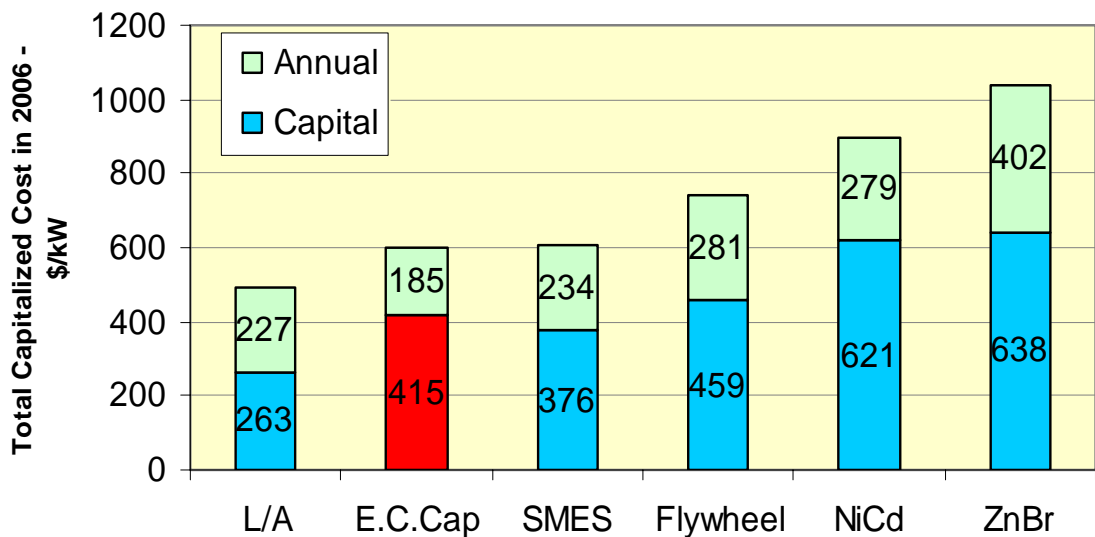
### Notice:

The comparisons are based on the cost information provided by manufacturers, as quoted in the Handbook, assuming 20 years of life and an installation in 2006. This information is approximate and only for initial screening. Interested parties need to check with the technology suppliers for more accurate cost figures. A detailed benefit analysis for each application in this comparison may be found in the Handbook, to which the reader is referred for additional information.

# Grid Angular Stability

**“Application A: Grid Angular Stability (GAS) –** mitigation of power oscillations by injection and absorption of real power at periods of 1 to 2 seconds. The reference duty cycle for analysis is standby for infrequent events characterized by 20 oscillatory cycles, cumulatively equivalent to a full power discharge (FPD) of 1 second duration and subsequent charge cycle; 1 event per day; 10 events per year. Valued at the cost of alternative solutions. ”

## Grid Angular Stability (GAS)

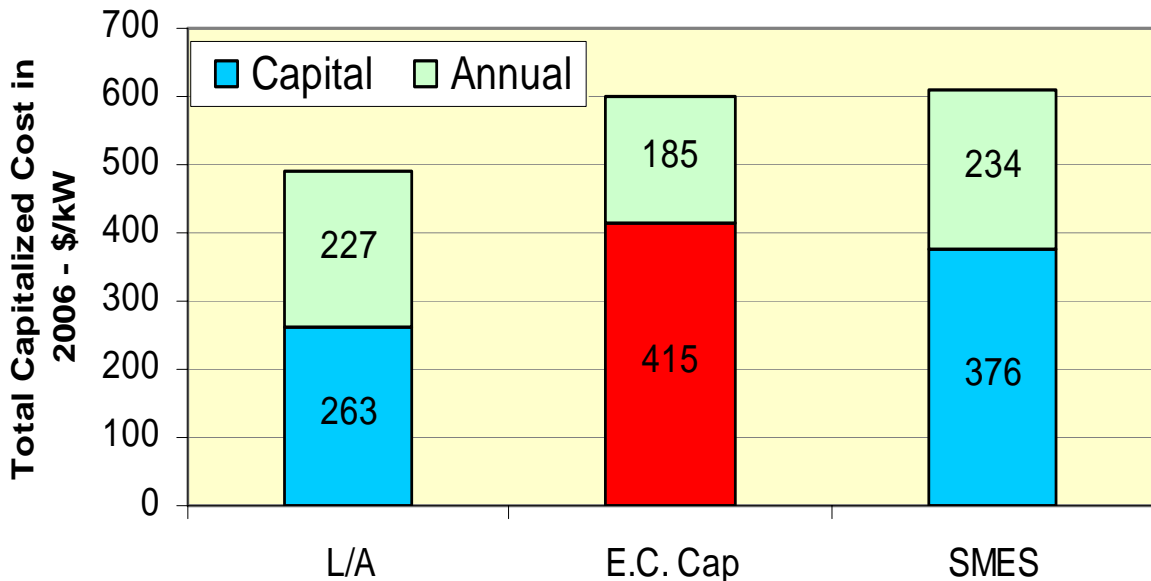


Based on EPRI-DOE Handbook of Energy Storage for T&D Applications-2003

# Grid Voltage Stability

**“Application B: Grid Voltage Stability (GVS) –**  
 mitigation of degraded voltage by additional reactive power  
 plus injection of real power for durations up to 2 seconds.  
 The reference duty cycle for analysis is standby for  
 infrequent events characterized by 1 second FPD, 1 event  
 per day, 10 events year. Valued at the cost of alternative  
 solutions. ”

## Grid Voltage Stability (GVS)



*Based on EPRI-DOE Handbook of Energy Storage for T&D Applications-2003*

# Short Duration Power Quality

“**Application F: Short Duration Power Quality (SPQ)** – capability to mitigate voltage sags (e.g. recloser events). The reference duty cycle for analysis is standby for infrequent events characterized by 2 seconds FPD, 1 event per hour, 5 events per day, 100 events per year. Valued at the cost of alternative solutions.”

